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The Impact of Financial Literacy on the Risk of Indebtedness: astudy with generation Z

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Abstract:
Background*: The article evaluates the impact of financial literacy on the risk of indebtedness of generation Z.*
Materials and Methods*: A survey was carried out with 577 respondents from different regions of Brazil. The analysis techniques used were descriptive statistics, factorial analysis and multiple regression.*
Results*: The greatest impact on reducing debt risk was financial literacy. Higher income and schooling and owning their own home also contribute to reducing the risk. When evaluating the three dimensions of financial literacy, it was found that attitude and financial behavior have very close impacts on reducing the propensity to indebtedness and greater than the impact of financial knowledge.*
Conclusion:*This article delves into the impact of financial literacy on Gen Z's indebtedness risk, being particularly relevant in Brazil, where household indebtedness is strikingly high, with approximately 79% of families in debt as of 2023 (Brasil, 2023). In order to build public policies to reduce the propensity for indebtedness of generation Z young people, actions are suggested that encompass the three dimensions of financial literacy, and that are directed mainly at young people with low income and education, who were identified as more vulnerable debt risk.*

Key Word*:Financial Literacy; Generation Z; Risk of Indebtedness; Financial Education; Personal Finance*

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I. Introduction

Financial literacy is essential for guiding individuals in selecting financial products that best meet their needs, especially when it comes to understanding financial products, services, and activities (Sun et al., 2020; Van Rooij et al., 2011; Bianchi, 2018; Hasan et al., 2021). A strong foundation in financial literacy positively impacts the economy (Lusardi and Messi, 2023). This understanding enhances individuals' comprehension of financial information (Junita and Panjaitan, 2022), leading to greater contributions to their country's economic progress, particularly in savings and financial sector development (Bayar et al., 2017). However, its effectiveness isn't limited to investors alone; financial literacy should be disseminated to the broader population as a tool for inclusive growth (Krishnakumare et al., 2019). According to Philippas and Avdoulas (2019), financial literacy is the ability to plan for the future, analyze financial options, and make informed decisions. This concept transcends mere technical knowledge of financial and risk concepts (Lusardi, 2019) (Lusardi, 2019), characterized only as one of the pillars of financial literacy, encompassing as well financial behavior and attitude (Organization for Economic Co-operation and Development [OECD], 2022a). For the individual to make more assertive financial decisions, they must feel confident and motivated in applying the knowledge they acquire, aiming to improve their financial well-being and being prepared to address the increasingly complex financial products offered by the market (Lusardi, 2019).

Evidence indicates that better financial education results in resource accumulation and reduced debt problems (Deuflhard et al., 2019; Vieira et al., 2020). Conversely, in leading emerging countries, low financial literacy correlates with increased debt risks and poor financial choices. Alarmingly, more than half of their population is considered financially illiterate (Lusardi, 2019). Financial literacy can significantly reduce materialism among Generation Z, influencing not just their knowledge but also shaping their financial behaviors and consumption tendencies (Dewi and Muchtar, 2023). Generation Z is less educated in possessing and using financial knowledge than millennials, and the main reasons identified for this disparity are lower life experience, immediacy, and a diminished interest in finance as a source of opportunities for self-development (Мальцева et al., 2022).

One of the consequences of this is the increased propensity to indebtedness (Wahono and Pertiwi, 2020), given that a reduced understanding of the risk of indebtedness is associated with higher transaction costs caused by contracting loans at higher interest rates and increasing anxiety about debts while individuals lose the real notion of the debt amount (Noviarini et al., 2021). According to Lusardi and Tufano (2015), only a third of the American population understands the concept of compound interest, and many do not quite understand how credit cards work, causing them to pay more interest and fees when accessing credit products.

The evidence underscores the need to implement strategies aimed at educating young people on appropriate financial management, even more so in view of the constant marketing strategies for personal loan products and services being promoted ever more aggressively, especially to young consumers (Fan and Chan, 2019). It is essential to identify potential variations resulting from these interventions to ensure that all targeted recipients of the policy derive equal benefits without exacerbating inequalities. Notably, for high school students, well-structured policies combined with adequately trained teachers can decrease indebtedness risks and lead to improved credit scores among the youth (Urban et al., 2020). Bamforth et al. (2017) reiterates the relevance of analyzing the topic with undergraduate students, noting that they tend to take their financial behavior into later life.

