Chapter 13

Basic survey data analysis using survey instruments

General comments about each of the three survey instruments

The general software is easy to use since the variable indicating each of the three survey instruments is only needed to tell, and then to run the program. If any of these is missing, this ‘box’ has not been needed to fill in, and the program runs correctly.

(i) Survey weights

The purpose is to select the weights that are most advanced as explained in Chapter 11. For developing these weights the auxiliary variables both from micro and macro level have been exploited as well as possible, including the calibration to those margins that are accurate enough and useful for the users. It should be carefully checked whether to use the analysis weights or the ordinary sampling weights. This because, the software packages do not necessarily work correctly in all cases. This does not concern averages or other basic estimates but more complex estimates including standard errors and design effects.

(ii) Explicit stratification

The number of explicit strata should not such that there are too little primary sampling units (PSU) and respondents respectively to get estimates reliable enough. Even tough that the minimum PSU size to estimate the variance is the two, this does not mean that the estimates are plausible. It is better to try get much more clusters and respondents respectively. If post-strata are created to adjust for the weights, this variable should be used in the estimation in the same way as explicit strata.

(iii) Clusters

PSU clusters here thus are such that are used in sampling design. It is good if their number is reasonably big. The PISA guidelines for example require that 150 schools at minimum should be drawn in the sample. That number varies much in ESS countries, being often higher but there are countries with a small number too. This is more typical if the two-domain sampling design has been used so that the clusters are only rural areas.

Example 13.1 The sampling weights vary quite much

Table 13.1 Percentages of elderly people without and with weights

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Age group	All weights = 1	Ordinary sampling weights
61-70	37.5	60.1
71-80	44.0	33.0
81-90	18.5	6.9
All	100.0	100.0

Example 13.2 Feeling about household's income nowadays with two types of weights

This example if from the round 7 of the European Social Survey. It is concerned the subjective income that is measured with four alternative categories as found from the tables. The two country tables are given.

Switzerland in which DEFFp is low but for Hungary it is fairly high.

Table 13.2a. Feeling about household's income nowadays with two types of weights, Switzerland

Category	Without weights		Best weights (post-stratified)	
	Percentage	Standard error	Percentage	Standard error
Living comfortably on current income	57.3	1.3	57.0	1.3
Coping on present income	31.9	1.2	32.0	1.2
Difficult on present income	8.5	0.7	8.6	0.7
Very difficult on present income	2.3	0.4	2,4	0.4

Table 13.2b. Feeling about household's income nowadays with two types of weights, Hungary

Category	Without weights		Best weights (post-stratified)	
	Percentage	Standard error	Percentage	Standard error
Living comfortably on current income	6.4	0.6	5.3	0.6
Coping on present income	51.4	1.2	46.2	1.4
Difficult on present income	33.1	1.2	35.9	1.4
Very difficult on present income	9.1	0.7	12.7	1.1

Table 13.2 The means and the confidence intervals of subjective income with and without the sampling weights as in Tables 13.2a and 13.2b

		Mean	95% Confidence interval	
Switzerland	Without	81.4	80.2	82.7
	With	81.2	79.9	82.5
Hungary	Without	51.7	50.5	52.9
	With	48.0	46.5	49.6

As far as the following examples are concerned you do not need to understand what each weight means exactly. Just to keep in mind that if the weight name is different, the weight is different as well. In real-life, if you do not completely understand a certain weight or another team, you have to ask the expert who hopefully knows. If you are convinced, just use it. If not convinced, ask again and again. Every expert should be able to tell what the weight or another term means. In these examples, the basic weight uses least auxiliary information whereas propensity plus calibration uses mostly. Post-stratification, pure propensity and pure calibration are between these. It is expected that the estimates are less biased if more auxiliary variables are used well. Concentrate now on differences between estimates with various weights.

Table 13.4 Subjective income by its categories with two weights. Calibration margins are
Two genders, Five age groups and Six explicit strata
(Chapter 7)

	Basic weights		Calibration after propensity weights	
Category of subjective income	**Low CI**	**High CI**	**Low CI**	**High CI**
Living comfortably on present income	41,9	46,8	36,8	41,8
Coping with present income	40,1	45,1	42,9	48,2
Difficult on present income	9,5	12,7	10,8	14,6
Very difficult on present income	1,4	2,7	1,7	3,3

Table 13.5 Confidence intervals (CI) of the mean for some ESS variables using three weights; the scale of all variables is from 0 to 100.

