Notes on the development of the I-SFB

January 2023

The Brazilian Financial Health Index (I-SFB) is the result of an initiative by Febraban in technical cooperation agreement with the Central Bank of Brazil. The I-SFB was created to measure Brazilian Financial Health in both macro and micro. In the macro, it has the function of being able to provide an aggregate look to assist in the formulation and measurement of public policies and Financial Education initiatives by agents in the sector. In micro, its objective is to allow the individual diagnosis of the Financial Health of Brazilians in an accurate, consistent, and reliable manner, providing a valuable tool to help professionals, researchers, and organizations dedicated to education and financial well-being in the design and evaluation of interventions.

In order to meet these goals, the I-SFB was developed through a rigorous process from the theoretical-conceptual standpoint to the analysis and modeling methodologies, also covering the procedures of sample definition, data collection, and quality control. The same happened with the scoring scale and the classification brackets, defined through modeling based on Item Response Theory (IRT). The Financial Health model, as well as the I-SFB questionnaire and scales, were developed after literature review and benchmark analysis, following gold-standard in methodological practices, and validated according to the parameters of the literature.

From the technical governance perspective, the project had a technical committee composed of members of Febraban and partner institutions, such as ABEL, ABECS, and ANBC; and members of the Studies and Research and Promotion and Financial Citizenship departments of the Central Bank of Brazil. The technical committee oversaw the development work of the I-SFB at all its stages of development.

In addition, an academic committee formed by Professor Ph.D. José Afonso Mazzon (FEA-USP), by Professor Ph.D. Edson Crescitelli (FEA-USP and ESPM), by Professor Ph.D. Mateus Ponchio (FGVEAESP and ESPM), and Professor Ph.D. Júlio Figueiredo (FGV-EAESP and ESPM). Without involvement in the methodological design of the project, the academic committee provided an extra layer of governance by playing the role of *peer reviewing* instance.

As a result, the I-SFB is a validated instrument both in its development process and in its psychometric properties. As a whole, the instrument – the I-SFB questionnaire and scales - is valid and reliable. Valid means it measures the right things; reliable means it measures the right things accurately and consistently. Thus, we can say that the I-SFB is accurate, reliable, and consistent in measuring overall Financial Health and in the dimensions of Security, Skill, Knowledge, and Freedom, as well as in the respondent's Financial Foundation.

This means that the instrument is able to be used independently by interested parties to measure Financial Health and its dimensions in Brazil, as published and according to the instructions of the Methodological Manual (https://pefmbddiag.blob.core.windows.net/cdn/downloads/ISFB_Manual_Metodologico_2022.pdf).

General information on the conceptual and operational definition of the I-SFB, as well as on the stages of development can be found in section 2 of the document “I-SFB/Febraban: The development of the indicator and the main findings of the national research used in its construction.” (https://pefmbddiag.blob.core.windows.net/cdn/downloads/Relatorio_Febraban_v1.pdf).

Next, we will deal with specific issues related to the development process.

1. On the Development of the I-SFB Conceptual Model

The conceptual model of the I-SFB was developed from literature review and benchmark analysis, in addition to being refined through the process of *peer review* provided by the Academic Committee.

After literature review and research, four instruments were used as a reference and tested for adaptation: the CFPB Well-Being Scale, the CFPB Skill Scale, the Wisconsin University Financial Capability Score, and the CSFI Financial Health Score. Despite testing items from all these instruments in the field, the methodological review had already put the focus on the scales of the CFPB (US Consumer Financial Protection Bureau). This occured because CFPB had a well-defined methodological and analytical approach. The CFPB studies used Exploratory and Confirmatory Factor Analysis procedures to assess the items and model the constructs and Item Response Theory (IRT) to construct the scales (Figure 1).