This article delves into the impact of financial literacy on Gen Z's indebtedness risk, being particularly relevant in Brazil, where household indebtedness is strikingly high, with approximately 79% of families in debt as of 2023 (Brasil, 2023). Existing literature scarcely touches on this topic in the Brazilian context. The present study not only explores the overarching issue of indebtedness but also evaluates the specific influences of financial literacy dimensions and socioeconomic factors on indebtedness risk. Thus, it is essential to understand better the financial literacy of young people and its impact on the risk of indebtedness, as these constitute the future driving force of the economy. The OECD (2020) identified that young people are less financially literate, have a less frugal financial attitude, obtain worse results in financial knowledge, and present reckless financial behaviors compared to the middle-aged public. In Brazil, 78.3% of the country's families are in debt, 86.6% of which are related to credit cards, which have incredibly high interest rates (Abdala, 2023), highlighting the need to study the financial literacy of young people in this country.

Financial literacy has become a topic of extreme relevance, especially given the easy access to the credit market (Goyal and Kumar, 2021), the increase in longevity and its consequences on the security system (Lusardi, 2019), the accelerated digitization of the financial market (Dubyna, 2021; OECD, 2018), and the recent financial crises (Lusardi et al., 2020).

Thus, financial literacy prepares people to manage their finances in such a way that they can manage their daily expenses (Lusardi, 2019), create an emergency fund (Fan and Henager, 2021), and plan their retirement years (Yeh, 2022). Thus, understanding the skills involved in a population's financial literacy is essential in developing national strategies (OECD, 2020).

Conceptually, the literature has a wide range of definitions, varying according to the researcher (Goyar and Kumar, 2020). Lusardi and Mitchell (2011) define financial literacy as the understanding of basic financial concepts and the ability to perform simple calculations. Seeking to channel research and different definitions, the OECD (2013) outlined financial literacy as a mixture of skills, behaviors, knowledge, awareness, and financial attitude necessary for the individual to make sound financial decisions, leading to a state of financial well-being. The OECD (2015) then proposed that the concept focuses on three dimensions: attitude, knowledge, and behavior.

The financial attitude can be defined as the personal inclination toward financial topics, encompassing the ability to plan for the future and maintain savings (Rai et al., 2019). Previous research has concluded a strong link between financial literacy and financial attitude. Financial attitude is a framework for guiding financial behavior and enabling the learning of financial knowledge (Heuberger et al., 2018).

According to Vieira et al. (2020), financial knowledge is already consolidated as a crucial competence for families and entrepreneurs. Financial literacy measures a person's understanding of financial concepts and the confidence to manage personal finances by making quick and assertive decisions (Khairani and Alfarisi, 2019). Lusardi (2019) suggests using three questions to measure knowledge, known as the “big three", and considers these questions appropriate for measuring knowledge because they are simple, relevant, brief, and allow comparison between respondents.

Financial behavior involves several aspects of the individual's financial life, such as how they plan their spending, investments, budget, and payment methods, being a key factor of financial literacy (OCDE, 2013; Rai et al., 2019). Improper financial behavior can lead to catastrophes in countries, as seen in the American housing bubble 2008. It is also possible to observe a disparity in behavior and knowledge according to the gender of the individual; men tend to present a better overall result than women (OECD, 2020; Park et al., 2021).

Thus, Goyal and Kumar (2021) denote that research on this topic revolves around evaluating financial literacy results, understanding the differences observed between the different aspects of a population, and studying the factors that affect and impact financial education and how to improve financial literacy.

In this sense, Philippas and Avdoulas (2019) indicated that only 19.3% of Gen Z university students in Greece could be considered financially literate, even though they have lived through one of the biggest crises in the country's history. The portion that most integrates this percentage is mainly men, individuals whose parents are considered highly educated, and people who monitor their spending well. In general, despite understanding the need to prepare financially for future events, such as university costs, Gen Z lacks understanding about their retirement, investments, and personal finances (Beck and Garris, 2019). Hafni et al. (2020) suggest actions aimed at financial knowledge and financial literacy through education, noting that these significantly impact the financial satisfaction of Gen Z youth.

