ANNEX 4

Construction of indexes for impact assessment analysis

PNUD laboratorios de aceleración

Content

# Annex 4. Construction of indexes for impact assessment analysis

Figure A4.1 illustrates the structure used for the creation of indexes used for impact assessment. To operationalize this structure, a bottom-up approach is used, where first, questions that respond to the same dimension are grouped into sub-indexes. Finally, these sub-indexes are grouped into the three general indexes described above. The procedure used is briefly described below.

Figure A4.1: Structure of the indexes created for the análisis
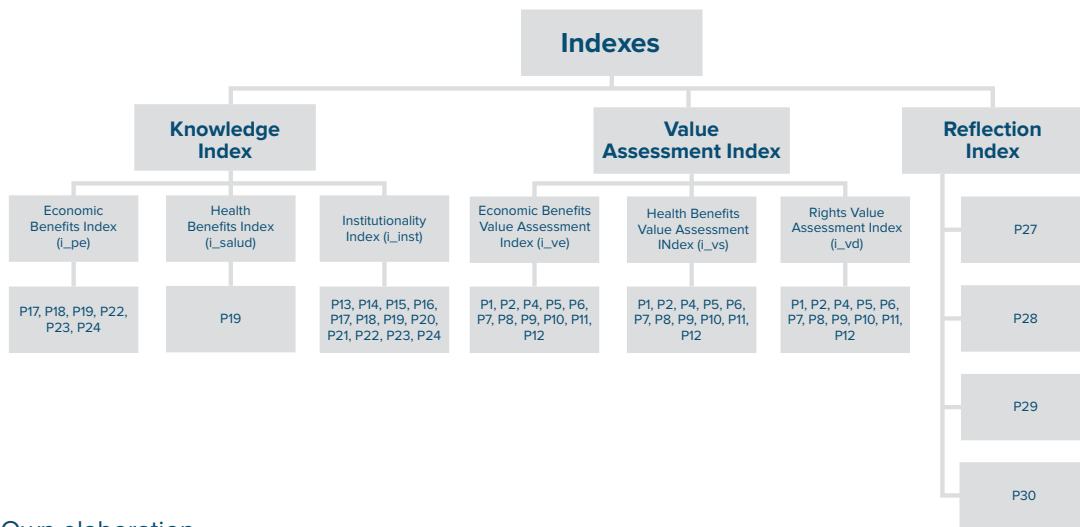
Source: Own elaboration

Knowledge indexes:

The knowledge indices correspond to the second section of the questionnaire.
As **Figure A4.1** indicates, this group is composed of three sub-indices:

a. Economic benefits index (i_{pe})
b. Health benefits index (i_{salud})
c. Institutionality index (i_{inst})

Table A4.1 shows an example of scoring for a question corresponding to this section.

Table A4. 1. Example of scoring assignment for the knowledge index

P13. At what point should a salaried worker be insured by IPS?				
Survey options	Database Value	Economic Benefits	Health Benefits	Institutional
a	1			
b	2			
c	3	0	0	1
d	4			
e	5			

The correct answer to Q13 is option "c", therefore, the values 0 or 1 are assigned according to the dimension covered by the question. In the case of the example, the answer responds to the institutional dimension, but not to the economic and health benefits dimensions.

Figure A4.1 shows the questions associated with each sub-index. Proceeding in the same way as for Q13, scores are generated for each question. Subsequently, the scores obtained for all the questions corresponding to that dimension are added up, as shown in Table A4.4, referring to the operationalization of the calculation for each index.

Perception indexes

The knowledge indexes correspond to the second section of the questionnaire. As **Figure A4.1** indicates, this group is composed of three sub-indices:

   a. Economic valuation index (i_{ve})
   b. Health valuation index (i_{vs})
   c. Rights valuation index (i_{vd})

Table A4.2 shows an example of scoring for a question corresponding to this section.