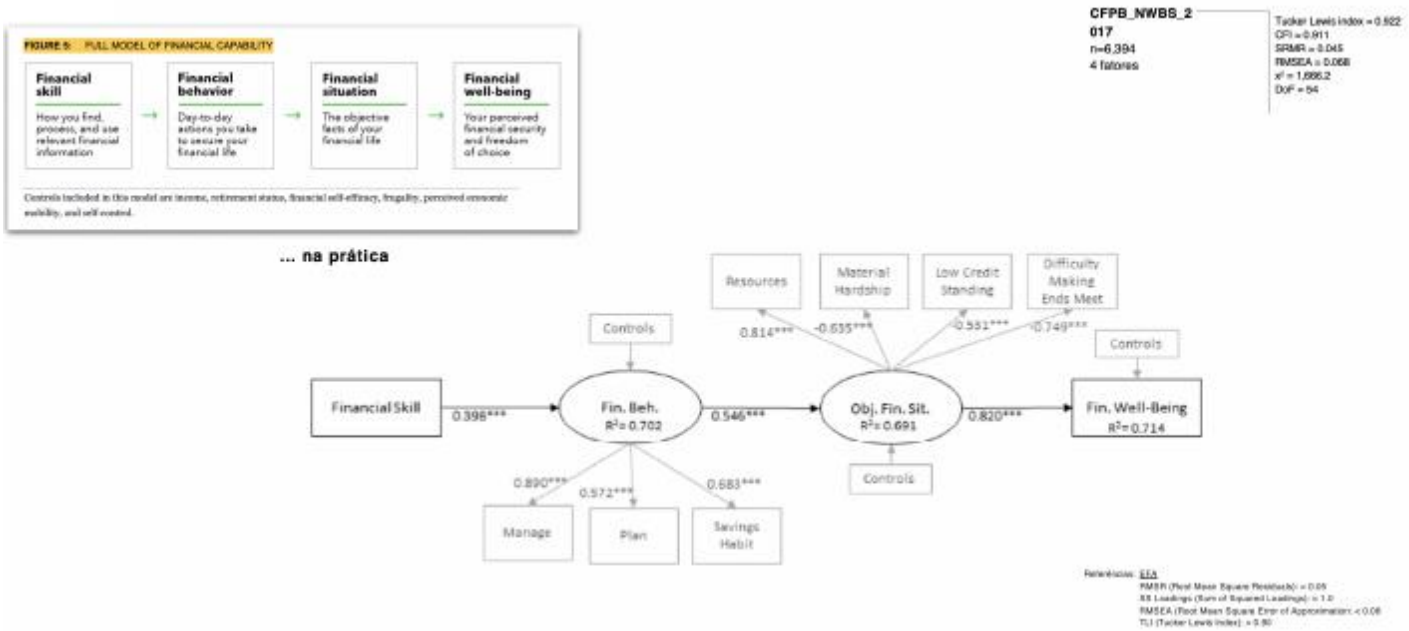


Figure 1. Conceptual Model and Financial Health Modeling of the CFPB

At this stage, “Financial Well-Being: The Goal of Financial Education” (CFPB, 2015), “MEASURING FINANCIAL WELL-BEING: A GUIDE TO USING THE CFPB FINANCIAL WELL-BEING” (CFPB, 2015), “CFPB FINANCIAL WELL-BEING SCALE: SCALE DEVELOPMENT TECHNICAL REPORT SCALE”, (CFPB, 2015), and “Understanding the Financial Pathways to Financial Well-Being – National Financial Well-Being Survey: Report 2" (ABTA Associates for CFPB, 2018) were important documents. Along with papers identified in the literature on financial education and well-being, they provided a conceptual basis for the constructs and relationships in the I-SFB's Financial Health model.

The pre-test data, however, revealed that the dimensions and items described in the CFPB model did not apply to Brazil's socioeconomic reality. Access to credit is one example. In the United States, credit is historically more accessible than in emerging countries. This premise is embedded in the CFPB model, which asks about the event that represents the deviation: the loss of access to credit. In Brazil, on the other hand, it is access to credit that constitutes the deviation and the lack of access to it is the norm. Thus, based on the factorial modeling (EFA and CFA) from the data of the Pre-Test field, the relevant items of the benchmarks were retained, the low relevance items were rejected and new items, more appropriate to the Brazilian reality, were included in the subsequent main field. Several of the new items were incorporated into the final model.