Personal debt is an integral part of the economy since it provides greater flexibility over family spending and consumption throughout life (Frigerio et al., 2020). Consumer credit has shown strong growth in the last 20 years (ECRI, 2017) and, supported by sociocultural transformations, has been incorporated by many consumers as part of their income, increasing the dependence of individuals on loans (Ferretti and Vandone, 2019).

Individuals who recklessly consider their credit limit as part of their current income or are typically anxious about money are more likely to engage in impulsive purchases and, consequently, debt risk behaviors (Abrantes-Braga and Veludo-de-Oliveira, 2020).

Excessive debt accumulation incurs substantial consequences, such as the risk of bankruptcy, credit restrictions, or even exclusion from the credit market (Meyll and Pauls, 2019). In addition to the financial effects, debts have other reflections on people's lives, making excessively indebted individuals more likely to present insomnia (Warth et al., 2019a), experience pain more often than the general population (Warth et al., 2019b), present financial well-being (Fan and Henager, 2022), and a lower academic performance than the others (Pisaniello et al., 2019), even having a direct effect on the risk of suicide (Rojas, 2022).

Some factors contribute to a greater propensity to excessive indebtedness, especially behavioral issues, such as lack of self-control and materialism (Azma et al., 2019). Added to this, impulsivity strongly impacts indebtedness, especially in young people under 25 years of age (Frigerio et al., 2020).

Financial literacy and the risk of indebtedness go hand in hand, as low levels of financial literacy are associated with a higher propensity to take on debt (Gathergood, 2012). To reverse this situation, especially concerning young workers, actions aimed at knowledge added to behavioral changes are fundamental in the work environment to reduce the risk of indebtedness (Abdullah et al., 2019).

However, approximately 70% of young people do not understand the reasons that led the world to the global economic recession in 2008 and are unaware of the risks of excessive indebtedness. Teaching financial literacy can be essential to better understand these risks, especially for young people from developing countries (Judit et al., 2020). Thus, this article will verify whether financial literacy also impacts the risk of indebtedness of Gen Z Brazilians.

II. Material And Methods

This research included a sample of 577 respondents from different regions of Brazil. The questions about financial behavior and attitude were prepared based on the study by Vieira et al. (2021) and Potrich et al. (2015). The scale proposed by Abrantes Braga and Veludo de Oliveira (2019) was used to determine the risk of indebtedness. It is also necessary to measure financial knowledge to build financial literacy. Three questions were used to cover this dimension, known as the "big three", developed by Lusardi and Mitchell (2008) and widely used for this purpose.

The structure of the dimensions was investigated using factor analysis with the varimax orthogonal rotation method to determine if the information could be summarized in a reduced set of factors. The factors represent the dimensions that summarize the original set of variables maintaining their representativeness (Hair et al., 2019). A commonality criterion superior to 0.50 was used to select the variables that would compose the factors, ensuring that the variables reach acceptable levels of explanation (Hair et al., 2019).

Thus, two tests were applied: the Bartlett sphericity test to verify if the model is adequate and the Kaiser-Meyer-Olkin (KMO) test, to test the general consistency of the data. In addition, we sought to evaluate whether the generated factors have an eigenvalue greater than 1 and a Cronbach's alpha greater than 0.7 (Hair et al., 2019).

Once the factors were constructed, how they influenced the risk of indebtedness was evaluated using a multiple linear regression model estimated by Ordinary Least Squares (OLS).

Questions were also applied to isolate profile effects, developed based on the study by Vieira et al. (2023). Dummy variables were created to analyze these questions in linear regression: dummy gender: 1-male, 0-female; dummy marital status: 1-single, 0-other; dummy skin color/ethnicity: 1-white, 0-other; dummy

dependents: 1-has dependents, 0-has no dependents; dummy education: 1-incomplete and complete elementary school, 0-other; dummy housing: 1-own, 0-other; dummy family income 1-class A, B, and C, 0-other; dummy spending: 1-spends more than earns, 0-spends equal or less than earns; dummy occupation: 1-civil servant or salaried employee, 0-other.
Thus, the following multiple linear regression model is defined for the present study.

$$Y_i = \beta_0 + \sum_{i=1}^{K} \beta_k X_k + \varepsilon$$

where Y is the dependent variable; β_0 is the intercept; k-th β_k are the slope coefficients of the k-th regressors X; and ; ε is the term of error.

