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SAMPLES, WEIGHTS, AND NONRESPONSE: THE ADULT COHORT OF THE NATIONAL EDUCATIONAL PANEL STUDY (WAVE 2 TO 6)

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Abstract

This report documents the target population, the sampling, the sample sizes, and the weighting procedures of the panel Waves 2 to 6 of the NEPS Starting Cohort 6 (Adult Education and Lifelong Learning). It introduces the target population of the Starting Cohort and the sampling design applied. Furthermore, the composition of the gross and the net samples of the different waves are described. Then, the derivation of the sampling weights is elaborated. This includes, the computation of design weights, non-response adjustments, and post-stratification of weights. In this context, selectivity due to nonresponse and attrition is investigated. A summary of the design variables and sampling weights are provided. This article concludes with some comments regarding the usage of sampling weights for analysis.

1. Prequel

This report documents the target population, the sampling, the sample sizes, and the weighting procedures of the panel Waves 2 to 6 of the NEPS Starting Cohort 6 (SC6, Adult Education and Lifelong Learning).[1] Wave 1 (not described here) corresponds to the survey "Working and Learning in a Changing World (ALWA)" conducted in 2009 by the Institute for Employment Research (IAB); for further details see Antoni et al. (2010)[2]. It served as a basis to establish the initial sample of SC6.[3] In total, the SC6 sample comprises three subsamples: respondents from the ALWA sample (ALWA), the enhancement & refreshment sample of Wave 2 (NEPS 1), and the refreshment sample of Wave 4 (NEPS 3). Table 1 summarizes the study numbers, the survey modes, the periods of the studies, as well as the numbers of participants in each wave. Table 2 completes this information by detailing the composition of the distinct samples together with the numbers of nonrespondents and final drop-outs.

Table 1: Summary of waves.

Wave	Study number	Survey mode	Period	Number of Participants
2	B72	CATI/CAPI	2009/10	11,649
3	B67	CAPI/CATI	2010/11	9,320
4	B68	CATI/CAPI	2011/12	14,104
5	B69	CAPI/CATI	2012/13	11,696
6	B70	CATI/CAPI	2013/14	10,639

CATI: Computer-assisted telephone interview, CAPI: Computer-assisted personal interview.

The remainder of this report is structured as follows: Section 2 introduces the target population of the Starting Cohort and the sampling design applied. Furthermore, the composition of the gross and the net samples of the different waves is described. In Section 3, the derivation of the sampling weights is elaborated in detail. This includes the computation of design weights, non-response adjustments, and post-stratification of weights. Section 4 gives a summary of the design variables and sampling weights provided. Section 5 concludes with some comments regarding the usage of sampling weights in statistical analysis.

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[1]The six waves correspond to the studies B72 (Wave 2), B67 (Wave 3), B68 (Wave 4), B69 (Wave 5) and B70 (Wave 6).

[2]See also http://www.iab.de/185/section.aspx/Publikation/k080811n14.

[3]For further information see Section 2.

Table 2: Case numbers, respondents, nonrespondents and final drop-outs.

Wave	Sub-sample	Gross sample	Participants	Participation proportion	Temporary drop-outs	Final drop-outs (within wave)	Final drop-outs (after wave)
2	**Total**	27009*	11649	0.431	1927	13433	1381
	ALWA	8997	6572	0.730	1927	498	1097
	NEPS 1	18012*	5077	0.282	0	12935	284
3**	**Total**	12195	9323	0.764	2578	294	511
	ALWA	7402	5639	0.763	1586	177	511
	NEPS 1	4793	3684	0.769	992	117	0
4	**Total**	28501*	14112	0.495	1806	12583	669
	ALWA	6714	5380	0.801	1023	311	207
	NEPS 1	4676	3524	0.754	783	369	218
	NEPS 3	17111	5208	0.304	0	11903	244
5**	**Total**	15249	11696	0.767	2113	1440	244
	ALWA	6196	4880	0.788	757	559	114
	NEPS 1	4089	3100	0.758	548	441	119
	NEPS 3	4964	3716	0.749	808	440	18
6	**Total**	13558	10639	0.785	2354	565	550
	ALWA	5523	4555	0.825	814	154	163
	NEPS 1	3529	2847	0.807	520	162	124
	NEPS 3	4506	3237	0.718	1020	249	263

* These numbers constitute gross samples, not only the persons who agreed to participate in NEPS (i.e., the panel cohort). ** In these waves, besides interviews competence tests had been conducted.

2. Population, Sampling Design, and Sample Sizes

The target population of the SC6 comprises people living in private households in Germany and being born in the years between 1944 and 1986. Access to this population is gained via three subsamples. The first subsample is a subset of ALWA: All participants of ALWA were asked to participate in NEPS. Those who agreed to participate form the first subsample of the initial SC6 sample. This sample covers birth cohorts from 1956 to 1986. In addition to the ALWA subsample, two further subsamples have been established: a refreshment sample that also covers the birth cohorts from 1956 to 1986 and an enhancement sample covering individuals born between 1944 and 1954. The refreshment sample was drawn from the same target population as the ALWA sample, that is, within the same communities. These communities also served as the basic population to draw the enhancement sample of elderly people from. In other words, all individuals who are born between 1944 and 1986 and who lived at the date of drawing (January 2005) in one of the municipalities which were sampled in the context of ALWA form the SC6 target population.

The sampling of the SC6 refreshment and the enhancement sample was conducted on the basis of a stratified two stage sampling approach. First, all German communities were subject to an *implicit* stratification according to Federal States, administrative districts, and classification of urbanization (BIK categorization). Then, within each stratum municipalities are sampled[4] proportional to the resident population of the target population of ALWA corresponding to the respective stratum. The measure of size was the number of individuals born between 1956 and 1986. The sampling frame used for this purpose was built on the basis of the German resident population data provided by the German Federal Statistical Office and the statistical offices of the German Länder. To sample municipalities, 281 sampling points[5] corresponding to 250 communities have been selected. Sampling points have been allocated according to the size of the resident population of a municipality.[6] Sampled municipalities which dropped out are replaced by municipalities from the same stratum which are structurally similar concerning size of resident population. Thus, in the end only 271 sampling points corresponding to 240 municipalities had been allocated.[7] From the registries of the registration offices of the corresponding municipalities addresses were drawn by means of systematic random sampling. Thus, municipalities form the primary sampling units and addresses the secondary sampling units. In the sampling process, all individuals who were part of the resident population of the sampled municipalities at the date of sampling (i.e., in 2008) and who were born between 1944 and 1986 had been considered.

In the refreshment sample (of Wave 2), 24 addresses had been drawn per sampling point and in the enhancement sample 45 addresses per sampling point. That way, 6,547 addresses with telephone number could be determined for the refreshment sample and 11,465 addresses with

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[4]Actually, these communities had already been sampled in the context of ALWA.

[5]Commonly, for administrative reasons within municipalities only multiples of a fixed quantum can be sampled. Therefore, the overall goal to sample addresses of individuals is achieved via sampling artificial units called sample points.

[6]Note that such processing allows for multiple sampling points per municipality. In the considered case, four, five, six, and twelve sampling points had been assigned to one municipality, respectively, and eight municipalities were assigned two sampling points.

[7]The reason is that the NEPS sample was sampled from exactly the same municipalities as the ALWA sample, and of that sample ten municipalities decided not to participate any longer. Note that ten municipalities could not be replaced.

telephone number for the enhancement sample. In sum, 8,997 individuals who participated in ALWA agreed to take part in NEPS. The first three rows of Table 2 show the resulting gross sample(s) and the number of individuals who gave an evaluable interview in Wave 2 (i.e., the net sample size).[8] The Wave 3 gross sample comprised all individuals who were asked for an interview in Wave 2 minus those individuals who refused to (further) take part in the panel. Table 2 (rows 4-6) gives the related gross and net sample sizes. In and after Wave 3 (before Wave 4), 805 individuals left the panel.

In Wave 4 (i.e., in study B68), the SC6 sample was enriched by a further refreshment sample covering the birth cohorts from 1944 to 1988. For this purpose, the same sampling procedure as for the refreshment sample of the initial SC6 sample was applied. That is, the Wave 4 refreshment sample was drawn within the 250 municipalities of the ALWA sample. At the end, 242 municipalities (with 273 sampling points allocated) provided information about their resident population. Per sampling point, from each register of a municipality, 63 addresses were drawn–resulting in a total of 17,111 addresses. Finally, 5,208 individuals gave their consent for participating in NEPS and gave an interview. Apart from this, all individuals who had already given their consent to attend in the SC6 studies and who did not withdraw it or refuse further participation (up to September 2011) were asked for an interview. All in all, in Wave 4, 14,112 interviews could be realized. The Wave 5 gross sample is composed by all individuals who gave their panel consent for taking part in NEPS, who did not refused before the onset of the Wave 5 survey (i.e., before September 2012), or dropped out due to other reasons (e.g., moving abroad and dying). The same applies to the Wave 6 sample but for the time before September 2013. In the Waves 5 and 6, in total 15,249 and 13,558 persons had been asked for an interview of which 11,696 and 10,639 could be realized. Table 2 gives the gross and net sample sizes of Wave 4 (rows 7-10), Wave 5 (rows 11-14) and Wave 6 (rows 15-18). Note that the sampling of the ALWA study, the sampling of Wave 2, and the sampling of Wave 4 had been conducted by the infas *Institut für angewandte Sozialwissenschaft GmbH*, see Aust, Gilberg, Hess, Kleudgen, and Steinwede (2011); Aust, Hess, Kleudgen, Malina, and Steinwede (2013).

3. Derivation of Sampling Weights

Alike the sampling, the computation of the sampling weights corresponding to the Waves 2 to 5 inclusively the necessary nonresponse adjustments has been conducted by infas, cp. Aust et al. (2012, 2011, 2013); Bech, Hess, Kleudgen, and Steinwede (2014). In addition, infas calibrated the sampling weights of the Waves 2 and 3 to external benchmark values taken from the Microcensus 2009 and 2010. The sampling weights of the Waves 4 and 5 were calibrated to values of the Microcensus 2011 and 2012 by the NEPS method group. Moreover, the sampling weights of Wave 6 were completely calculated by the NEPS method group including nonresponse adjustments and the calibration to the Microcensus 2013.

3.1. Design Weights

For all considered subsamples, design weights were calculated as inverse sampling probabilities allowing to adjust the sampling design for disproportional stratification. That is, when

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[8]The net samples presented in this report always exclude unfinished interviews.

assuming for an individual an inclusion probability π, its corresponding design weight is $1/\pi$. Recall that for all subsamples a stratified two stage sampling approach has been adopted. First, the target population had been stratified according to Federal States, administrative districts, and classification of urbanization (BIK scale), yielding a total of L strata. Then, sampling points had been allocated and municipalities had been selected. Finally, from the selected municipalities addresses had been sampled on the basis of the number of sampling points allocated. For the initial SC6 sample and the Wave 4 refreshment sample, 250 municipalities (281 sampling points) had been sampled from a total of 12,429 German municipalities.[9] For this purpose, within each stratum l, $l = 1, \ldots, L$, s_l municipalities had been sampled proportional to their size. The measure of size (MOS) applied for this purpose is N_{m_l}/N_l, with N_{ml} denoting the number of available addresses within municipality m in stratum l and N_l denoting the total number of addresses available in stratum l. Subsequently, s_{mlk} denotes the number of sampling points allocated to municipality m in stratum l in subsample k, and c_k the number of addresses drawn per sampling point in the subsample k. Thus, the sampling probability of an individual address i in stratum l in municipality m in subsample k is given as

$$\pi_{ilmk} = \frac{s_l N_{m_l}}{N_l} \times \frac{c_k s_{mlk}}{N_{m_l}} = \frac{c_k s_{mlk} s_l}{N_l} \approx \frac{c_k s_l}{N_l},$$

since s_{mlk} is in general equal to one (apart from 12 municipalities, see above). By design, the sampling procedure of SC6 resembles a simple random sampling approach. In detail, the number s_l of municipalities sampled at the first stage is chosen such that $s_l \propto N_l/N$, where $N = 39,235,797$ is the total of the German resident population born between 1944 and 1986 at survey start. Thus, the sampling probability π_{ilmk} is (approximately) equal to $\pi = \left(\sum_{l,k} c_k s_l\right)/N = n/N$ with n denoting the number of all addresses that have overall been sampled.[10]

3.2. Cross-sectional and Longitudinal Weights

For all individuals who have been selected to be part of Wave 2, design weights are computed. To account for nonresponse among these individuals, the design weights had to be adjusted accordingly.