The new items were selected from an additional round of literature review focusing on variables and scales validated in academic studies. The main sources for the items considered were the well-being perception scale by Netemeyer et al. (2018), the spending self-control scale by Haws et al. (2012), the propensity to save scale by Dholakia et al. (2016), the materialism scale by Richins (2004), items adapted to the Brazilian context by Ponchio and Aranha (2008), the financial knowledge scale by Knoll and Houts (2012), the time perspective inventory by Zimbardo and Boyd (1999), items from the National Well-Being Survey (CFPB, 2017) and, finally, items proposed by the I-SFB development team.

2. On the development of the Financial Health model and the I-SFB scales

In the end, the I-SFB team arrived at constructs quite similar to those in the literature and benchmarks (skill/knowledge, stated attitude/behavior, psychological and material security, and financial freedom), but with different paths and relationships. The CFPB, for example, proposes a progressive and unidirectional relationship. In it, skill/knowledge fosters better behavior; better behaviors bring more security; and more security, in turn, brings greater well-being – represented here mainly by financial freedom. It is worth noting that in the CFPB model, these paths are established through the relationship between one-dimensional instruments – the Well-Being Scale and the Skill Scale – and other items of the National Well-Being Survey.

The I-SFB goes beyond this in different ways. First, Freedom is established as a central construct in the I-SFB and is measured both directly, through specific items, and indirectly, through the Security and Proficiency predictor constructs. Second, Skill/Knowledge and Stated Attitude/Behavior show two sides of the same coin in the Financial Proficiency construct, which is a 2nd order construct encompassing these two dimensions. As stated, both Security and Proficiency are predictors of Freedom, which is defined as the degree of available possibilities perceived in the present and in the future as a function of the individual's financial situation. It is also worth noting that the I-SFB captures the indirect effect of Security on the relationship between Proficiency and Freedom, reflecting the influence of the financial situation experienced by the individual on their Financial Health. Finally, the I-SFB incorporates the individual's Financial Foundation – that is, their starting point. Financial Foundation is not a predictor, but it is a construct correlated with both Safety and Proficiency. It reflects the effect of context on possibilities – for example: if the person is disciplined but simply does not have a sufficient income, which is common in emerging economies such as Brazil, they have a natural cap imposed on their ability to save.