The Kolmogorov-Smirnov, variance inflation factor (VIF), and Pesarán–Pesarán tests were performed to identify the assumptions of residual normality, absence of multicollinearity, and homoscedasticity of the model, respectively.

III. Result

The study only considered legal age (older than 18) individuals who are part of Gen Z. Thus, the lowest age identified was 18 years, while the highest age of the study was 26 years, with a mean age of 22. The profile of the respondents is presented in Table 1.

Table 1: Descriptive statistics according to gender, marital status, skin color, education level, financial dependents, type of housing, gross family monthly income, expenses, occupation, credit card ownership.

Variable	Alternative	Frequency	Percentage (%)
Gender	Male	217	37.8
	Female	357	62.2
Marital Status	Single	445	77.9
	Married or in a stable relationship	107	18.7
	Separated/divorced	11	1.9
	Other	8	1.4
Skin Color/ethnicity	White	352	61.4
	Black	74	12.9
	Mixed Race (Brown)	139	24.3
	Asian/Yellow	6	1.0
	Indigenous	2	0.3
Highest Completed Education Level	Incomplete Elementary School	26	4.6
	Elementary School	41	7.2
	Technical course	52	9.1
	High School	293	51.4
	Higher Education/College	137	24.0
	Post-graduation	21	3.7
Do you currently have people who depend on your money?	No	394	68.8
	Yes	179	31.2
Type of housing	Own	255	44.7
	Rented	219	38.4
	Borrowed	45	7.9
	Financed	12	2.1
	Other	39	6.8
Gross Monthly Family Income	Up to $220.00	52	9.4
	Between $220.01 and $440.00	114	20.5
	Between $440.01 and $660.00	95	17.1
	Between $660.01 and $880.00	81	14.6
	Between $880.01 and $1,100.00	70	12.6
	Between $1,100.01 and $1,760.00	77	13.8
	Between $1,7600.01 and $2,200.00	40	7.2
	Above $2,200,01	27	4.9
Regarding your expenses you would say	I spend more than I earn	153	26.6
	I spend the same as I earn	212	36.9
	I spend less than I earn	210	36.5
What is your occupation?	Civil Servent	46	8.1
	Salaried employee	240	42.3
	Self-employed	79	13.9
	Business owner	27	4.8
	Not working	104	18.3
	Other	72	12.7
Has a Credit/Debit Card No	No	137	23.7
	Yes	440	76.3

Table 1 shows a predominance of female respondents, single, white, with high school education, without dependents, who mainly live in their own or rented housing and use credit cards. Despite being young, most are inserted in the labor market, mainly salaried, a result very similar to that of the survey with Polish Gen Z conducted by Dolot (2018). On the other hand, the sample differs from that collected by Abrantes-Braga and Veludo de Oliveira (2019) regarding schooling, where most respondents presented higher education.
Table 2 provides more details regarding the perspective of the respondents' financial behavior.

Table 2: Variable, mean and percentage of responses to financial behavior questions.

Variable	Percentage (%)					
	Mean	1*	2*	3*	4*	5*
I reserve the money I receive monthly for future needs	2.6	29.7	20.2	19.7	15.3	15.0
I keep part of my income every month.	2.6	30.7	22.0	20.2	13.6	13.6
I regularly save money to meet long-term financial goals.	2.6	28.9	21.6	22.6	13.6	13.4
I save more when I receive a salary increase	2.8	25.3	21.0	21.5	15.3	16.8
In the past months, I have been able to save money	2.5	33.6	19.7	22.7	9.7	14.4
Before buying something, I carefully consider whether I can afford it	3.9	7.5	7.7	20.3	17.6	47.0

Note:1*-Never; 2*-Rarely; 3*-Sometimes; 4*-Frequently; 5*-Always

Based on Table 2, it is possible to observe that respondents tend not to save money. The first five variables show that individuals who never or rarely save money outperform those who frequently or consistently do so. On the other hand, there is a greater propensity to consider financial capacity before buying something, as presented in the last variable.