3.2.1. Wave 2

In order to compute nonresponse adjusted sampling weights for individuals i who are part of the ALWA subsample, first the probability $^W\pi_{i1}$ of panel willingness and then the probability $^P\pi_{i1}$ of participation has to be derived. Thereafter, the nonresponse adjusted sampling weights w_{ilm1} can be computed as:

$$w_{ilm1} = w_{ilm}^{ALWA} \cdot \left(^W\pi_{i1} \cdot {}^P\pi_{i1}\right)^{-1}.$$

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[9]For the sake of convenience, we consider the drop out among the 250 sampled municipalities–resulting in either a sample of 240 municipalities (refreshment and enhancement sample of Wave 2) or a sample of 242 municipalities (refreshment same of Wave 4)–as being completely at random.

[10] Due to the applied sampling procedure, the ALWA subsample and the Wave 2 refreshment sample might overlap. This issue has been tackled by computing for all individuals who can be part of more than one subsample design weights for each of the subsample of which they can be part. The individual design weights are computed as a linear combination minimizing the variance of an estimator for the total population number serving as a benchmark.

Here, w_{ilm1}^{ALWA} denotes the original design weight of an individual being part of the ALWA subsample (i.e., $k = 1$). In other word, the weight w_{ilm1} is the cross-sectional weight of an individual of the ALWA subsample to participate in Wave 2. Logit regressions are used to estimate the probabilities $^{W}\pi_{i1}$ and $^{P}\pi_{i1}$. The set of covariates incorporated within the regression and resulting odds ratios are given in the Tables 7 and 8 in the Appendix. Overall, the regressions only point to modest selectivity concerning *educational attainment* and *income*. Individuals with a high level of education show a slightly higher probability to attend in the survey than individuals with a low educational level. Likewise, individuals with higher income are more willing to attend in the survey than individuals with lower income.

To derive sampling weights for all individuals i being part of the Wave 2 refreshment and enhancement subsample, the probabilities $^{P}\pi_{ik}$ of the current participation have to be derived ($k = 2, 3$). The corresponding adjusted weights are

$$w_{ilmk} = \left(\pi_{ilmk} \cdot {}^{P}\pi_{ik} \right)^{-1}.$$

with $k = 2, 3$. The weight w_{ilmk} corresponds to the cross-sectional weight of an individual attending Wave 2. Again, logit regressions are used to estimate the probabilities $^{P}\pi_{i2}$ and $^{P}\pi_{i3}$. The estimation results are given in Table 9 in the Appendix. Small selection effects can be observed related to *country of birth*. Furthermore, people born in the years from 1944 to 1955 have a slightly lower probability to attend in the survey than people born later.

Besides nonresponse adjustments, the weights of Wave 2 are calibrated to make the distribution of sample data concordant with known totals. Adjusting data to external population totals reduces the bias in the sampled data, but at the same time it tends to increase the variance in the data (i.e., the sampling error). This trade-off has to be regarded in the calibration process. To avoid any substantial enhancement of the sampling error, we adjust only few relevant marginal distributions of the SC6 sample. Calibration factors are determined using the so-called linear GREG estimation method, see Särdal (2007); Särdal and Lundström (2005). This method allows specifying adjusted design weights as products of design weights and calibration factors. That is, for a sample unit i with adjusted weight w_{ilmk} and calibration factor g_i the calibrated weight is given as $w_{ilmk}^{cal} = g_i w_{ilmk}$. Before, the adjusted weights have been trimmed at the 5th and 95th percentile in order to limit extreme outliers and thus the variance of the weights. External benchmark distributions are taken from the German Microcensus 2009. Calibration factors are computed using marginal distributions for the following variable combinations:

- gender and educational attainment (according to ISCED97 categories) and
- birth year and educational attainment (according to ISCED97 categories).

The Tables 10 and 11 in the Appendix provide a comparison between sample distribution and reference distribution for the above mentioned benchmark variables. The observed differences can be gauged on the basis of the efficiency measure $E = \tilde{n}/n$ with n denoting the sample size and $\tilde{n}$ the effective number of cases. The latter indicates the number of respondents that would have produced the same sampling error under a simple random sampling design (given the variance of the attributes accounted for in the calibration process). It can be computed as follows.[11]

$$\tilde{n} = \frac{\left(\sum_{i=1}^{n} g_i \right)^2}{\sum_{i=1}^{n} (g_i)^2}$$

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[11]For reasons of clarity, subsequently all indices related to stratum, municipality, and subsample are omitted.

In the considered setting, the efficiency measure is approximately 60 percent. Minding the multilevel weighting concept applied, and the voluntary nature of the survey it can be considered as being good.

3.2.2. Wave 3

The longitudinal and cross-sectional weights for the attendance in Wave 3 are computed starting from the calibrated (cross-sectional) weights of attending Wave 2. For this purpose, two groups of participants need to be differentiated. The first group consists of all individuals who had already participated in the Wave 2, denoted as "repeaters". The second group is made up by those individuals who attended the ALWA study, agreed to participate in NEPS, failed participating in Wave 2, but did not drop-out ultimately. These individuals are called "temporary drop-outs". The longitudinal weights $^{R}w_i^{L}$ of repeaters i are computed by means of their cross-sectional Wave 2 weights w_i and their probability $^{R}p_i$ of participating in Wave 3:

$$^{R}w_i^{L} = w_i \cdot {^{R}p_i}^{-1}.$$

A logistic regression model had been used to estimate the participation probabilities $^{R}p_i$ for all repeaters. All cases that had already participated in Wave 2 formed the basis of the computation (in total, 11,362 cases). The parameters and results of the logistic regression analysis are shown in Table 12 in the Appendix. The regressions indicate selectivity concerning *educational attainment* and *mother tongue*. Individuals whose mother tongue is not German attend less likely in the survey. Furthermore, individuals with a higher level of education are more willing to participate in the survey than individuals with lower educational attainment. The longitudinal weights $^{TA}w_i^{L}$ of the temporary drop-outs i have been computed by means of their sampling weights w_i^{ALWA} attending the ALWA study, their probabilities $^{W}\pi_{i1}$ of panel willingness, their participation probabilities $^{P}\pi_{i1}$ of taking part in Wave 2, as well as their participation probabilities $^{TA}p_i$ of taking part in Wave 3:

$$^{TA}w_i^{L} = w_i^{ALWA} \cdot \left({^{W}\pi_{i1}} \cdot \left(1 - {^{P}\pi_{i1}}\right) \cdot {^{TA}p_i} \right)^{-1}.$$

Again, a logistic regression had been used to estimate the probabilities of temporary drop-outs to participate in Wave 3. In sum, the participation probabilities of 833 temporary drop-out cases had been modeled. The parameters and the results of this regression analysis are given in Table 13 in the Appendix. (The derivation of $^{W}\pi_{i1}$ and $^{P}\pi_{i1}$ is described in Section 3.2.1.) Now the cross-sectional weights for participants in Wave 3 can be computed as

$$^{R}w_i^{C} = {^{R}w_i^{L}} \cdot n_R/(n_R + n_{TA}) \qquad \text{for repeaters and as}$$
$$^{TA}w_i^{C} = {^{TA}w_i^{L}} \cdot n_{TA}/(n_R + n_{TA}) \qquad \text{for temporary drop-outs,}$$

where n_R is the number of repeaters and n_{TA} the number of temporary drop-out cases. Here, the panel attrition due to individuals who refuse to further participate is assumed to occur completely at random.

To make the distribution of sample data concordant with known totals, the cross-sectional weights of Wave 3 are calibrated to benchmark distributions taken from the German Microcensus 2010. Before calibration, the adjusted Wave 3 weights have been trimmed at the 5th and 95th percentile. Calibration has then been conducted applying GREG estimation on the

basis of the marginal distributions for the following variable combinations:

- gender and educational attainment (according to ISCED97 categories),
- birth year and educational attainment (according to ISCED97 categories),
- place of living (Federal State categories),
- BIK categories of municipality size,
- birth year and country of birth.

A comparison of the Microcensus distribution 2010 and the unweighted realized sample does not indicate any major differences; cp. Tables 14 to 19 given in the Appendix. Nevertheless, there are differences between the realized cases and the basic population, particularly pertaining to attributes of *country of birth* and *education*. These differences were equalized through the nonresponse adjustment and calibration procedure.

3.2.3. Wave 4

The Wave 4 sample comprises–besides the individuals who had already agreed to participate in the SC6 studies of Wave 2 and who did not withdraw their panel consent up to September 2011–a refreshment sample of individuals who were born between 1944 and 1988. The sampling procedure applied to establish this refreshment sample is identical to the one applied to establish the Wave 2 sample; see Section 3. Thus, the design weights derivation of the refreshment sample corresponds to the derivation of the Wave 2 design weights, cp. Section 3.1. In sum, design weights have been computed for the 17,111 individuals who were part of the gross sample of the refreshment sample. Note that an individual who is part of the Wave 4 refreshment sample has a nonzero probability to be also part of the Wave 2 sample. To counteract this incoherence, design weights have been computed for both settings (i.e., for being part of the Wave 2 sample and for being part of the Wave 4 sample) and then linearly combined such that the variance of an estimator for the total population number becomes minimal; see also footnote 10. Not all individuals who had initially been sampled participated in the Wave 4 study. This was accounted for by adjusting the design weights accordingly. For this purpose, participation probabilities had been estimated using logistic regression models. Table 20 (in the Appendix) shows the respective parameters and estimation results. On the basis of the estimated participation probabilities, adjustment factors had been computed and multiplied to the design weights. The parameter estimates indicate that male respondents and individuals of older birth cohorts attend less likely in the survey. Moreover, individuals who are not born in Germany are less willing to participate than German-born respondents.

The Wave 4 sampling weights have been derived alike the Wave 3 sampling weights. First, two groups of participants have been differentiated: repeaters and temporary drop-outs. Repeaters constituted those individuals who took part in Wave 3 and did not refuse up to September 2011. Likewise, the group of temporary drop-outs is made up by those individuals who did neither participate in Wave 3 nor refuse further participation. For repeaters, first the probability to not refuse has been estimated and then the probability to actually participate in the study. The results of the accordant logistic regression models for repeaters are given in the Tables 21 and 22 in the Appendix. Apparently, unmarried individuals have a lower probability of participating in the survey. The product of both probabilities gives the propensity of an individual to participate in Wave 3 and 4, and its inverse constitutes the accordant adjustment factor.

That is, multiplied with the cross-sectional Wave 3 weight it yields the cross-sectional weight of Wave 4 repeaters. The parameters and results of the logistic regression analysis of temporary drop-outs are shown in Table 23 in the Appendix. The related inverse participation probabilities form the adjustment factors of temporary drop-out cases to temporarily drop-out in Wave 3 and to participate in Wave 4. By means of these adjustment factors, by the temporary drop-outs' cross-sectional weights of Wave 2, and by their non-participation probability of Wave 3 corresponding longitudinal weights can be derived. Combining the longitudinal weights of repeaters and temporary drop-outs as described for Wave 3 (cp. Section 3.2.2) allows deriving cross-sectional sampling weights for Wave 4.

To improve the representativeness of the sample, the cross-sectional weights have been calibrated to benchmark distributions taken the Microcensus 2011. To this end, the following marginal distributions have been considered:

- gender and educational attainment (according to ISCED97 categories),
- birth year and educational attainment (according to ISCED97 categories),
- place of living (Federal State categories),
- BIK categories of municipality size, as well as
- birth year and country of birth.

The Tables 24 to 29 in the Appendix contrast the corresponding distributions derived from the Microcensus 2011 data with the accordant distributions taken from the realized unweighted sample of Wave 4. The differences between the studied distributions are small. Nevertheless, calibration seems to be reasonable, in particular, with respect to *country of birth* and *educational attainment*.