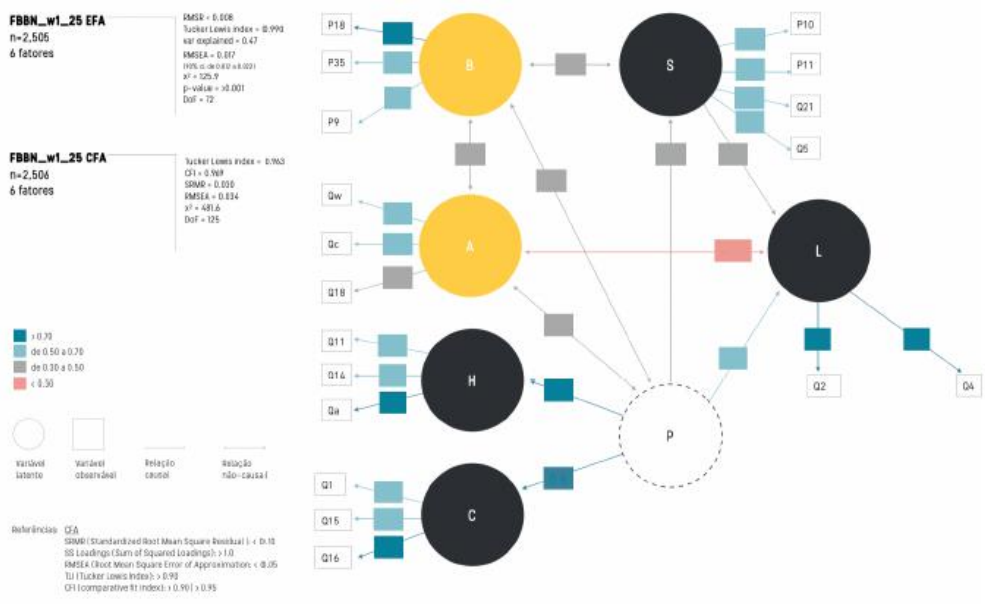


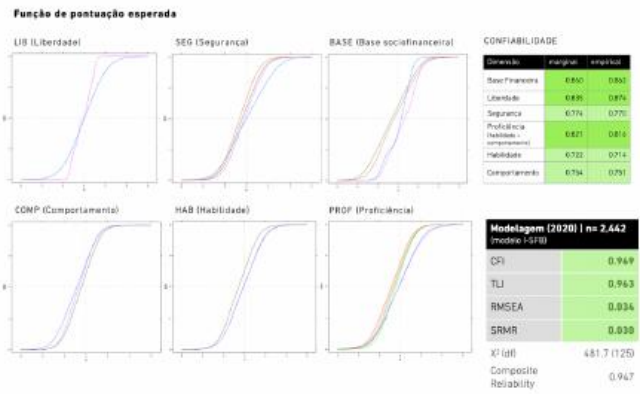
Figure 2. I-SFB Financial Health Model (2020).

As shown in Figure 2, with the complete Financial Health model, the I-SFB instrument measures Financial Health and its dimensions through 12 items (constructs in black). The model satisfied the conditions of convergence and divergence in both the Exploratory and Confirmatory phases. The retained items also meet the literature criteria for factor loads, cross loads, and sample size.

Score scales were developed using Item Response Theory (IRT). IRT modeling was applied in the Modeling Datasets, which consisted of a dataset with half of the captured cases randomly selected. During this process, the discriminatory power of each question and the difficulty of each of its levels were tested (Figures 3a and 3b). Unlike benchmarks, the I-SFB instrument reflects the model's multidimensionality: each construct (dimension) has its score scale validated. This also applies to the general I-SFB scale, which represents financial health as a whole and is the function of the various constructs (dimensions). The products of this process are the templates for converting the summed score of each dimension and the total into a scale from 0 to 100 (as described in the Methodological Manual).

Índice de Saúde Financeira | Poder de Discriminação das Perguntas e de níveis de resposta

Dimensão	Pergunta	Discriminação	Dificuldade			
			Nível 1	Nível 2	Nível 3	Nível 4
COMPORTAMENTO	Eu sei como me obrigar a cumprir minhas metas financeiras.	very high	very easy	easy	medium	hard
	Eu sei como me controlar para não gastar muito.	very high	very easy	easy	medium	hard
	Eu sei como me obrigar a poupar.	very high	easy	easy	medium	hard
HABILIDADE	Eu sei tomar decisões financeiras complicadas.	very high	easy	easy	medium	hard
	Eu sou capaz de reconhecer um bom investimento.	high	easy	easy	hard	hard
	Eu sei me informar para tomar decisões financeiras.	very high	very easy	easy	medium	hard
SEGURANÇA	Preocupações com as despesas e compromissos financeiros são motivo de estresse na minha casa.	very high	easy	easy	medium	hard
	Por causa dos compromissos financeiros assumidos, o padrão de vida da minha casa foi bastante reduzido.	very high	easy	easy	medium	hard
	Nos últimos 12 meses, qual frase melhor descreve a comparação entre a renda total e os gastos na sua casa?	high	easy	easy	hard	very hard
	Estou apertado(a) financeiramente.	very high	easy	easy	medium	hard
LIBERDADE	Estou garantindo meu futuro financeiro.	moderate	easy	easy	hard	hard
	O jeito que eu cuido do meu dinheiro me permite aproveitar a vida.	very high	easy	easy	medium	hard



Figures 3a. I-SFB scales: discrimination and difficulty tests and 3b. I-SFB scales: expected score function, tests of reliability of IRT scales and CFA validation tests.

A revalidation made from Pulse 2 data, using the same sample design and collection techniques, but with a field in the first quarter of 2022, reaffirmed the validity and reliability of the I-SFB verified by the tests in Pulse Base 1 (Figure 4). The comparison demonstrates the robustness of the ISFB: it proved to be valid and reliable even in the face of changes in the economic, political and public health contexts in Brazil that occurred between the two fields.