These results are consistent with the survey on Greece's Gen Z by Philippas and Avdoulas (2019), where 56.8% of respondents said they did not save money. This behavior can prove to be a threat, given that insufficient savings associated with unstable income aggravate the risk of indebtedness (Chotewattanakul et al., 2019). Factors related to savings are crucial for young people and children, and Te'eni-Harari (2016) suggests actions from childhood, such as parental involvement and contact with money from an early age.
Table 3 presents the variables related to the risk of indebtedness and financial attitude.

Table 3: Variable, average, and percentage of answers to the questions of risk of indebtedness and financial attitude.

Dimension	Variable	Percentage(%)					
		Mean	1*	2*	3*	4*	5*
Indebtedness Risk	I am often in debt much more than I can pay	2.4	31.9	30.7	10.7	19.6	7.1
	I often have to pay fines (or interests) for paying overdue bills	2.3	38.2	26.5	9.1	20.9	5.4
	I often borrow money to pay off my debts	2.1	42.5	28.9	9.6	12.4	6.6
	I am often in debt for much more than my monthly income	2.1	41.4	29.1	8.7	15.5	5.2
	My debts damage my life goals, such as saving money…	2.7	28.7	22.8	12.4	23.9	12.2
Financial Attitude	I tend to live for today and let tomorrow take care of itself	2.7	23.9	28.1	16.3	18.4	13.3
	I find it more satisfying to spend money than to save it for the long term	2.5	24.1	32.3	19.4	14.4	9.7
	Money is there to be spent	2.9	20.9	18.5	19.9	27.0	13.8

Note: 1-Totally disagree, 2- Disagree; 3- indifferent; 4-Agree; 5-Totally agree

Indebtedness risk can be considered low based on the average of the responses. This result is quite similar to that found by Abrantes Braga and Veludo de Oliveira (2019), with a very close average of responses, also identifying the same variable as the one with the highest average of the questions focused on the risk of indebtedness.

Regarding the questions about financial attitude, identified through the last three variables, it is observed that respondents tend to worry about their future when they decide to spend. This is a good sign, since spending behavior without caution and without thinking about the future increases compulsive buying, which in turn increases dependence on loans, increasing young people's financial trouble (Aw et al., 2018).
The questions that cover the dimension of financial knowledge can be seen in Table 4.

Table 4: Variable code and percentage of correct and incorrect answers.

Variable	Correct Answers (%)	Alternatives
Suppose you had $20 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?	62.1	More than $ 22,00*; Exactly $ 22,00; Less than $ 22,00; Do not know
Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	43.7	More than today; Exactly the same; Less than today*; Do not know
Please tell me whether this statement is true or false. "Buying a single company's stock usually provides a safer return than a stock mutual fund."	48.3	True; False*; Do not know

*Denotes the correct answer

Table 4 shows a low average of correct answers. The result differs from studies such as that of Noviarini et al. (2021), who observed a high percentage of correct answers in their survey with New Zealanders. With the data collected, factor analysis begins to build the dimensions of financial literacy. Table 5 shows the financial behavior.

Table 5: Financial behavior according to the items that compose it, factor loads, explained variation, and Cronbach's Alpha.

Variable	Factor Load	Explained Variation (%)
Financial Behavior – Alpha = 0.935		79.52
I reserve the money I receive monthly for future needs	0.932	
I keep part of my income every month.	0.920	
I regularly save money to meet long-term financial goals.	0.917	
In the past months, I have been able to save money	0.878	
I save more when I receive a salary increase	0.806	

When analyzing the six items constituting financial behavior, a factor with an eigenvalue greater than 1 was observed. In this dimension, the variable "Before buying something, I carefully consider whether I can afford it" presented a commonality of 0.128, thus being excluded from the model. The dimension presented a KMO of 0.895 and a significant Bartlett sphericity test, confirming the factorability of the data.

The first two variables presented the highest factor loads for the financial behavior dimension. This result aligns with the study by Vieira et al. (2021), where the same items obtained the highest factor loads in the analysis. Based on the averages observed in Table 3, it is possible to see that the model maintained an unfavorable orientation of the respondents' financial behavior, excluding only the question that diverged from the others.