	Basic weight		Pure calibration		Calibration after propensity weight	
Variable	**95% CI**		**95% CI**		**95% CI**	
Most people try to take advantage of you, or try to be fair	63,3	65,2	63,0	65,0	60,8	63,0
Trust in the legal system	61,6	63,9	61,6	63,9	60,0	62,4
Trust in politicians	43,5	45,7	43,4	45,7	41,2	43,5
Number of daily cigarettes	20,3	26,0	20,3	26,0	23,1	29,6
How happy are you	75,1	76,8	74,9	76,6	72,9	74,9
Drinking alcohol every week, %	25,8	30,6	26,6	31,4	25,3	30,0

Example on using sampling weights for cross-country survey data without country results

If the cross-country data includes ordinary sampling weights, that is, their sum is equal to the target population size, all types of domain analysis can be made using these weights. This is automatically possible for the PISA data, but not for the ESS. However, when creating the ordinary sampling weights as presented in Chapter 8. Many cross-country analyses can still be done using analysis weights given that the statistical model includes the country as a control variable. Such examples are given later in this chapter. We here present two ESS examples in which the domain units can be in different countries. This requires to use ordinary weights. The dependent variable in both examples, Tables 13.6 and 13.7, the variable created in Chapter 1, called Foreigner Positiveness, but the domains are different, Religion and Education.

Table 13.6 Foreigner positiveness by religion groups in 21 ESS countries of Round 7, sorted by the mean of the weights

Religion or denomination belonging at present	Without Weights			With weights		
	Mean	Low CI	High CI	Mean	Low CI	High CI
Jewish	51,4	50,6	52,1	50,1	48,8	51,4
Roman Catholic	49,6	49,3	50,0	52,2	51,6	52,8
Not Applicable	53,5	53,2	53,9	53,5	52,8	54,1
Protestant	55,5	54,9	56,0	54,9	54,0	55,9
Orthodox	50,4	49,1	51,7	56,2	53,0	59,3
Eastern Religions	63,2	60,3	66,1	58,4	53,0	63,8
Other Christian Denominator	57,4	55,4	59,4	58,6	55,9	61,4
Islamic	50,7	49,3	52,1	60,1	58,2	62,0
No Answer	53,8	46,4	61,1	61,1	49,9	72,2
Other Non-Christian Religions	58,7	55,1	62,3	61,3	53,3	69,4
Refusal	56,5	50,8	62,2	65,2	53,4	77,1

Table 13.7 Foreigner positiveness by education in 21 ESS countries of Round 7, sorted by the mean

Education	Mean	95% CI	
Very little	42,7	41,2	44,3
Low	46,9	45,7	48,1
Missing	47,3	43,8	50,8
Basic	50,0	49,0	50,9
Low University	51,5	50,5	52,5
Middle University	55,4	54,5	56,2
Master University	58,5	57,6	59,5
Doctoral	64,5	63,7	65,2

Table 13.8 The means and standard errors estimated without and with survey instruments of the PISA variable 'Problem solving.' The overall design effect including its both components calculated from the standard errors. The countries are sorted by the relative differences of the means, first ones going below when using the weights, whereas the last ones to the opposite direction.

Country code	Respon-dents	Simple random sampling Without weights		All survey instruments applied		
		Mean	Std Error of Mean	Mean	Std Error of Mean	Design Effect DEFF
Czech Republic	5327	528,3	1,2	509,0	3,2	6,7
Spain	10175	488,5	1,0	476,8	3,9	16,9
Hungary	4810	467,7	1,4	459,0	4,2	8,8
Belgium	8597	513,6	1,1	507,8	3,2	8,7
Slovak Republic	4678	486,8	1,4	483,3	4,2	9,0
United Kingdom	4185	520,0	1,4	516,8	4,0	7,8
Israel	5055	456,4	1,6	454,0	5,2	10,0
France	4613	513,4	1,4	511,0	3,4	6,2
United Arab Emirates	11500	413,0	1,0	411,2	3,5	13,8
Poland	4607	482,7	1,4	480,8	4,6	11,3

Cont. from

Russian Federation	5231	490,8	1,1	489,1	4,2	13,4
Sweden	4736	492,1	1,3	490,7	3,3	6,3
United States of America	4978	509,2	1,2	507,9	4,6	13,6
Turkey	4848	455,6	1,1	454,5	4,2	15,2
Japan	6351	552,2	1,0	552,2	3,7	14,3
Korea	5033	561,1	1,2	561,1	3,8	9,3
Germany	5001	508,4	1,4	508,7	4,8	12,1
Ireland	5016	497,8	1,3	498,3	3,4	7,4
Norway	4686	502,5	1,4	503,3	3,7	6,8
Croatia	5008	465,4	1,2	466,3	3,6	8,6
Italy	5495	508,6	1,2	509,6	3,4	7,8
Montenegro	4744	404,9	1,2	406,7	9,5	64,7
Portugal	5722	491,6	1,1	494,4	4,1	13,0
Singapore	5546	558,4	1,2	562,4	4,7	15,1
Netherlands	4460	506,2	1,4	510,7	5,0	12,2
Canada	21544	517,0	0,6	525,7	2,5	15,2
Australia	14481	513,1	0,8	523,1	2,0	6,4
Finland	8829	510,5	1,0	522,8	2,3	5,3
Denmark	7481	481,3	1,1	497,1	3,5	10,8
Slovenia	5911	458,3	1,3	475,8	3,9	9,8

Multivariate linear regression with survey instruments

Multivariate Binary regression (logit or probit) with survey instruments

These or one at minimum will be learned by doing in training.