3.2.4. Wave 5

The procedure to compute longitudinal and cross-sectional weights for Wave 5 is equivalent to the one applied for the Wave 3 and Wave 4 samples. That is, to specify the propensity of individuals to take part in Wave 5, repeaters and temporary drop-outs are distinguished, and related models describing the participation probabilities are estimated. These models allow deriving adjustment factors which are used to calculate longitudinal and cross-sectional weights. (See Sections 3.2.1 and 3.2.2 for a detailed description of the related computation.) The parameters and results of the models estimated are given in the Tables 30, 31 and 32 in the Appendix. For the repeaters the regressions indicate selectivity concerning *educational attainment* and *marital status*. Individuals with higher educational attainment are more likely to participate and unmarried respondents have a higher probability of nonparticipation. The parameter estimates of the temporary drop-outs show that individuals who were born abroad have a lower participation propensity than those who were born in Germany.

Similarly to the Waves 2 to 4, the cross-sectional weights of Wave 5 were calibrated such that the weighted sample data matches with external benchmark distributions. The variables considered in this context are the same as in the Waves 3 and 4 (cp. Section 3.2.1 and Section 3.2.2). For calibration, the data of the Microcensus 2012 has been used. The Tables 33 to 38 in the Appendix show the comparison of the related distributions. Differences concerning the distribution of the *educational attainment* and the *country of birth* are revealed.

3.2.5. Wave 6

For all members of the Wave 6 gross sample, participation probabilities have been estimated in order to derive Wave 6 sampling weights. For this purpose, two logistic regression models have been calculated. The first model estimated the probability of being part of the "used sample" of Wave 6, i.e. being one of the respondents who were still available for the panel study and could be contacted and asked for participation in Wave 6.[12] The persons who could be contacted for an interview are the basis of the second model indicating the Wave 6 participation propensity. Missing values in the model covariates were handled by multiple imputation. The parameter estimates of the computed models are given in Table 39 and 40 in the Appendix. The results of the first model show selectivity with regards to *birth cohort*, *sex*, and *household size*. Individuals of younger birth cohorts and male respondents are more likely in the used sample of Wave 6 than older and female individuals. The number of individuals in a household has negative impact on the probability to attend in the survey. In addition, individuals whose mother tongue is not German as well as lower educated respondents have a lower likelihood of participating in the survey. The inverse of the estimated probabilities constitute the adjustment factors used to derive longitudinal and cross-sectional Wave 6 weights.

In detail, the longitudinal weights w_i^L of continuous participation until Wave 6 are computed by means of the longitudinal weights of the previous wave, the probabilities of being part of the used sample ${}^U\rho_i$ and the likelihood of participating in Wave 6 ${}^P\rho_i$.

Since there exist two different NEPS subsamples drawn at two different time points, we calculate two types of longitudinal weights, one starting from Wave 2 and one beginning with Wave 4, when the (second) refreshment sample has been drawn. For individuals who were part of the ALWA and the initial NEPS sample, both types of longitudinal weights are computed using either the longitudinal weight for participation from Wave 2 to Wave 5 $w_i^{L,2345}$ or the longitudinal weight $w_i^{L,45}$ which expresses constant participation for Waves 4 and 5. For respondents who are part of the Wave 4 refreshment sample the longitudinal weight $w_i^{L,45}$ for participating in the Waves 4 and 5 has been used for further weights calculation. Hence, the longitudinal weights for Wave 6 are computed as follows:

$$w_i^L = w_i^{L,2345} \cdot \left({}^U\rho_i \cdot {}^P\rho_i\right)^{-1}, \text{ and}$$
$$w_i^L = w_i^{L,45} \quad \cdot \left({}^U\rho_i \cdot {}^P\rho_i\right)^{-1}.$$

The cross-sectional weights for participants in Wave 6 are calculated by using the respondents' design weights[13] w_i and by correcting them by the participation probability for Wave 6:

$$w_i^C = w_i \cdot {}^P\rho_i^{-1}.$$

The latter were additionally calibrated to match sample distributions with external benchmark distributions. The variables considered in this context are the same as in the Waves 3 to 5 (cp. Section 3.2.1 and Section 3.2.2). Benchmark distributions had been taken from the Microcensus 2013. A comparison of the (unweighted) Wave 6 sample distributions and the benchmark distributions from the Microcensus can be found in Tables 41 to 46 in the Appendix. Es-

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[12]In the weight adjustments of previous waves, it was assumed that the dropout of the used sample occured completely at random why no further correction was performed.

[13]The design weight of an individual indicates his/her population equivalence.

pecially with regards to *education* and the *country of birth* the distributions studied differ. This deviation can be overcome by the calibrated Wave 6 weights.

Table 3: Types of weights provided.

Type of weight	Label
Weights of individuals participating in Wave 2 (study B72)	w_t2
Weights of individuals participating in Wave 3 (study B67)	w_t3
Weights of individuals participating in Wave 4 (study B68)	w_t4
Weights of individuals participating in Wave 5 (study B69)	w_t5
Weights of individuals participating in Wave 6 (study B70)	w_t6
Weights of individuals participating in Wave 2 and 3	w_t23
Weights of individuals participating in Wave 2, 3, and 4	w_t234
Weights of individuals participating in Wave 2, 3, 4, and 5	w_t2345
Weights of individuals participating in Wave 2, 3, 4, 5, and 6	w_t23456
Weights of individuals participating in Wave 4 and 5	w_t45
Weights of individuals participating in Wave 4, 5, and 6	w_t456

Table 4: Summary statistics for (calibrated and standardized) weights.

Label of weight	Number of individuals	Min.	Lower Quart.	Median	Mean	Upper Quart.	Max.
w_t2	11,649	0.116	0.483	0.769	1.000	1.185	6.869
w_t3	9,320	0.064	0.415	0.720	1.000	1.233	11.813
w_t4	14,104	0.000	0.413	0.841	1.000	1.262	4.024
w_t5	11,696	0.000	0.216	0.460	1.000	1.081	5.283
w_t6	10,639	0.000	0.381	0.716	1.000	1.201	18.719
w_t23	9,037	0.113	0.451	0.737	1.000	1.166	12.880
w_t234	7,901	0.109	0.416	0.688	1.000	1.121	21.739
w_t2345	6,820	0.093	0.365	0.623	1.000	1.050	116.196
w_t23456	6,166	0.100	0.400	0.684	1.000	1.158	4.475
w_t45	11,196	0.045	0.421	0.753	1.000	1.128	21.901
w_t456	9,715	0.047	0.416	0.767	1.000	1.170	4.303

4. Summary of Design Variables and Weights

To ease statistical analysis, all of the survey weights are provided in a standardized form, where standardization was performed to have weights with mean one. Table 3 lists the types of weights provided for the SC6 SUF release version 6-0-1 and Table 4 gives some summary statistics of the (standardized) weights provided. Along with sampling weights, variables highlighting the sampling design are published. They are summarized in Table 5.

5. Comments regarding the Usage of Weights

No general recommendations are at hand concerning the usage of design and nonresponse adjusted weights. Whether and how weights should be used depends on the analysis considered.

Table 5: Design variables provided.

Type of design information	Label
Primary Sampling Unit (Sampling point number)	psu
Identifier of stratum (Implicit stratification)	stratum
Initial sample (ALWA, NEPS)	sample
Initial sample detailed (ALWA, NEPS enhancement, NEPS refreshment)	subsample
Federal state	tx80101
BIK 10 classification	tx80102
BIK 7 classification	tx80103

While the use of weights is recommended in descriptive analysis, there are no general results available on how to use nonresponse adjusted design weights in statistical inference, see Rohwer (2011) for a general discussion. The use of weights may possibly help to highlight important features of the analysis under consideration, not least serving as a robustness check for the analysis performed. Generally, models have to be tested for their dependence on the sampling design. Concretely, this means that the user has to ensure that the way of sampling has no or only a negligible effect on the model results or/and that the sampling design is considered in the model definition adequately. A general description of how to test and account for the sampling design is given in Snijder and Bosker (2012, pp. 216-246), for example. Two possible strategies exist to include weights in the analysis. First, in the model-based approach, all variables employed for constructing the weights are included as explanatory variables into the model under consideration. In the second (design-based) approach design information and weights are directly included into the model. As a guideline, we recommend the first strategy. Here, it is advised to include all of the variables found to have significant effects on the participation propensities in the Waves (studies) yielding the samples used should be included as covariates in the analysis model.

The *survey* package[14] of Stata allows defining the survey design of the sample at hand, and thus conducting design-based inference in an appropriate way (Valliant, Dever, & Kreuter, 2013). An example of an accordant command for the Wave 2 sample is

```
svyset psu [pweight=w_t2_cal], strata(stratum)
```

In this command, psu contains the first stage sampling units and w_t2_cal describes the corresponding (calibrated) survey weight to be part of the Wave 2 sample. The term stratum is self-explanatory. All subsequent analysis has to be preceded by the prefix svy. Also the statistical software R provides a survey package to deal with design-based inference, see Lumley (2004, 2011). Here, the definition of a design object is similar to the one asked for in Stata.

---

[14]See http://www.stata.com/manuals13/svy.pdf.

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A. Results of Nonresponse Modeling and Calibration

Table 7: Results of the logit regression model measuring the panel willingness of participants of the ALWA survey.

Variable	Reference Category	Odds Ratio	P-Value
Birth year	1980 – 1986		
1956 – 1969		1.05	0.73
1970 – 1979		1.02	0.86
Gender	female		
male		0.99	0.93
Country of birth	born in Germany		
born abroad		0.72	0.06
Mother tongue	Non-German		
German		1.22	0.28
Marital status	unmarried		
married		1.03	0.84
separated		1.89	0.00
widowed		2.34	0.16
Household size	three and more persons		
one person		1.30	0.08
two persons		1.08	0.47
School qualification	'Realschule'		
'Hauptschule'		0.92	0.41
upper secondary education		1.03	0.75
other		0.61	0.01
School qualification parents	'Realschule'		
'Hauptschule'		0.91	0.35
upper secondary education		1.23	0.09
other		0.51	0.00
Income	1,501 – 3,500 Euro		
up to 1,500 Euro		0.80	0.08
more than 3,500 Euro		1.88	0.00
Federal state	Nordrhein-Westfalen		
Schleswig-Holstein		1.14	0.61
Hamburg		0.99	0.99
Niedersachsen		0.96	0.76
Bremen		0.95	0.92
Hessen		1.04	0.79
Rheinland-Pfalz		1.21	0.35
Baden-Württemberg		1.02	0.86
Bayern		0.81	0.09
Saarland		0.90	0.75
Berlin		0.94	0.79
Brandenburg		1.32	0.30
Mecklenburg-Vorpommern		0.91	0.77
Sachsen		1.08	0.70
Sachsen-Anhalt		1.38	0.25
Thüringen		1.49	0.18
Pseudo R^2	**0.03**		
Number of cases	**10,404**		

Table 8: Results of logit regression model measuring the participation probability of individuals of the ALWA subsample.