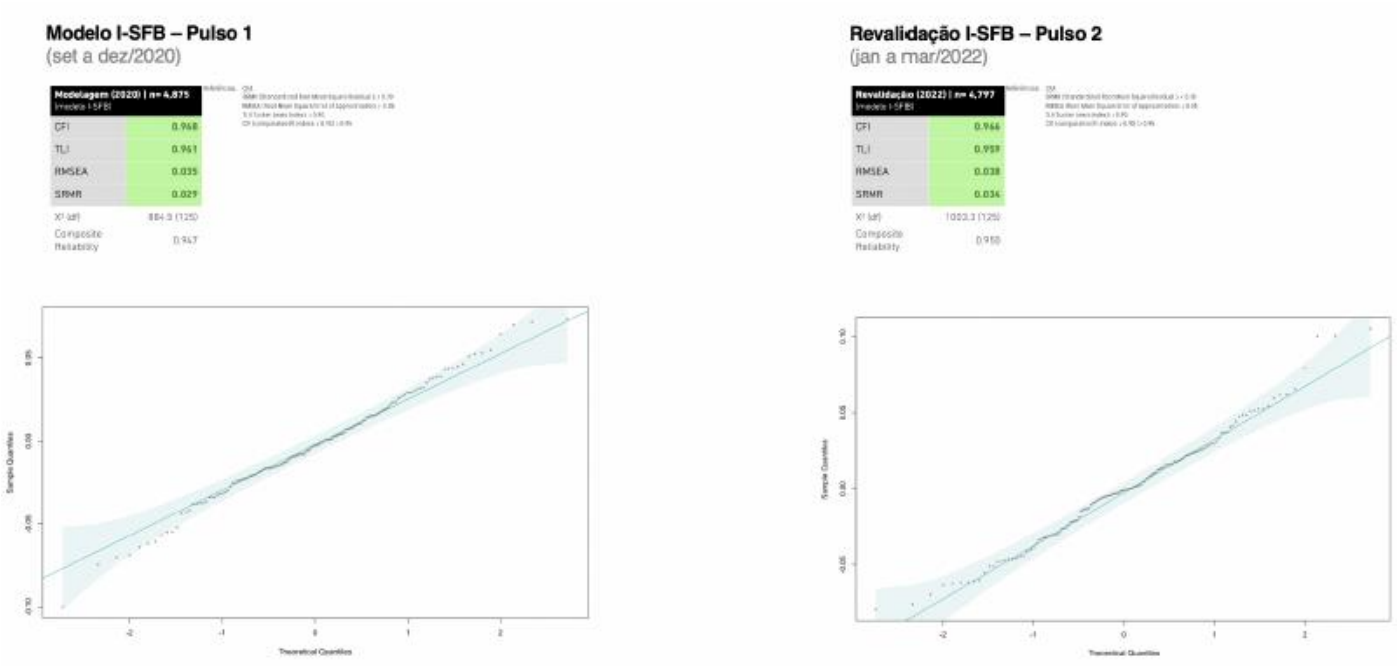


Figure 4. Validation tests and Q-Q graph of the bases of Pulse 1 (2020) and Pulse 2 (2022).

3. On project design and quality control of data, and methods

The field was carried out by a specialized company (Bridge Pesquisas) and the data were collected through telephone interviews (CATI) using the random dialing method. To ensure the quality of the interviews, 100% of the audio was recorded and each interviewer had 20% of their interviews, randomly selected, and verified. The final base was still submitted to other methods for detection of Insufficient Effort by the respondents. This process was observed in the Pre-Test, Pulse 1 (the main field of the development project), and Pulse 2.

The understanding of the questions was checked at all stages. Instead of the *back translation* technique to evaluate the adaptation of the items of the benchmarks to Portuguese, we used a qualitative step: the Cognitive Test. It was ensured that both the wording of the items and their meaning were universally accessible to Brazilians, regardless of age, socioeconomic status, and regional differences In the quantitative phases, the lack of understanding was captured in the variable "I did not understand" This option was not stimulated and was marked by the interviewer in case of prolonged hesitation, in the verbalization of non-understanding or case of request for explanation of the question to the interviewer In the quantitative step, we check the levels of understanding according to the total of items and for each item (Figure 5).