Then, the variables encompassing the risk of indebtedness and the financial attitude were analyzed, allowing us to visualize two factors with an eigenvalue greater than 1. According to the commonality criterion, the variable "I often borrow money to pay my debts" was excluded from the risk of indebtedness by presenting a value of 0.055. The factor analysis was performed again on the remaining items, obtaining a KMO of 0.852, and was significant according to the Bartlett sphericity test. Thus, Table 6 presents the dimensions of risk of indebtedness and financial attitude.

Table 6: Riskof indebtedness and financial attitude according to the variables that compose them, factor loads, explained variation, and Cronbach's alpha.

Variable	Factor Load	Explained Variation (%)
Indebteness Risk - Alpha=0.846		39.28
I am often in debt much more than I can pay	0.830	
I am often in debt for much more than my monthly income	0.818	
I often have to pay fines (or interests) for paying overdue bills	0.775	
My debts damage my life goals, such as saving money…	0.775	
Financial Attitude – Alpha = 0.810		31.48
I find it more satisfying to spend money than to save it for the long term	0.839	

Money is there to be spent	0.837	
I tend to live for today and let tomorrow take care of itself	0.778	

The two factors together explain 70.76% of the variation. The variables framed in each dimension of the factor analysis are consistent with the studies of Abrantes-Braga and Veludo-De-Oliveira (2019), Potrich et al. (2021), and Vieira et al. (2021). It is possible to observe that variables that address the ability of respondents to pay debts predominate in the risk of indebtedness dimension. According to the average of the descriptive statistics of these variables presented in Table 3, there is no tendency towards indebtedness.

The financial attitude factor loads analysis shows the same order of variable weights as in the study by Vieira et al. (2021). According to descriptive statistics, a conservative financial attitude is observed in the respondents' spending, being more likely to think about the future when they consider spending money.

In addition to creating the dimension of financial literacy, factors were created from their weighted average, according to Vieira et al. (2021) and the OECD data processing recommendation (2022b), to standardize the scores of the three dimensions of financial literacy (behavior, attitude, and knowledge) on a scale ranging from 0 to 1. The weight of the factorial load of the item was the criterion used. The responses of the respective variables were inverted for the financial attitude to present the appropriate result and in the same orientation as the other dimensions. The standardization model is presented in Table 7.

Table 7: Standardization of the scores of the dimensions of financial behavior, risk of indebtedness, financial attitude, financial knowledge, and construction of financial literacy.

Financial Behavior: BEHV = [(0.209*Item 1 + 0.207*Item 2 + 0.206*Item 3 + 0.197* Item 5 + 0.181*Item 4)-1]/4
Indebtedness Risk: RISK = [(0.259*Item 7 + 0.256*Item 10 + 0.242*Item 8 + 0.242*Item 11)-1]/4
Financial Attitude: ATIT = [(0.342*Item 13 + 0.341*Item 14 + 0.317*Item 12)-1]/4
Financial Knowledge: KNOW = (Item 15 + Item 16 + Item 17)/3
Financial Literacy: FLIT = (BEHV + ATIT + KNOW)/3

Note:*The variables codes of the financial behavior, indebtedness risk, financial attitude and financial knowledge refers to the variables in the Tables 2, 3 and 4, respectively, in the same order they were presented in these tables