Variable	Reference Category	Odds Ratio	P-Value
Birth year	1980 – 1986		
1956 – 1969		1.38	0.00
1970 – 1979		1.34	0.00
Gender	female		
male		1.08	0.12
Country of birth	born in Germany		
born abroad		0.76	0.03
Mother tongue	Non-German		
German		1.46	0.01
Marital status	unmarried		
married		1.20	0.03
separated		1.09	0.42
widowed		1.09	0.77
Household size	three persons and more		
one person		0.87	0.11
two persons		0.89	0.07
School qualification	'Realschule'		
'Hauptschule'		0.87	0.06
upper secondary education		1.43	0.00
other		0.93	0.62
School qualification parents	'Realschule'		
'Hauptschule'		1.12	0.09
upper secondary education		1.12	0.12
other		0.83	0.11
Income	1,501 – 3,500 Euro		
up to 1,500 Euro		0.82	0.03
more than 3,500 Euro		1.01	0.85
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.87	0.35
Hamburg		1.35	0.15
Niedersachsen		0.92	0.38
Bremen		0.85	0.60
Hessen		0.94	0.59
Rheinland-Pfalz		0.95	0.66
Baden-Württemberg		0.92	0.37
Bayern		1.02	0.78
Saarland		1.08	0.73
Berlin		0.96	0.80
Brandenburg		0.82	0.20
Mecklenburg-Vorpommern		1.16	0.52
Sachsen		0.97	0.79
Sachsen-Anhalt		0.75	0.06
Thüringen		1.26	0.17
BIK categories	500,000 and more inhab. (styp 1)		
less than 2000 inhab.		1.24	0.28
2000 – 5000 inhab.		1.08	0.64
5000 – 20,000 inhab.		1.02	0.88
20,000 – 50,000 inhab.		1.10	0.34
50,000 – 100,000 inhab. (styp 2/3/4)		1.24	0.06
50,000 – 100,000 inhab. (styp 1)		0.97	0.89

		Odds Ratio	P-Value
100,000 – 500,000 inhab. (styp 2/3/4)		0.97	0.76
100,000 – 500,000 inhab. (styp 1)		0.86	0.08
500,000 and more inhab. (styp 2/3/4)		0.97	0.77
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		1.04	0.63
7 to 10 attempts		0.97	0.69
more than 10 attempts		0.35	0.00
Pseudo R^2	**0.07**		
Number of cases	**8,997**		

Table 9: Results of logit regression model measuring the participation probability of the refreshment sample and of the additional sample.

Variable	Reference Category	Odds Ratio	P-Value
Birth year	1980 – 1988		
1944 – 1955		0.83	0.00
1956 – 1969		0.98	0.78
1970 – 1979		0.96	0.66
Gender	female		
male		0.95	0.15
Country of birth	born in Germany		
born abroad		0.52	0.00
Federal state	Nordrhein-Westfalen		
Schleswig-Holstein		0.88	0.24
Hamburg		0.95	0.67
Niedersachsen		1.04	0.58
Bremen		0.90	0.62
Hessen		1.02	0.77
Rheinland-Pfalz		0.89	0.19
Baden-Württemberg		0.93	0.24
Bayern		0.98	0.79
Saarland		1.11	0.48
Berlin		0.97	0.72
Brandenburg		0.93	0.47
Mecklenburg-Vorpommern		0.80	0.12
Sachsen		1.19	0.04
Sachsen-Anhalt		0.94	0.56
Thüringen		0.92	0.50
BIK categories	500,000 and more inhab. (styp 1)		
less than 2000 inhab.		1.38	0.03
2000 – 5000 inhab.		0.81	0.08
5000 – 20,000 inhab.		1.09	0.24
20,000 – 50,000 inhab.		1.13	0.05
50,000 – 100,000 inhab. (styp 2/3/4)		1.15	0.06
50,000 – 100,000 inhab. (styp 1)		1.10	0.44
100,000 – 500,000 inhab. (styp 2/3/4)		0.99	0,89
100,000 – 500,000 inhab. (styp 1)		0.91	0.13
500,000 and more inhab. (styp 2/3/4)		1.20	0.01

Attempts to contact target	1 to 3 attempts		
5 to 6 attempts		1.46	0.00
7 to 10 attempts		1.25	0.00
more than 10 attempts		0.72	0.00
Pseudo R^2	**0.02**		
Number of cases	**18,012**		

Table 10: Sample and reference distribution according to gender and educational attainment.

	actual distribution net sample				target distribution population (Microcensus 2009)	
	refreshment	additional sample	panel sample	total		
Gender and education	%	%	%	%	%	total
male						
ISCED 1	1.32	0.97	0.33	0.67	1.50	712,401
ISCED 2	3.70	3.03	1.42	2.23	4.63	2,194,902
ISCED 3ca	3.40	2.16	3.15	2.93	2.54	1,203,307
ISCED 3b	16.44	21.12	17.16	18.10	23.92	11,343,006
ISCED 4ab	4.46	2.19	4.85	4.08	3.32	1,573,744
ISCED 5b	5.58	8.18	6.33	6.70	5.16	2,446,774
ISCED 5a	10.81	12.01	14.09	12.98	8.29	3,932,478
ISCED 6	1.07	1.16	1.57	1.37	0.84	396,103
female						
ISCED 1	1.47	1.48	0.30	0.82	1.80	853,680
ISCED 2	7.56	9.05	2.51	5.11	6.81	3,231,635
ISCED 3ca	4.57	2.41	2.30	2.71	2.12	1,007,536
ISCED 3b	22.83	23.34	22.47	22.77	23.77	11,270,789
ISCED 4ab	6.24	1.87	8.00	6.07	4.18	1,982,235
ISCED 5b	0.81	1.80	1.16	1.27	3.88	1,841,603
ISCED 5a	8.93	8.73	13.54	11.48	6.84	3,246,127
ISCED 6	0.81	0.52	0.81	0.73	0.40	187,680
Total	100.00	100.00	100.00	100.00	100.00	47,424,000

Table 11: Sample and reference distribution according to birth year and educational attainment.

	actual distribution net sample				target distribution population (Microcensus 2009)	
	refreshment	additional sample	panel sample	total		
Birth year and education	%	%	%	%	%	total
1975 – 1986						
ISCED 1	1.12	-	0.23	0.32	0.76	360,672
ISCED 2	4.67	0.03	1.13	1.43	2.87	1,362,317
ISCED 3ca	4.52	-	3.83	2.93	2.96	1,405,517
ISCED 3b	10.10	0.10	6.76	5.55	9.65	4,578,228
ISCED 4ab	4.11	0.03	4.26	3.11	2.97	1,407,526
ISCED 5b	0.76	-	0.96	0.67	1.49	706,275
ISCED 5a	6.14	-	6.35	4.62	3.70	1,756,143
ISCED 6	0.05	-	0.35	0.21	0.15	69,322

1965 – 1974					
ISCED 1	0.66	-	0.20	0.22	0.89	421,422
ISCED 2	3.45	-	0.96	1.12	2.51	1,188,010
ISCED 3ca	1.67	-	0.68	0.67	0.67	316,067
ISCED 3b	14.71	0.13	13.72	10.27	12.17	5,773,486
ISCED 4ab	3.70	-	3.91	2.83	2.24	1,064,593
ISCED 5b	2.69	-	2.91	2.09	2.48	1,176,972
ISCED 5a	6.90	0.06	8.98	6.25	4.27	2,024,834
ISCED 6	0.66	-	0.93	0.64	0.39	182,616
1956 – 1964					
ISCED 1	0.91	-	0.21	0.27	0.81	382,079
ISCED 2	3.09	0.06	1.84	1.58	2.65	1,257,552
ISCED 3ca	1.73	-	0.93	0.82	0.57	271,768
ISCED 3b	14.1	0.13	19.13	13.21	12.58	5,965,853
ISCED 4ab	2.84	0.06	4.69	3.14	1.53	726,051
ISCED 5b	2.94	0.16	3.61	2.58	2.59	1,229,473
ISCED 5a	6.49	0.1	12.31	8.07	3.54	1,680,748
ISCED 6	1.12	-	1.10	0.81	0.36	168,476
1944 – 1955					
ISCED 1	0.10	2.45	-	0.67	0.85	401,908
ISCED 2	0.05	11.98	-	3.20	3.41	1,618,658
ISCED 3ca	0.05	4.57	-	1.23	0.46	217,491
ISCED 3b	0.36	44.11	0.03	11.84	13.28	6,296,228
ISCED 4ab	0.05	3.96	-	1.06	0.75	357,809
ISCED 5b	-	9.82	0.02	2.63	2.48	1,175,657
ISCED 5a	0.20	20.57	-	5.52	3.62	1,716,880
ISCED 6	0.05	1.67	-	0.45	0.34	163,369
Total	100.00	100.00	100.00	100.00	100.00	47,424,000

Table 12: Results of the logit regression model measuring the participation propensity of repeaters in Wave 3.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.20	0.06
1956 – 1969		1.38	0.00
1944 – 1955		1.04	0.74
Gender	female		
male		1.04	0.41
Country of birth	born in Germany		
born abroad		0.87	0.30
Mother tongue	Non- German		
German		1.39	0.02
Marital status	unmarried		
married		1.12	0.16
separated		1.21	0.07
widowed		1.20	0.30
Household size	three and more		
one person		0.88	0.15
two persons		0.89	0.06

School qualification	'Realschule'		
'Hauptschule'		0.80	0.00
upper secondary education		1.36	0.00
other		1.17	0.13
Secondary school qualification of parents	'Realschule'		
'Hauptschule'		1.19	0.01
upper secondary education		1.10	0.18
other		1.11	0.68
Income	1501 – 3500 Euro		
up to 1500 Euro		0.92	0.28
more than 3500 Euro		1.05	0.40
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		1.25	0.17
Hamburg		1.19	0.37
Niedersachsen		1.01	0.91
Bremen		1.29	0.41
Hessen		1.03	0.74
Rheinland-Pfalz		1.08	0.54
Baden-Württemberg		1.12	0.22
Bayern		1.20	0.03
Saarland		1.12	0.60
Berlin		0.90	0.44
Brandenburg		1.16	0.35
Mecklenburg-Vorpommern		0.81	0.29
Sachsen		1.29	0.05
Sachsen-Anhalt		1.61	0.01
Thüringen		1.26	0.16
BIK categories	500,000 and more inh. (styp 1)		
less than 2000 inhab.		1.38	0.14
2000 – 5000 inhab.		1.10	0.59
5000 – 20,000 inhab.		1.10	0.39
20,000 – 50,000 inhab.		1.06	0.55
50,000 – 100,000 inhab. (styp 2/3/4)		1.15	0.21
50,000 – 100,000 inhab. (styp 1)		1.19	0.40
100,000 – 500,000 inhab. (styp 2/3/4)		1.00	0.99
100,000 – 500,000 inhab. (styp 1)		0.99	0.94
more than 500,000 inhab. (styp 2/3/4)		0.86	0.13
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		0.79	0.00
7 to 10 attempts		0.39	0.00
more than 10 attempts		0.15	0.00
Pseudo R^2	0.10		
Number of cases	11,362		

Table 13: Results of the logit regression model measuring the participation propensity of individuals who participated in Wave 3 but not in Wave 2.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.18	0.47
1944 – 1969		1.13	0.53
Gender	female		
male		1.04	0.79
Country of birth	born in Germany		
born abroad		0.80	0.43
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.57	0.22
Hamburg		0.31	0.15
Niedersachsen		1.40	0.28
Bremen		5.00	0.24
Hessen		0.88	0.71
Rheinland-Pfalz		0.61	0.24
Baden-Württemberg		0.70	0.21
Bayern		0.80	0.38
Saarland		1.33	0.67
Berlin		0.74	0.53
Brandenburg		0.45	0.13
Mecklenburg-Vorpommern		1.27	0.78
Sachsen		0.94	0.89
Sachsen-Anhalt		0.38	0.05
Thüringen		0.77	0.65
BIK categories	500,000 and more inh. (styp 1)		
less than 2000 inhab.		2.16	0.23
2000 to 5000 inhab.		1.37	0.51
5000 to 20,000 inhab.		1.03	0.93
20,000 to 50,000 inhab.		1.75	0.07
50,000 to 100,000 inhab. (styp 2/3/4)		3.04	0.00
50,000 to 100,000 inhab. (styp 1)		1.88	0.36
100,000 to 500,000 inhab. (styp 2/3/4)		1.55	0.12
100,000 to 500,000 inhab. (styp 1)		1.22	0.46
more than 500,000 inhab. (styp 2/3/4)		1.38	0.33
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		0.86	0.45
7 to 10 attempts		0.54	0.01
more than 10 attempts		0.15	0.00
Pseudo R^2	0.11		
Number of cases	833		

Table 14: Comparison of the distribution of the Wave 3 sample data and the target distribution (Mikrocensus 2010) according to gender and educational attainment.