Table A4.2. Example of scoring assignment for the perception index

| Survey Options | Database Value | P5. Which of these options offers the most security in case of a workplace accident? | | |
		Economic Benefits Value Assessment	Health Benefits Value Assessment	Rights Value Assessment
a	1	1	1	2
b	2	0	0	0
c	3	0	0	0
d	4	0	0	0
e	5	0	0	0

Within this section there is no right or wrong answer, therefore, a different weight (PA) is assigned to each type of answer, where PA can take the value 0 if the answer has no rights approach, 1 if it is a middle term and 2 if it corresponds to a rights approach explicitly. Figure A4.1 shows the questions that are associated with each sub-index. Using this scheme, the scores obtained for all the questions corresponding to that dimension are added up, as shown in **Table A4.4**.

Response rates to moral dilemmas

Finally, we analyze the effects of a ranking exercise of options according to the importance given by the participants to a set of options in the "moral dilemma or stories for reflection" section, included in a section of the questionnaire. An example of scoring for responses to this type of question is shown below.

Example for reflective questions or moral dilemmas section:

27) Marcos got his first job at the age of 21 in a construction company. When he goes to work, the employer tells him that the contract will be for one year and offers him a daily wage as remuneration, and then asks him: "Do you want to work with or without IPS? Marcos thinks: "I'm too young to have social security, I'm healthy, I'm not sick and with my father I've already learned about construction and I don't think I'll have an accident. I really don't want IPS so that I have more money left over. But he also remembers his grandfather, who still works despite his advanced age because his contributions were not enough for him to retire. Marcos does not know what his grandfather thinks, but he knows that he did not demand his social security payment when he was younger. *What do you think about this case? Order all the options according to their importance, **assigning a value from 1 to 6**, where 1 is the most important value and 6 the least important.*

Table A4.3. Example for reflective questions or moral dilemmas section:

Participant Assigned Ranking	Options	Assigned Weight
	It's okay for Marcos to not contribute right now, because he has other, more important needs for the money.	0
	As a society, we should practice solidarity so that elder retirees can have a pension thanks to our contributions.	2
	Young, healthy people don't need social security because the run few risks on the job.	0
	Social security is important at all life stages, because onenever knows what might happen in the future and always needs protection.	2
	Contributing from a young age gives you a greater chance of retiring when you reach 60 to enjoy your old age.	1
	Marcos' grandfather deserves a dignified retirement, like all senior citizens.	1

As shown in **Table A4.3**, the participant assigns a value according to their order of importance from 1 to 6. For the construction of the index, the order of the values is inverted in order to obtain a better representation of the options most valued by the participants. Thus, a value of 6 is assigned to the most important options and 1 to the least important options. The evaluation of each participant's approach to rights is carried out by means of weights assigned to each of the responses, according to whether they are closer or less close to the rights approach sought by the intervention. Thus, a value of "0" indicates that the response has no rights approach, "1" is a medium term, and "2" corresponds to an explicit rights approach.

Operationally, first, the options are recoded in the reverse order valued by the participant. That is, value 6 (the participant's) is assigned value 1, value 5 (the participant's) is assigned value 2, and so on. Finally, these scores are weighted by the weight assigned to each response **(see Table 4)**.

It is important to note that, unlike the first three questions, question 30 contains 7 options to be ranked by the participant. In this case, the evaluation is carried out in the same way, but ranking the options from 1 to 7.