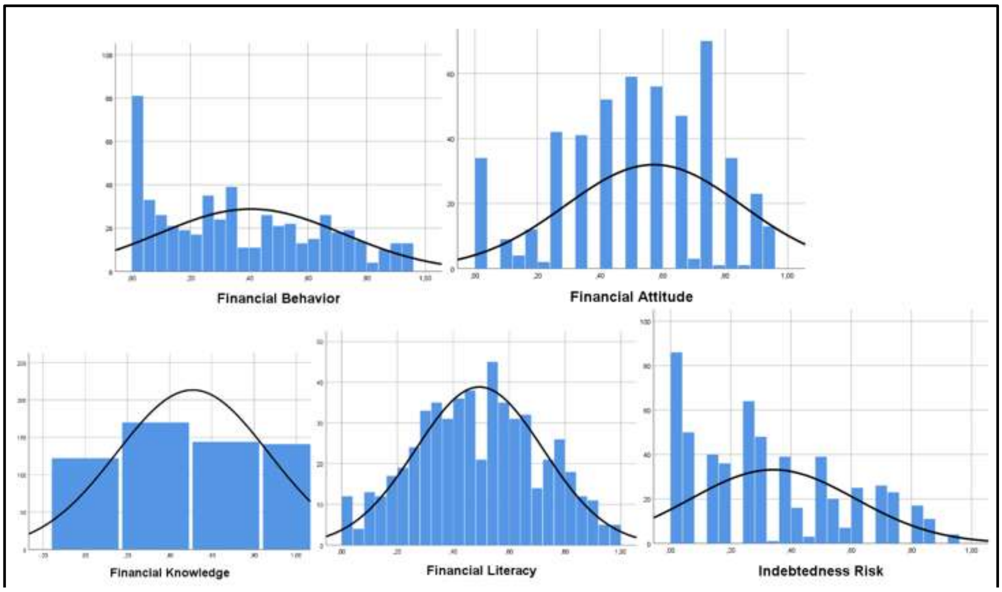
After the scores were standardized, perceptions were verified by their means and standard deviation, as shown in Table 8.

Table 8: Mean and standard deviation of financial literacy, its dimensions, and the risk of indebtedness.

Dimension	Financial Literacy	Financial Attitude	Financial Knowledge	Indebtedness Risk	Financial Behavior
Mean	0.494	0.572	0.509	0.341	0.405
Standard Deviation	0.228	0.283	0.359	0.273	0.314

Table 8 shows that the respondents' financial literacy and the risk of indebtedness are low, given the averages presented. The histograms of financial literacy, its dimensions, and the risk of indebtedness were prepared to visualize the respondents' tendencies better, as shown in Figure 1.

Figure 1: Histograms of financial literacy, its dimensions, and the risk of indebtedness.



The financial attitude curve, as shown in Figure 1, demonstrates that respondents do not spend without thinking about the future, and financial knowledge indicates that they obtain half of the answers right. The reduced financial literacy is mainly responsible for the financial behavior of the respondents, who do not tend to maintain money, given the asymmetry to the left observed in the histogram.

Subsequently, two multiple linear regressions were performed, using the risk of indebtedness as the dependent variable. Model 1 encompasses financial literacy, while Model 2 uses each of the three dimensions that make up financial literacy to allow individual analysis of the impact of each of them, as provided in Table 9.

Table 9: Multiple linear regression of the two models on the risk of indebtedness.

Variable	Standardized coefficients			
	Model 1	VIF	Model 2	VIF
Gender Dummy	0.060	1.080	0.048	1.079
Marital Status Dummy	-0.041	1.188	-0.041	1.182
Skin Color/Ethnicity *Dummy*	-0.030	1.129	-0.043	1.130
Highest Completed Education Level *Dummy*	0.136*	1.122	0.125*	1.159
Money Dependents *Dummy*	-0.036	1.194	-0.032	1.197
Housing *Dummy*	-0.128*	1.049	-0.117*	1.049
Family Income *Dummy*	-0.104*	1.165	-0.116*	1.182
Spending *Dummy*	0.353*	1.096	0.317*	1.314
Occupation *Dummy*	0.018	1.076	0.037	1.090
Has a credit/debit card	-0.009	1.111	-0.021	1.121
Financial Literacy	-0.418*	1.166		
Financial Attitude			-0.245*	1.296
Financial Knowledge			-0.107*	1.296
Financial Behavior			-0.241*	1.296

Note: Model 1: R^2: 0.543; KS: 0.200; DW: 1.718; Pesarán Pesarán: 0.173
Model 2: R^2: 0.558; KS: 0.152; DW: 1.752; Pesarán Pesarán: 0.135
*Significant at 5%

The Kolmogorov-Smirnov, variance inflation factor, Durbin Watson, and Pesarán Pesarán tests were performed to ensure that both regressions meet the indicated assumptions. Both models meet all assumptions, presenting normality in the distribution of residues, absence of multicollinearity, absence of autocorrelation, and homoscedasticity.