	actual distribution net sample	target distribution population (Mikrocensus 2010)	
Gender and education	%	%	total
male			
ISCED 1	0.48	1.58	744,484
ISCED 2	1.92	4.44	2,095,599
ISCED 3ca	2.74	1.94	918,490
ISCED 3b	17.58	24.06	1,364,786
ISCED 4ab	4.22	3.39	1,601,706
ISCED 5b	6.95	5.48	2,590,162
ISCED 5a	13.91	8.36	3,948,233
ISCED 6	1.45	0.88	415,862
female			
ISCED 1	0.63	1.89	892,575
ISCED 2	4.66	6.57	3,102,092
ISCED 3ca	2.40	1.61	762,387
ISCED 3b	22.42	24.10	11,382,921
ISCED 4ab	6.28	4.24	2,002,132
ISCED 5b	1.26	4.03	1,901,064
ISCED 5a	12.26	6.97	3,291,538
ISCED 6	0.84	0.45	211,969
Total	100.00	100.00	47,266,000

Table 15: Comparison of the distribution of the Wave 3 sample data and the target distribution (Microcensus 2010) according to birth year and educational attainment.

	actual distribution net sample	target distribution population (Microcensus 2010)	
Birth year and education	%	%	total
1975 – 1986			
ISCED 1	0.28	0.80	375,452
ISCED 2	1.15	2.65	1,250,839
ISCED 3ca	2.37	2.38	1,123,346
ISCED 3b	5.25	9.78	4,618,870
ISCED 4ab	3.00	3.05	1,441,577
ISCED 5b	0.76	1.71	807,122
ISCED 5a	5.17	4.07	1,921,433
ISCED 6	0.25	0.20	93,361
1965 – 1974			
ISCED 1	0.10	0.94	441,947
ISCED 2	1.08	2.46	1,161,747
ISCED 3ca	0.65	0.52	246,645
ISCED 3b	10.42	12.31	5,815,781
ISCED 4ab	2.86	2.25	1,064,096
ISCED 5b	2.22	2.60	1,227,183
ISCED 5a	6.77	4.22	1,994,299
ISCED 6	0.69	0.41	195,302

1956 – 1964			
ISCED 1	0.25	0.85	399,636
ISCED 2	1.53	2.53	1,194,871
ISCED 3ca	0.84	0.40	1,190,735
ISCED 3b	13.85	12.74	6,014,722
ISCED 4ab	3.54	1.56	735,693
ISCED 5b	2.65	2.71	1,277,624
ISCED 5a	8.86	3.53	1,669,186
ISCED 6	0.90	0.36	168,533
1944 – 1955			
ISCED 1	0.49	0.89	420,024
ISCED 2	2.81	3.37	1,590,234
ISCED 3ca	1.28	0.25	120,151
ISCED 3b	10.49	13.34	6,298,334
ISCED 4ab	1.08	0.77	362,472
ISCED 5b	2.57	2.50	1,179,297
ISCED 5a	5.37	3.50	1,654,853
ISCED 6	0.45	0.36	170,635
Total	100.00	100.00	47,226,000

Table 16: Comparison of the distribution of the Wave 3 sample data and the target distribution (Microcensus 2010) according to Federal State.

	actual distribution net sample	target distribution population (Microcensus 2010)	
Federal State	%	%	total
Schleswig-Holstein	2.99	3.37	1,593,000
Hamburg	2.04	2.30	1,085,000
Niedersachsen	10.28	9.50	4,487,000
Bremen	0.62	0.82	388,000
Nordrhein-Westfalen	22.38	21.62	10,211,000
Hessen	7.82	7.46	3,522,000
Rheinland-Pfalz	4.86	4.84	2,284,000
Baden-Württemberg	12.29	12.95	6,118,000
Bayern	15.48	15.40	727,000
Saarland	1.51	1.25	588,000
Berlin	3.51	4.46	2,108,000
Brandenburg	3.25	3.20	1,509,000
Mecklenburg-Vorpommern	1.51	2.07	979,000
Sachsen	5.54	5.07	2,394,000
Sachsen-Anhalt	3.05	2.88	1,358,000
Thüringen	2.86	2.82	1,330,000
Total	100.00	100.00	47,226,000

Table 17: Comparison of the distribution of the Wave 3 sample data and the target distribution (Microcensus 2010) according to BIK categories of municipal size.

	actual distribution net sample	target distribution population (Microcensus 2010)	
BIK categories	%	%	total
less than 2000 inhab.	2.17	1.92	909,000
2000 to 5000 inhab.	2.68	2.76	1,304,000
5000 to 20,000 inhab.	8.05	7.81	3,686,000
20,000 to 50,000 inhab.	12.39	11.43	5,399,000
50,000 to 100,000 inhab. styp 2/3/4	9.10	7.82	3,692,000
50,000 to 100,000 inhab. styp 1	2.02	2.23	1,055,000
100,000 to 500,000 inhab. styp 2/3/4	15.72	14.84	7,007,000
100,000 to 500,000 inhab. styp 1	15.48	16.16	7,630,000
500,000 and more inhab. styp 2/3/4	8.41	9.08	4,288,000
500,000 and more inh. styp 1	23.99	25.95	12,256,000
Total	100.00	100.00	47,226,000

Table 18: Comparison of the distribution of the Wave 3 sample data and the target distribution (Microcensus 2010) according to birth year.

	actual distribution net sample	target distribution population (Microcensus 2010)	
Year of birth	%	%	total
1944	1.72	1.95	919,000
1945	1.43	1.42	671,000
1946	1.64	1.69	797,000
1947	1.83	1.89	892,000
1948	1.75	2.03	957,000
1949	2.31	2.17	1,023,000
1950	2.10	2.25	1,062,000
1951	2.29	2.26	1,065,000
1952	2.44	2.28	1,075,000
1953	2.11	2.30	1,087,000
1954	2.64	2.38	1,125,000
1955	2.31	2.38	1,123,000
1956	3.30	2.48	1,170,000
1957	3.11	2.56	1,210,000
1958	3.27	2.57	1,215,000
1959	4.14	2.69	1,272,000
1960	3.80	2.80	1,323,000
1961	3.48	2.82	1,332,000
1962	3.80	2.80	1,323,000
1963	3.68	2.94	1,389,000
1964	3.84	3.00	1,417,000
1965	3.89	3.02	1,428,000
1966	3.45	3.11	1,470,000
1967	2.97	2.94	1,388,000
1968	2.84	2.83	1,336,000
1969	2.48	2.71	1,278,000
1970	2.40	2.59	1,221,000

1971	1.97	2.41	1,139,000
1972	1.91	2.18	1,031,000
1973	1.49	1.98	933,000
1974	1.37	1.95	923,000
1975	1.32	1.97	931,000
1976	1.23	1.99	940,000
1977	1.46	2.01	950,000
1978	1.35	2.04	962,000
1979	1.47	2.03	957,000
1980	1.38	2.18	1,031,000
1981	1.37	2.12	1,003,000
1982	1.46	2.15	1,013,000
1983	1.71	2.10	991,000
1984	1.46	2.02	953,000
1985	1.65	1.98	935,000
1986	2.36	2.05	966,000
Total	100.00	100.00	47,226,000

Table 19: Comparison of the distribution of the Wave 3 sample data and the target distribution (Microcensus 2010) according to country of birth.

	actual distribution net sample	target distribution population (Microcensus 2010)	
Country of birth	%	%	total
born abroad	8.30	17.48	8,257,000
born in Germany	91.70	82.52	38,969,000
Total	100.00	100.00	47,226,000

Table 20: Results of the logit regression model measuring the participation propensity of individuals of the refreshment sample of Wave 4.

Variable	Reference	Odds Ratio	P-Value
Birth Year	1980 – 1988		
1970 – 1979		1.02	0.75
1956 – 1969		1.12	0.04
1944 – 1955		1.14	0.02
Gender	female		
male		0.89	0.00
Country of birth	born in Germany		
born abroad		0.49	0.00
not specified		0.76	0.00
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.99	0.95
Hamburg		0.81	0.11
Niedersachsen		1.07	0.29

Bremen		0.89	0.59
Hessen		0.92	0.24
Rheinland-Pfalz		0.89	0.19
Baden- Württemberg		0.89	0.06
Bayern		1.01	0.83
Saarland		0.79	0.12
Berlin		0.81	0.03
Brandenburg		0.86	0.14
Mecklenburg-Vorpommern		0.81	0.10
Sachsen		0.93	0.44
Sachsen-Anhalt		0.90	0.33
Thüringen		1.13	0.26
BIK categories	500,000 and more inh. (styp 1)		
less than 2000 inhab.		1.47	0.01
2000 – 5000 inhab.		0.95	0.66
5000 – 20,000 inhab.		1.26	0.00
20,000 – 50,000 inhab.		1.16	0.03
50,000 – 100,000 inhab. (styp 2/3/4)		1.20	0.01
50,000 – 100,000 inhab. (styp 1)		0.98	0.89
100,000 – 500,000 inhab. (styp 2/3/4)		1.20	0.00
100,000 – 500,000 inhab. (styp 1)		1.08	0.21
more than 500,000 inhab. (styp 2/3/4)		1.16	0.04
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		1.14	0.00
7 to 10 attempts		1.15	0.01
more than 10 attempts		0.86	0.00
Pseudo R^2	0.01		
Number of cases	17,111		

Table 21: Results of the logit regression model measuring the participation willingness of repeaters in Wave 4.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.13	0.31
1956 – 1969		1.18	0.16
1944 – 1955		2.84	0.00
Gender	female		
male		0.97	0.72
Country of birth	born in Germany		
born abroad		0.97	0.86
Mother tongue	Non-German		
German		1.01	0.98
Marital status	unmarried		
married		3.38	0.00
separated		1.72	0.00
widowed		1.82	0.05
Household size	three and more		
one person		1.03	0.82
two persons		1.00	0.98

		Odds Ratio	P-Value
School qualification	'Realschule'		
'Hauptschule'		0.98	0.87
upper secondary education		1.38	0.00
other		1.56	0.16
School qualification of parents	'Realschule'		
'Hauptschule'		0.85	0.09
upper secondary education		0.97	0.76
other		0.17	0.00
Income	1.501 – 3500 Euro		
up to 1500 Euro		2.08	0.00
more than 3500 Euro		1.23	0.04
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.78	0.26
Hamburg		1.08	0.79
Niedersachsen		1.03	0.87
Bremen		0.91	0.84
Hessen		0.79	0.12
Rheinland-Pfalz		0.92	0.64
Baden-Württemberg		0.85	0.22
Bayern		0.88	0.31
Saarland		1.14	0.71
Berlin		0.86	0.48
Brandenburg		0.98	0.94
Mecklenburg-Vorpommern		0.98	0.94
Sachsen		0.93	0.70
Sachsen-Anhalt		0.72	0.14
Thüringen		1.33	0.30
Pseudo R^2	0.07		
Number of cases	12,195		

Note: At the end of the Wave 3 survey, the SC6 sample comprised 12,195 *cases who were willing to further participate in NEPS. In the beginning of the Wave 4 survey, this number reduced to* 11,390.