Table A4.4: Operationalization of indexes

Index	Operationalization
Economic benefits index	i_{pe} = (P13×0) + (P14×0) + (P15×0) + (P16×0) + (P17×1) + (P18×1) + (P19×1) + (P20×0) + (P21×0) + (P22×1) + (P23×1) + (P24×1)
Health Benefits Index	i_{salud} = (P13×0) + (P14×0) + (P15×0) + (P16×0) + (P17 ×0) + (P18 ×0) + (P19 ×1) + (P20 ×0) + (P21 ×0) + (P22 ×0) + (P23 ×0) + (P24 ×0)
Institutional index	i_{inst} = (P13×1) + (P14×1) + (P15×1) + (P16×1) + (P17 ×1) + (P18×1) + (P19×1) + (P20×1) + (P21 ×1) + (P22×1) + (P23×1) + (P24×1)
Economic valuation index	i_{ive} = P1 × PA + P2 × PA + P4 × PA + P5 × PA + P6 × PA + P7 × PA + P8 × PA + P9 × PA + P10 × PA + P11 × PA + P12 × PA*
Health assessment index	i_{vs} = P1 × PA + P2 × PA + P4 × PA + P5 × PA + P6 × PA + P7 × PA + P8 × PA + P9 × PA + P10 × PA + P11 × PA + P12 × PA*
Rights valuation index	i_{vd} = P1 × PA + P2 × PA + P4 × PA + P5 × PA + P6 × PA + P7 × PA + P8 × PA + P9 × PA + P10 × PA + P11 × PA + P12 × PA*
Solidarity liability dilemma	$i_{dilema1}$ = (P27_1×0) + (P27_2×2) + (P27_3×0) + (P27_4 ×2) + (P27_5×1) + (P27_6×1)
Dilemma of integrality of the social security system	$i_{dilema2}$ = (P28_1×2) + (P28_2×2) + (P28_3×0) + (P28_4 ×0) + (P28_5×1) + (P28_6×1)
Dilemma of the right to access social security	$i_{dilema3}$ = (P29_1×0) + (P29_2×2) + (P29_3×2) + (P29_4 ×1) + (P29_5×1) + (P29_6×0)
Dilemma of integrality of the social security system	$i_{dilema4}$ = (P30_1×0) + (P30_2×0) + (P30_3×1) + (P30_4 ×1) + (P30_5×2) + (P30_6×2) + (P30_7×0)

*PA is the weight assigned to each individual's response. PA can assume the value of 0 if the response has no rights approach, 1 if it is a middle term and 2 if it explicitly corresponds to a rights approach.

Creation of general indexes and consistency analysis

As described above, several indexes are constructed to quantify the results of each section of the questionnaire. In summary, according to Figure 5, we have the following structure:

1) Three indexes for the "Knowledge" section: economic benefits index, health benefits index, and institutional index.

2) Three indexes for the "Perception" section: economic benefits perception index, health benefits perception index and labor rights perception index.

3) Four indexes for the "Reflective (moral dilemma)" section: solidarity responsibility index (P27), comprehensiveness of social security index (P28), right to access social security index (P29), equality in access to social security index (P30).

Figure 5 also shows the indexes that are grouped together to form the "general or combined indexes", which represent each of the three sections of our questionnaire. For example, the economic benefits index, the health benefits index and the institutional index are combined to create the "Knowledge Index" which measures the total knowledge of each individual, regardless of the economic, health or labor rights dimensions of this knowledge.

To assess whether the "combined indices" measure the same concept or construct, Cronbach's alpha (Cronbach, 1951) is calculated. As a general criterion, George and Mallery (2003, p. 231) suggest the following recommendations for evaluating Cronbach's alpha coefficient values:

- α> 0.9 to 0.95 is excellent.
- α > 0.8 is good
- α > 0.7 is acceptable
- α > 0.6 is questionable
- α > 0.5 is poor
- α <0.5 is unacceptable

Within a standard exploratory analysis, an internal consistency value around 0.7 is adequate and is the minimum acceptable level (Nunnally and Bernstein, 1994). However, in the early stages of research or exploratory studies, an internal consistency value of 0.6 or 0.5 may be sufficient (Nunnaly, 1967).

Preliminary results of the calculation are shown in Table A4. 5. The results are acceptable for both the Knowledge and Perception indices, indicating that the internal consistency of these two indices is acceptable, i.e., the items that form them are measuring the same concept or construct. In contrast, Cronbach's alpha for the reflective index is unacceptable. Therefore, these items (P27, P28, P29 and P30) are used as different measures of the reflective dimension.

Finally, to perform the grouping, we proceed to use the Principal Component Analysis (PCA) technique to determine the weight that each sub-index will have within the sum that will originate the overall index.

Table A4. 5: Cronbach's Alpha results for the Knowledge, Perception and Reflection indices.

Order assigned by the participant	Indices	Alpha	Preliminary Stages of an Exploratory Study
Knowledge Index	-Economic benefits -Health Benefits -Institutionality	0.7378 (acceptable)	Sufficient
Value Assessment Index	-Economic Benefits Value Assessment -Health Benefits Value Assessment -Rights Value Asessment	0.7877 (acceptable)	Sufficient
Reflection Index (responses to moral dilemmas)	P27, P28, P29, P30	0.4528 (not acceptable)	Not Sufficient