Figure 5. Examples of comprehension control in the qualitative (Cognitive Test) and quantitative steps.

The samples were designed with quotas of socioeconomic level (CCEB 2020), age group (IBGE SISDP groups), gender, region of residence, and area of residence (inland town or capital/RM). These variables were used in the weighting. The weight in all cells was below 2, according to current best practices (Figure 6).

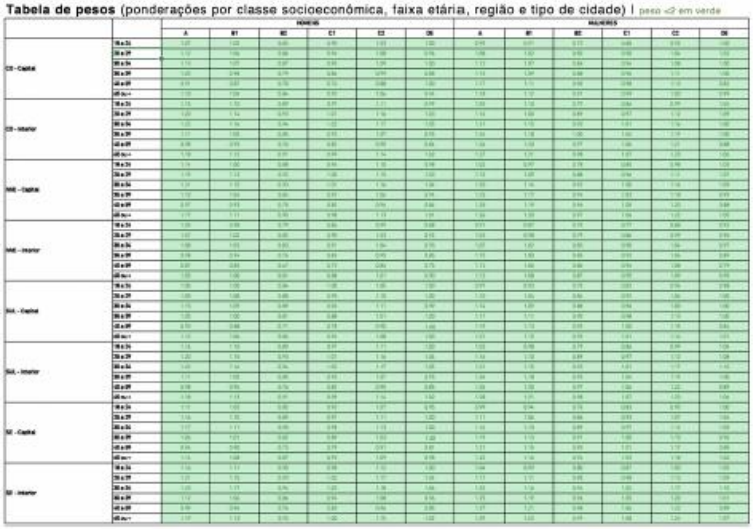


Figure 6. Example of controlling weights per cell of the sample quota variables

Pulse 1 had a total sample of 5220 respondents and Pulse 2 had a sample of 5000. After elimination for inconsistencies and other violations and the weighting process, the final weighted samples were, respectively, 4863 and 4796. Both have a confidence interval of plus or minus 1.41pp.

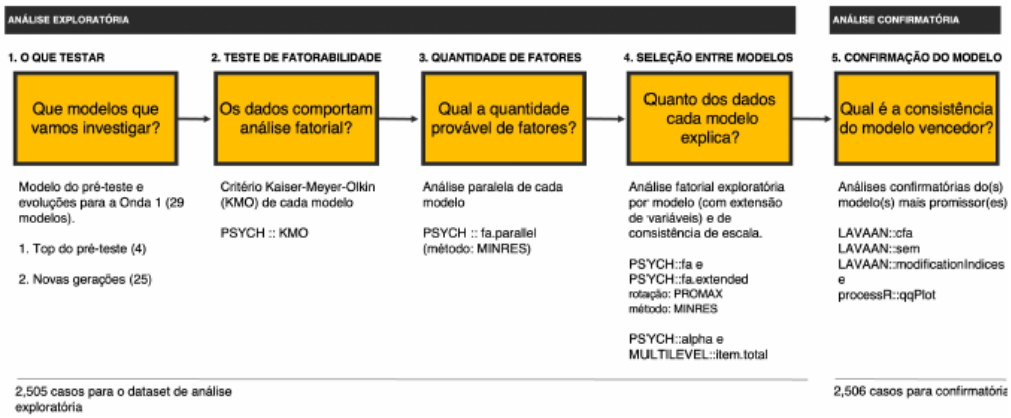


Figure 7. Analysis and modeling methodology scheme and the packages and functions used in its execution

Before starting the analysis and modeling process itself, the total datasets was randomly divided into a Modeling Datasets and a Validation Datasets of equal sizes (50/50 division). The Modeling Datasets was used in the Exploratory phase and the Validation Datasets in the Confirmatory phase. Before exploratory modeling, multivariate normality and factorability tests were performed. During the Exploratory Factor Analysis (EFA), we performed a parallel analysis of all candidate models. Given the nature of the conceptual model and after initial tests, the analysis favored the use of oblique rotation (Promax). Validation tests (e.g. CFI, TLI, RMSEA, RSMR, Composite Reliability) of the model were performed in both phases.