Table 22: Results of the logit regression model measuring the participation propensity of repeaters in Wave 4.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.12	0.35
1956 – 1969		1.47	0.00
1944 – 1955		1.08	0.55
Gender	female		
male		1.02	0.80
Country of birth	born in Germany		
born abroad		1.16	0.38
Mother tongue	Non-German		
German		1.53	0.02
Marital status	unmarried		
married		1.22	0.09
separated		1.10	0.50
widowed		1.52	0.14

Household size	three and more		
one person		1.13	0.34
two persons		1.01	0.90
School qualification	'Realschule'		
'Hauptschule'		0.75	0.00
upper secondary education		1.25	0.01
other		1.27	0.09
School qualification of parents	'Realschule'		
'Hauptschule'		0.95	0.53
upper secondary education		0.99	0.89
other		0.59	0.07
Income	1.501 – 3500 Euro		
up to 1500 Euro		0.86	0.14
more than 3500 Euro		1.24	0.01
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.93	0.69
Hamburg		0.82	0.40
Niedersachsen		0.89	0.36
Bremen		1.31	0.55
Hessen		1.18	0.27
Rheinland-Pfalz		0.97	0.88
Baden-Württemberg		0.81	0.06
Bayern		0.85	0.15
Saarland		0.93	0.78
Berlin		1.28	0.24
Brandenburg		0.87	0.50
Mecklenburg-Vorpommern		1.50	0.20
Sachsen		0.93	0.65
Sachsen-Anhalt		1.09	0.68
Thüringen		1.42	0.14
BIK categories	500,000 and more inh. (styp 1)		
less than 2000 inhab.		0.66	0.07
2000 to 5000 inhab.		1.29	0.25
5000 to 20,000 inhab.		1.25	0.14
20,000 to 50,000 inhab.		0.84	0.14
50,000 to 100,000 inhab. (styp 2/3/4)		1.10	0.51
50,000 to 100,000 inhab. (styp 1)		0.93	0.76
100,000 to 500,000 inhab. (styp 2/3/4)		1.06	0.60
100,000 to 500,000 inhab. (styp 1)		1.00	0.99
more than 500,000 inhab. (styp 2/3/4)		1.11	0.45
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		1.11	0.36
7 to 10 attempts		0.74	0.01
more than 10 attempts		0.18	0.00
Pseudo R^2	0.12		
Number of cases	9,321		

Table 23: Results of the logit regression model measuring the participation propensity of individuals who participated in Wave 4 but not in Wave 3.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.25	0.15
1956 – 1969		1.13	0.38
1944 – 1955		0.96	0.78
Gender	female		
male		1.07	0.43
Country of birth	born in Germany		
born abroad		0.67	0.01
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		1.05	0.87
Hamburg		1.07	0.86
Niedersachsen		1.56	0.01
Bremen		0.79	0.72
Hessen		1.29	0.17
Rheinland-Pfalz		1.21	0.40
Baden-Württemberg		0.93	0.66
Bayern		0.93	0.64
Saarland		0.64	0.30
Berlin		1.75	0.02
Brandenburg		0.74	0.32
Mecklenburg-Vorpommern		1.30	0.49
Sachsen		0.85	0.51
Sachsen-Anhalt		1.33	0.43
Thüringen		1.19	0.56
BIK categories	500,000 and more inh. Styp 1		
less than 2000 inhab.		1.37	0.48
2000 to 5000 inhab.		1.26	0.45
50000 to 20.000 inhab.		0.93	0.75
20,000 to 50,000 inhab.		1.08	0.66
50,000 to 100,000 inhab. (styp 2/3/4)		0.70	0.10
50,000 to 100,000 inhab. (styp 1)		0.66	0.30
100,000 to 500,000 inhab. (styp 2/3/4)		0.96	0.82
100,000 to 500,000 inhab. (styp 1)		1.08	0.62
more than 500,000 inhab. (styp 2/3/4)		0.91	0.64
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		1.11	0.44
7 to 10 attempts		1.42	0.02
more than 10 attempts		0.66	0.00
Pseudo R^2	0.03		
Number of cases	2069		

Table 24: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to gender and educational attainment.

	actual distribution net sample	target distribution population (Microcensus 2011)	
Gender and education	%	%	total
male			
ISCED 1	0.48	1.49	703,000
ISCED 2	2.00	4.28	2,012,000
ISCED 3a	1.84	1.65	776,000
ISCED 3b	16.98	23.81	11,203,000
ISCED 3c	0.40	0.45	201,000
ISCED 4ab	2.96	3.40	1,602,000
ISCED 5a	12.54	8.16	3,841,000
ISCED 5b	11.18	6.05	2,845,000
ISCED 6	1.06	0.85	398,000
female			
ISCED 1	0.60	1.79	843,000
ISCED 2	3.47	6.43	3,024,000
ISCED 3a	1.57	1.36	639,000
ISCED 3b	18.38	23.65	11,131,000
ISCED 3c	0.19	0.31	144,000
ISCED 4ab	3.62	4.16	1,956,000
ISCED 5a	10.06	6.69	3,150,000
ISCED 5b	12.10	5.07	2,384,000
ISCED 6	0.57	0.42	199,000
Total	100.00	100.00	47,060,000

Table 25: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to birth year and educational attainment.

	actual distribution net sample	target distribution population (Microcensus 2011)	
Birth year and education	%	%	total
1975 – 1986			
ISCED 1	0.23	0.74	348,000
ISCED 2	1.02	2.57	1,207,000
ISCED 3ca	1.10	1.88	883,000
ISCED 3b	4.02	9.72	4,570,000
ISCED 4ab	0.03	0.03	13,000
ISCED 5b	1.55	3.00	1,412,000
ISCED 5a	3.67	4.25	1,999,000
ISCED 6	2.78	2.33	1,097,000
ISCED 6	0.23	0.21	97,000
1965 – 1974			
ISCED 1	0.33	0.90	425,000
ISCED 2	1.98	2.41	1,132,000
ISCED 3a	1.08	0.52	244,000
ISCED 3b	15.74	12.16	5,717,000
ISCED 3c	0.22	0.17	82,000
ISCED 4ab	2.94	2.25	1,060,000

ISCED 5a	9.83	4.96	1,860,000
ISCED 5b	10.47	3.00	1,411,000
ISCED 6	0.71	0.38	178,000
1956 – 1964			
ISCED 1	0.18	0.82	385,000
ISCED 2	1.08	2.46	1,155,000
ISCED 3a	0.54	0.37	174,000
ISCED 3b	8.47	12.53	5,895,000
ISCED 3c	0.11	0.24	114,000
ISCED 4ab	1.43	1.55	728,000
ISCED 5a	5.13	3.38	1,588,000
ISCED 5b	5.50	3.06	1,437,000
ISCED 6	0.32	0.34	160,000
1944 – 1955			
ISCED 1	0.26	0.83	389,000
ISCED 2	1.24	3.28	1,543,000
ISCED 3a	0.45	0.23	109,000
ISCED 3b	7.60	13.09	6,154,000
ISCED 3c	0.22	0.25	116,000
ISCED 4ab	0.55	0.77	3,601,000
ISCED 5a	3.99	3.28	1,544,000
ISCED 5b	4.70	2.74	1,287,000
ISCED 6	0.32	0.32	156,000
Total	100.00	100.00	47,029,000

Table 26: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to Federal State.

	actual distribution net sample	target distribution population (Microcensus 2011)	
Federal State	%	%	total
Schleswig-Holstein	2.94	3.39	1,598,000
Hamburg	1.92	2.29	1,079,000
Niedersachsen	10.61	9.50	4,475,000
Bremen	0.63	0.83	392,000
Nordrhein-Westfalen	22.40	21.66	10,207,000
Hessen	7.64	7.50	3,533,000
Rheinland-Pfalz	4.87	4.82	2,272,000
Baden-Württemberg	12.24	12.93	6,094,000
Bayern	15.61	15.40	7,258,000
Saarland	1.42	1.24	582,000
Berlin	3.76	4.47	2,106,000
Brandenburg	3.23	3.16	1,491,000
Mecklenburg-Vorpommern	1.74	2.07	977,000
Sachsen	5.01	5.05	2,378,000
Sachsen-Anhalt	2.94	2.88	1,355,000
Thüringen	3.01	2.82	1,328,000
Total	100.00	100.00	47,125,000

Table 27: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to BIK categories of municipal size.

	actual distribution net sample	target distribution population (Microcensus 2011)	
BIK categories	%	%	total
less than 2000 inhab.	1.99	1.81	852,000
2000 to 5000 inhab.	2.55	2.75	1,298,000
5000 to 20,000 inhab.	8.03	8.10	3,819,000
20,000 to 50,000 inhab.	11.85	11.54	5,438,000
50,000 to 100,000 inhab. styp 2/3/4	9.05	7.84	3,695,000
50,000 to 100,000 inhab. styp 1	1.98	2.32	1,094,000
100,000 to 500,000 inhab. styp 2/3/4	16.40	14.41	6,795,000
100,000 to 500,000 inhab. styp 1	15.71	15.61	7,358,000
500,000 and more inhab. styp 2/3/4	8.85	9.37	4,418,000
500,000 and more inh. styp 1	23.58	26.25	12,374,000
Total	100.00	100.00	47,141,000

Table 28: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to birth year.

	actual distribution net sample	target distribution population (Microcensus 2011)	
Year of birth	%	%	total
1944	1.82	1.89	892,000
1945	1.38	1.43	674,000
1946	1.68	1.66	781,000
1947	1.85	1.86	878,000
1948	1.91	2.03	955,000
1949	2.39	2.18	1,025,000
1950	2.37	2.20	1,038,000
1951	2.42	2.23	1,053,000
1952	2.57	2.28	1,073,000
1953	2.20	2.31	1,088,000
1954	2.69	2.32	1,095,000
1955	2.35	2.38	1,122,000
1956	3.08	2.49	1,175,000
1957	2.96	2.54	1,195,000
1958	3.14	2.57	1,210,000
1959	3.79	2.68	1,261,000
1960	3.37	2.78	1,312,000
1961	3.47	2.85	1,344,000
1962	3.27	2.84	1,339,000
1963	3.52	2.95	1,392,000
1964	3.52	3.01	1,416,000
1965	3.58	2.97	1,399,000
1966	3.46	3.05	1,435,000
1967	2.95	2.96	1,397,000
1968	2.80	2.83	1,333,000
1969	2.39	2.68	1,264,000
1970	2.57	2.58	1,215,000
1971	1.97	2.47	1,165,000

1972	1.98	2.19	1,032,000
1973	1.70	2.01	946,000
1974	1.47	1.98	933,000
1975	1.56	1.93	910,000
1976	1.40	2.01	948,000
1977	1.54	1.99	939,000
1978	1.62	2.04	963,000
1979	1.55	2.04	960,000
1980	1.59	2.19	1,032,000
1981	1.47	2.14	1,007,000
1982	1.59	2.15	1,014,000
1983	1.70	2.11	994,000
1984	1.60	2.04	962,000
1985	1.75	2.04	961,000
1986	2.01	2.10	991,000
Total	100.00	100.00	47,118,000

Table 29: Comparison of the distribution of the Wave 4 sample data and the target distribution (Microcensus 2011) according to country of birth.

	actual distribution net sample	target distribution population (Microcensus 2011)	
Country of birth	%	%	total
born abroad	9.63	17.69	8,335,000
born in Germany	90.37	82.31	38,783,000
Total	100.00	100.00	47,118,000

Table 30: Results of the logit regression model measuring the participation willingness of repeaters in Wave 5.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 − 1986		
1970 − 1979		1.08	0.52
1956 − 1969		0.99	0.92
1944 − 1955		0.60	0.00
Gender	female		
male		1.11	0.13
Country of birth	born in Germany		
born abroad		0.76	0.06
Mother tongue	Non-German		
German		1.21	0.22
Marital status	unmarried		
married		2.15	0.00
separated		1.99	0.00
widowed		2.63	0.00

		Odds Ratio	P-Value
Household size	two persons		
one person		1.34	0.01
three persons		0.87	0.11
four persons		0.87	0.17
five or more persons		0.94	0.66
School qualification	ISCED 3b		
ISCED 1/2		0.91	0.38
ISCED 3ca/4ab		1.29	0.01
ISCED 5b		0.87	0.25
ISCED 5a/6		1.25	0.01
School qualification parents	'Realschule'		
'Hauptschule'		1.22	0.01
upper secondary education		1.46	0.00
other		2.38	0.02
Income	1,501 – 3,500 Euro		
up to 1,500 Euro		1.01	0.89
more than 3,500 Euro		1.29	0.00
Federal state	Nordrhein-Westfalen		
Schleswig-Holstein		1.15	0.48
Hamburg		0.90	0.63
Niedersachsen		1.37	0.01
Bremen		1.12	0.78
Hessen		1.32	0.05
Rheinland-Pfalz		1.26	0.15
Baden-Württemberg		1.03	0.81
Bayern		1.00	0.97
Saarland		0.92	0.74
Berlin		1.55	0.03
Brandenburg		0.93	0.68
Mecklenburg-Vorpommern		1.50	0.14
Sachsen		1.22	0.20
Sachsen-Anhalt		2.08	0.00
Thüringen		1.45	0.08
Pseudo R^2	**0.0271**		
Number of cases	**16,356**		

Note: At the end of the Wave 4 survey, the sample comprised 16,356 cases who were willing to further participate in NEPS. In the beginning of the Wave 5 survey, this number reduced to 15,249.

Table 31: Results of the logit regression model measuring the participation propensity of repeaters in Wave 5.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.14	0.13
1956 – 1969		1.35	0.00
1944 – 1955		1.24	0.02
Gender	female		
male		0.98	0.72
Country of birth	born in Germany		
born abroad		0.99	0.94
Mother tongue	Non-German		
German		1.82	0.00

Marital status	unmarried		
married		1.40	0.00
separated		1.24	0.03
widowed		1.39	0.06
Household size	two persons		
one person		1.15	0.09
three persons		1.03	0.68
four persons		1.08	0.28
five persons and more		0.99	0.94
School qualification	ISCED3B		
ISCED1/2		0.84	0.04
ISCED3CA/4AB		1.35	0.00
ISCED5B		1.19	0.06
ISCED5A/b		1.45	0.00
School qualification of parents	'Realschule'		
'Hauptschule'		1.03	0.64
upper secondary education		0.96	0.53
other		0.67	0.03
Income	1.501 – 3500 Euro		
up to 1500 Euro		1.00	0.97
more than 3500 Euro		0.95	0.35
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		0.96	0.79
Hamburg		1.12	0.52
Niedersachsen		1.27	0.01
Bremen		1.49	0.22
Hessen		1.35	0.00
Rheinland-Pfalz		0.99	0.96
Baden-Württemberg		1.20	0.03
Bayern		1.30	0.00
Saarland		0.93	0.73
Berlin		1.17	0.24
Brandenburg		1.09	0.53
Mecklenburg-Vorpommern		0.69	0.03
Sachsen		1.40	0.01
Sachsen-Anhalt		1.30	0.09
Thüringen		1.62	0.00
BIK categories	500,000 and more inh. (styp 1)		
less than 2000 inhab.		1.61	0.02
2000 to 5000 inhab.		0.77	0.09
5000 to 20,000 inhab.		0.91	0.35
20,000 to 50,000 inhab.		0.93	0.44
50,000 to 100,000 inhab. (styp 2/3/4)		0.89	0.23
50,000 to 100,000 inhab. (styp 1)		1.19	0.35
100,000 to 500,000 inhab. (styp 2/3/4)		1.05	0.57
100,000 to 500,000 inhab. (styp 1)		1.14	0.12
more than 500,000 inhab. (styp 2/3/4)		0.97	0.78
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		0.96	0.48
7 to 10 attempts		0.61	0.00
more than 10 attempts		0.18	0.00
Pseudo R^2	0.10		
Number of cases	13,860		

Table 32: Results of the logit regression model measuring the participation propensity of individuals who participated in Wave 5 but not in Wave 4.

Variable	Reference	Odds Ratio	P-Value
Birth year	1980 – 1986		
1970 – 1979		1.08	0.69
1956 – 1969		1.06	0.72
1944 – 1955		0.58	0.01
Gender	female		
male		1.27	0.04
Country of birth	born in Germany		
born abroad		0.55	0.01
Household size	two persons		
one person		1.25	0.20
three persons		1.53	0.01
four persons		0.76	0.14
five persons and more		0.85	0.54
Federal State	Nordrhein-Westfalen		
Schleswig-Holstein		1.10	0.81
Hamburg		1.26	0.05
Niedersachsen		1.96	0.00
Bremen		2.91	0.19
Hessen		2.20	0.00
Rheinland-Pfalz		1.04	0.89
Baden-Württemberg		1.36	0.15
Bayern		1.35	0.15
Saarland		1.06	0.91
Berlin		1.65	0.15
Brandenburg		1.43	0.37
Mecklenburg-Vorpommern		1.42	0.51
Sachsen		3.12	0.00
Sachsen-Anhalt		0.68	0.35
Thüringen		1.26	0.59
BIK categories	500,000 and more inh. Styp 1		
less than 2000 inhab.		2.94	0.02
2000 to 5000 inhab.		1.31	0.55
50000 to 20.000 inhab.		0.75	0.28
20,000 to 50,000 inhab.		1.09	0.68
50,000 to 100,000 inhab. (styp 2/3/4)		1.09	0.74
50,000 to 100,000 inhab. (styp 1)		1.33	0.54
100,000 to 500,000 inhab. (styp 2/3/4)		1.06	0.80
100,000 to 500,000 inhab. (styp 1)		1.17	0.44
more than 500,000 inhab. (styp 2/3/4)		0.89	0.65
Attempts to contact target	1 to 3 attempts		
4 to 6 attempts		1.25	0.12
7 to 10 attempts		1.18	0.41
more than 10 attempts		0.35	0.00
Pseudo R^2	0.09		
Number of cases	1389		

Table 33: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to gender and educational attainment.

Gender and education	actual distribution net sample	target distribution population (Microcensus 2012)	
	%	%	total
male			
ISCED 1	0.32	1.48	696,000
ISCED 2	0.31	4.26	2,006,000
ISCED 3a	0.38	1.44	680,000
ISCED 3b	9.44	23.80	11,208,000
ISCED 3c	0.25	0.36	170,000
ISCED 4ab	0.97	3.35	1,579,000
ISCED 5a	21.63	8.49	4,000,000
ISCED 5b	14.92	6.02	2,837,000
ISCED 6	1.07	0.87	408,000
female			
ISCED 1	0.84	1.78	893,000
ISCED 2	0.67	6.47	3,047,000
ISCED 3a	1.63	1.18	558,000
ISCED 3b	8.01	23.56	11,093,000
ISCED 3c	0.07	0.27	127,000
ISCED 4ab	0.45	4.09	1,924,000
ISCED 5a	21.46	7.07	3,329,000
ISCED 5b	16.79	5.05	2,378,000
ISCED 6	0.61	0.45	214,000
Total	100.00	100.00	47,093,000

Table 34: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to birth year and educational attainment.

Birth year and education	actual distribution net sample	target distribution population (Microcensus 2012)	
	%	%	total
1975 – 1986			
ISCED 1	0.26	0.73	338,000
ISCED 2	0.09	2.34	1,076,000
ISCED 3a	0.06	1.19	548,000
ISCED 3b	0.76	9.13	4,208,000
ISCED 3c	0.01	0.01	600,346
ISCED 4ab	0.03	2.72	1,255,000
ISCED 5a	6.00	4.62	2,126,000
ISCED 5b	6.47	2.31	1,062,000
ISCED 6	0.26	0.26	121,000
1965 – 1974			
ISCED 1	0.28	0.89	408,000
ISCED 2	0.46	2.47	1,137,000
ISCED 3a	0.96	0.54	247,000
ISCED 3b	6.71	12.35	5,690,000
ISCED 3c	0.05	0.15	68,000
ISCED 4ab	0.54	2.26	1,040,000
ISCED 5a	20.29	4.14	1,909,000

ISCED 5b	13.67	2.99	1,379,000
ISCED 6	0.71	0.40	183,000
1956 – 1964			
ISCED 1	0.13	0.80	369,000
ISCED 2	0.24	2.55	1,174,000
ISCED 3a	0.48	0.38	177,000
ISCED 3b	3.81	12.89	5,940,000
ISCED 3c	0.01	0.20	90,000
ISCED 4ab	0.30	1.57	721,000
ISCED 5b	10.91	3.50	1,610,000
ISCED 5a	6.96	3.11	1,433,000
ISCED 6	0.31	0.35	159,000
1944 – 1955			
ISCED 1	0.54	0.86	397,000
ISCED 2	0.28	3.36	1,548,000
ISCED 3a	0.53	0.25	6,102,000
ISCED 3b	6.11	13.25	104,000
ISCED 3c	0.18	0.23	1,190,735
ISCED 4ab	0.53	0.75	346,000
ISCED 5b	6.72	3.40	1,564,000
ISCED 5a	4.15	2.74	1,261,000
ISCED 6	0.32	0.33	152,000
Total	100.00	100.00	46,065,000

Table 35: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to Federal State.

	actual distribution net sample	target distribution population (Microcensus 2012)	
Federal State	%	%	total
Schleswig-Holstein	2.80	3.41	1,606,000
Hamburg	1.89	2.29	1,082,000
Niedersachsen	10.92	9.53	4,492,000
Bremen	0.68	0.81	384,000
Nordrhein-Westfalen	21.39	21.64	10,205,000
Hessen	7.85	7.52	3,546,000
Rheinland-Pfalz	4.69	4.83	2,279,000
Baden-Württemberg	12.27	12.89	6,080,000
Bayern	15.77	15.44	7,281,000
Saarland	1.39	1.23	578,000
Berlin	3.83	4.51	2,125,000
Brandenburg	3.27	3.17	1,497,000
Mecklenburg-Vorpommern	1.65	2.04	964,000
Sachsen	5.42	5.02	2,365,000
Sachsen-Anhalt	3.06	2.86	1,350,000
Thüringen	3.10	2.80	1,319,000
Total	100.00	100.00	47,153,000

Table 36: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to BIK categories of municipal size.

BIK categories	actual distribution net sample	target distribution population (Microcensus 2012)	
	%	%	total
less than 2000 inhab.	2.18	1.65	780,000
2000 to 5000 inhab.	2.46	2.59	1,220,000
5000 to 20,000 inhab.	7.92	8.45	3,985,000
20,000 to 50,000 inhab.	11.91	10.47	4,935,000
50,000 to 100,000 inhab. styp 2/3/4	8.96	8.20	3,866,000
50,000 to 100,000 inhab. styp 1	2.00	2.28	1,074,000
100,000 to 500,000 inhab. styp 2/3/4	16.58	14.65	6,908,000
100,000 to 500,000 inhab. styp 1	15.77	15.12	7,127,000
500,000 and more inhab. styp 2/3/4	8.88	9.59	4,523,000
500,000 and more inh. styp 1	23.34	27.00	12,731,000
Total	100.00	100.00	47,149,000

Table 37: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to birth year.

Year of birth	actual distribution net sample	target distribution population (Microcensus 2012)	
	%	%	total
1944	1.75	1.86	875,000
1945	1.45	1.44	678,000
1946	1.68	1.64	772,000
1947	1.91	1.82	859,000
1948	1.90	2.02	951,000
1949	2.34	2.19	1,032,000
1950	2.38	2.20	1,037,000
1951	2.46	2.22	1,047,000
1952	2.61	2.27	1,070,000
1953	2.26	2.27	1,072,000
1954	2.67	2.28	1,077,000
1955	2.40	2.41	1,135,000
1956	3.23	2.50	1,179,000
1957	2.94	2.53	1,194,000
1958	3.29	2.61	1,230,000
1959	3.83	2.67	1,261,000
1960	3.51	2.80	1,320,000
1961	3.40	2.85	1,343,000
1962	3.47	2.85	1,343,000
1963	3.57	2.97	1,399,000
1964	3.60	3.01	1,421,000
1965	3.69	2.94	1,388,000
1966	3.49	2.95	1,391,000
1967	2.89	2.88	1,358,000
1968	2.99	2.89	1,364,000
1969	2.45	2.71	1,277,000
1970	2.49	2.59	1,222,000
1971	1.89	2.44	1,152,000

1972	1.92	2.20	1,038,000
1973	1.73	1.99	940,000
1974	1.41	2.00	944,000
1975	1.44	1.94	917,000
1976	1.42	2.03	955,000
1977	1.68	1.99	939,000
1978	1.51	2.09	984,000
1979	1.52	2.07	975,000
1980	1.39	2.16	1,019,000
1981	1.37	2.14	1,009,000
1982	1.48	2.19	1,032,000
1983	1.55	2.09	987,000
1984	1.44	2.08	983,000
1985	1.57	2.09	985,000
1986	2.06	2.11	996,000
Total	100.00	100.00	4,715,000

Table 38: Comparison of the distribution of the Wave 5 sample data and the target distribution (Microcensus 2012) according to country of birth.

	actual distribution net sample	target distribution population (Microcensus 2012)	
Country of birth	%	%	total
born abroad	8.44	17.96	8,466,000
born in Germany	91.56	82.04	38,684,000
Total	100.00	100.00	47,150,000

Table 39: Results of the logit regression model measuring the probability of being part of the used sample for Wave 6.

Variable	Reference	Odds Ratio	P-Value
Participation in Wave 5	no		
yes		383.69	0.00
Birth year	1944 – 1955		
1956 – 1969		1.47	0.00
1970 – 1979		2.20	0.00
1980 – 1986		2.74	0.00
Gender	male		
female		0.78	0.00
Country of birth	born abroad		
born in Germany		1.17	0.41
Mother tongue	German		
Other		1.56	0.02
Marital status	unmarried		
married		0.90	0.29
divorced		1.17	0.30

widowed		0.76	0.28
Household size	one person		
two persons		0.78	0.03
three persons and more		0.75	0.02
School qualification	ISCED 1/2ab		
ISCED 3ac/4ab		0.94	0.70
ISCED 3b		0.78	0.06
ISCED 5a/6		0.82	0.14
ISCED 5b		0.80	0.12
Federal State	Schleswig-Holstein		
Hamburg		0.59	0.09
Niedersachsen		0.98	0.93
Bremen		0.55	0.27
Nordrhein-Westfalen		1.37	0.13
Hessen		0.76	0.24
Rheinland-Pfalz		0.75	0.23
Baden-Württemberg		1.36	0.44
Bayern		0.82	0.36
Saarland		0.62	0.17
Berlin		0.61	0.07
Brandenburg		0.62	0.09
Mecklenburg-Vorpommern		0.74	0.33
Sachsen		0.82	0.44
Sachsen-Anhalt		1.22	0.49
Thüringen		0.78	0.40
BIK categories	less than 2000 inhab.		
2000 to 5000 inhab.		1.05	0.89
5000 to 20,000 inhab.		1.63	0.11
20,000 to 50,000 inhab.		1.03	0.93
50,000 to 100,000 inhab. (styp 2/3/4)		1.02	0.94
50,000 to 100,000 inhab. (styp 1)		0.87	0.69
100,000 to 500,000 inhab. (styp 2/3/4)		1.37	0.29
100,000 to 500,000 inhab. (styp 1)		1.12	0.71
more than 500,000 inhab. (styp 2/3/4)		1.31	0.38
more than 500,000 inhab. (styp 1)		1.53	0.15
Number of cases	15,260		

Table 40: Results of the logit regression model measuring the participation propensity of individuals in Wave 6.

Variable	Reference	Odds Ratio	P-Value
Participation in Wave 5	no		
yes		11.77	0.00
Birth year	1944 – 1955		
1956 – 1969		1.09	0.19
1970 – 1979		0.93	0.41
1980 – 1986		0.65	0.00
Gender	male		
female		1.08	0.09
Country of birth	born abroad		
born in Germany		1.28	0.06

Mother tongue	German		
Other		0.65	0.00
Marital status	unmarried		
married		1.16	0.04
divorced		0.98	0.85
widowed		1.20	0.29
Household size	one person		
two persons		1.03	0.69
three persons and more		1.03	0.72
School qualification	ISCED 1/2ab		
ISCED 3ac/4ab		1.42	0.00
ISCED 3b		1.20	0.04
ISCED 5a/6		1.90	0.00
ISCED 5b		1.40	0.00
Federal State	Schleswig-Holstein		
Hamburg		0.53	0.00
Niedersachsen		0.87	0.41
Bremen		0.65	0.19
Nordrhein-Westfalen		0.78	0.11
Hessen		0.77	0.13
Rheinland-Pfalz		1.01	0.96
Baden-Württemberg		1.36	0.08
Bayern		0.85	0.31
Saarland		0.80	0.39
Berlin		0.93	0.71
Brandenburg		0.95	0.81
Mecklenburg-Vorpommern		1.30	0.30
Sachsen		1.03	0.85
Sachsen-Anhalt		0.92	0.69
Thüringen		1.11	0.64
BIK categories	less than 2000 inhab.		
2000 to 5000 inhab.		1.03	0.91
5000 to 20,000 inhab.		1.32	0.17
20,000 to 50,000 inhab.		1.15	0.47
50,000 to 100,000 inhab. (styp 2/3/4)		1.14	0.50
50,000 to 100,000 inhab. (styp 1)		1.67	0.05
100,000 to 500,000 inhab. (styp 2/3/4)		1.24	0.25
100,000 to 500,000 inhab. (styp 1)		1.43	0.06
more than 500,000 inhab. (styp 2/3/4)		1.26	0.24
more than 500,000 inhab. (styp 1)		1.42	0.06
Attempts to contact target		1.00	0.00
Number of cases	13,558		

Table 41: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to gender and educational attainment.

	actual distribution net sample	target distribution population (Microcensus 2013)	
Gender and education	%	%	total
male			
ISCED 1	0.32	1.44	662,000
ISCED 2	1.64	4.11	1,891,000
ISCED 3a	1.65	1.27	583,000
ISCED 3b	16.03	23.71	10,909,000
ISCED 3c	0.39	0.35	163,000
ISCED 4ab	2.87	3.31	1,525,000
ISCED 5a	13.66	8.96	4,120,000
ISCED 5b	11.65	5.77	2,656,000
ISCED 6	1.17	0.86	395,000
female			
ISCED 1	0.50	1.69	777,000
ISCED 2	3.79	6.45	2,966,000
ISCED 3a	1.58	1.07	491,000
ISCED 3b	17.36	23.77	10,936,000
ISCED 3c	0.23	0.28	128,000
ISCED 4ab	3.50	4.11	1,889,000
ISCED 5a	10.88	7.55	3,475,000
ISCED 5b	12.14	4.83	2,222,000
ISCED 6	0.64	0.47	218,000
Total	100.00	100.00	46,006,000

Table 42: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to birth year and educational attainment.

	actual distribution net sample	target distribution population (Microcensus 2013)	
Birth year and education	%	%	total
1975 − 1986			
ISCED 1	0.20	0.74	333,000
ISCED 2	1.03	2.28	1,025,000
ISCED 3a	0.94	1.00	449,000
ISCED 3b	4.38	9.29	4,182,000
ISCED 3c	0.08	0.01	5,000
ISCED 4ab	1.74	2.69	1,212,000
ISCED 5a	5.53	4.99	2,245,000
ISCED 5b	3.56	2.22	997,000
ISCED 6	0.43	0.31	141,000
1965 − 1974			
ISCED 1	0.10	0.87	393,000
ISCED 2	1.10	2.47	1,112,000
ISCED 3a	0.75	0.52	236,000
ISCED 3b	8.51	12.37	5,568,000
ISCED 3c	0.12	0.16	70,000
ISCED 4ab	1.90	2.26	1,019,000

ISCED 5a	5.94	4.38	1,972,000
ISCED 5b	6.29	2.90	1,304,000
ISCED 6	0.52	0.40	178,000
1956 – 1964			
ISCED 1	0.20	0.76	344,000
ISCED 2	1.71	2.50	1,127,000
ISCED 3a	0.92	0.38	173,000
ISCED 3b	11.01	12.82	5,770,000
ISCED 3c	0.11	0.19	85,000
ISCED 4ab	1.87	1.57	708,000
ISCED 5a	7.54	3.64	1,638,000
ISCED 5b	7.55	2.95	1,326,000
ISCED 6	0.43	0.34	153,000
1944 – 1955			
ISCED 1	0.32	0.76	344,000
ISCED 2	1.59	3.31	149,000
ISCED 3a	0.62	0.25	112,000
ISCED 3b	9.49	13.30	5,987,000
ISCED 3c	0.31	0.21	94,000
ISCED 4ab	0.86	0.75	337,000
ISCED 5a	5.54	3.48	1,568,000
ISCED 5b	6.39	2.61	1,174,000
ISCED 6	0.42	0.30	137,000
Total	100.00	100.00	45,008,000

Table 43: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to Federal State.

	actual distribution net sample	target distribution population (Microcensus 2013)	
Federal State	%	%	total
Schleswig-Holstein	2.93	3.38	1,559,000
Hamburg	1.76	2.23	1,028,000
Niedersachsen	10.85	9.54	4,396,000
Bremen	0.65	0.81	375,000
Nordrhein-Westfalen	21.67	21.65	9,979,000
Hessen	7.66	7.58	3,492,000
Rheinland-Pfalz	4.81	4.89	2,255,000
Baden-Württemberg	11.95	12.87	5,931,000
Bayern	15.66	15.60	7,191,000
Saarland	1.38	1.25	576,000
Berlin	3.91	4.36	2,007,000
Brandenburg	3.28	3.16	1,454,000
Mecklenburg-Vorpommern	1.76	2.04	942,000
Sachsen	5.48	4.99	2,301,000
Sachsen-Anhalt	3.11	2.84	1,311,000
Thüringen	3.15	2.79	1,287,000
Total	100.00	100.00	46,084,000

Table 44: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to BIK categories of municipal size.

	actual distribution net sample	target distribution population (Microcensus 2013)	
BIK categories	%	%	total
less than 2000 inhab.	2.11	1.67	769,000
2000 to 5000 inhab.	2.35	2.67	1,231,000
5000 to 20,000 inhab.	7.98	8.48	3,908,000
20,000 to 50,000 inhab.	11.63	10.57	4,870,000
50,000 to 100,000 inhab. styp 2/3/4	8.81	8.17	3,765,000
50,000 to 100,000 inhab. styp 1	2.10	2.28	1,052,000
100,000 to 500,000 inhab. styp 2/3/4	16.42	14.63	6,739,000
100,000 to 500,000 inhab. styp 1	15.97	15.00	6,913,000
500,000 and more inhab. styp 2/3/4	8.89	9.72	4,477,000
500,000 and more inh. styp 1	23.74	26.81	12,354,000
Total	100.00	100.00	46,078,000

Table 45: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to birth year.

	actual distribution net sample	target distribution population (Microcensus 2013)	
Year of birth	%	%	total
1944	1.73	1.86	859,000
1945	1.45	1.41	651,000
1946	1.64	1.60	737,000
1947	1.83	1.81	832,000
1948	1.88	1.98	910,000
1949	2.32	2.17	998,000
1950	2.31	2.21	1,017,000
1951	2.49	2.19	1,010,000
1952	2.64	2.26	1,043,000
1953	2.27	2.28	1,052,000
1954	2.70	2.28	1,052,000
1955	2.27	2.38	1,095,000
1956	3.17	2.45	1,127,000
1957	3.05	2.52	1,162,000
1958	3.37	2.57	1,182,000
1959	3.82	2.67	1,229,000
1960	3.66	2.77	1,275,000
1961	3.42	2.82	1,298,000
1962	3.50	2.86	1,318,000
1963	3.58	2.98	1,374,000
1964	3.77	2.99	1,379,000
1965	3.70	2.93	1,348,000
1966	3.52	2.97	1,366,000
1967	2.93	2.85	1,312,000
1968	2.96	2.86	1,318,000
1969	2.53	2.76	1,271,000
1970	2.57	2.61	1,201,000

1971	1.91	2.50	1,151,000
1972	2.04	2.26	1,041,000
1973	1.64	2.05	945,000
1974	1.42	1.99	917,000
1975	1.42	2.00	923,000
1976	1.45	2.05	945,000
1977	1.57	2.03	934,000
1978	1.49	2.11	974,000
1979	1.58	2.08	958,000
1980	1.35	2.19	1,010,000
1981	1.28	2.18	1,002,000
1982	1.44	2.19	1,011,000
1983	1.61	2.15	991,000
1984	1.38	2.05	944,000
1985	1.45	2.04	941,000
1986	1.88	2.09	963,000
Total	100.00	100.00	46,066,000

Table 46: Comparison of the distribution of the Wave 6 sample data and the target distribution (Microcensus 2013) according to country of birth.

	actual distribution net sample	target distribution population (Microcensus 2013)	
Country of birth	%	%	total
born abroad	7.62	17.57	8,092,000
born in Germany	92.38	82.43	37,974,000
Total	100.00	100.00	46,066,000