Apart from financial literacy and its dimensions, both models were statistically significant for the same covariates, which pointed in the same direction and were in the same order of impact.

It is impossible to determine that gender, marital status, skin color, financial dependents, occupation, and the fact of having a credit/debit card impact the propensity to indebtedness when assuming a statistical significance of 5%, given the significance presented by these covariates. The fact that gender does not present statistically significant differences in the risk of indebtedness contradicts results obtained in other populations, which identified gender differences in the risk of indebtedness of the generation Z, which can be explained by the cultural, social and economic differences of the populations.

In addition to the positive impact, mandatory financial literacy programs do not affect high school graduation rates (Urban, 2023). On the other hand, this result differs from other studies that visualized women (Matos et al., 2019), having a credit card, being single, and not having dependents as aggravating factors of the risk of indebtedness (Flores and Vieira, 2014).

According to the coefficients, the main factor that increases the risk of indebtedness is that the individual spends more than they earn. The result converges with the studies of Flores and Vieira (2014) and Azma et al. (2019), who found that individuals who spend without adequate planning are more prone to indebtedness.

Subsequently, schooling also has an impact on the greater propensity to indebtedness. Individuals who attended no more than elementary school had a higher risk of indebtedness. Low education was also shown to aggravate the risk of indebtedness by Flores and Vieira (2014) and is associated with low levels of financial literacy (Duarte, 2021).

On the other hand, owning your own home has been shown to reduce debt risk. Not having to pay rent reduces the individual's monthly expenses, which can allow more significant financial slack and less propensity to go into debt. Ong et al. (2019) indicated the large number of individuals who end up severely indebted due to housing financing, recommending that policymakers beware of exposing economies to unacceptably high levels of debt-driven consumption.

Income was also presented as a factor influencing the propensity for indebtedness. Belonging to higher income classes (A, B, or C) reduces the risk of indebtedness, which was also identified by Azma et al. (2019) and Flores and Vieira (2014) as vital in the propensity for indebtedness.

Financial literacy was the factor that most impacted reducing the risk of indebtedness identified in this and other studies (Chotewattanakul et al., 2019). Literacy significantly impacts the financial life course of Gen Z individuals (Junita and Panjaitan, 2022), reducing financial fragility and increasing financial well-being (Philippas and Avdoulas, 2019). It also reduces the tendency to the materialism of these young people (Dewi and Muchtar, 2023) and the population as a whole (Potrich and Vieira, 2018).

Financial attitude and behavior had very close results in reducing the propensity to indebtedness, superior to financial knowledge, when each dimension of financial literacy was segregated in the second model. This result indicates that behavioral aspects and gratification postponement has a more intense effect reducing the indebtedness risk compared to more technical aspects of financial knowledge.

Despite the difference in impact, it is essential to point out that the dimensions are potentially correlated when considering exclusively young people, as indicated by Amagir et al. (2020). This result is based on the OECD (2020), which indicates that solid public policies aimed at improving the population's financial literacy should not be restricted to actions aimed at financial knowledge but also encompass attitudes, skills, and behaviors.

IV. Conclusion

This study evaluated the significance and impact of the financial literacy of young Gen Z Brazilians on their risk of indebtedness. It was identified that this factor is crucial to reduce risk. It was demonstrated that this is the most influential factor in reducing the risk of indebtedness, surpassing factors related to individual profile and background.

Despite the low risk of indebtedness identified in the study, the high percentage of indebted persons in the country highlights the need to take action to reverse this situation. Such actions should mainly target young people, as they constitute the present and future workforce of the country and need adequate financial and mental well-being to work and accumulate resources. Judit et al. (2020) state that educational institutions and voluntary NGOs are the leading forces in disseminating financial literacy and should start from the primary education of individuals in schools and within the family environment.

The financial behavior of the respondents indicated little concern about accumulating resources for the future, although the financial attitude suggested a concern about the future when spending money. Vieira et al. (2014) observed that individuals who value the possession of money are less prone to indebtedness since they are more willing to save and spend only what was previously planned. This highlights the latent need to implement savings behavior in actions aimed at reducing the risk of indebtedness, given that this study showed that behavioral factors were more critical in reducing debt than financial knowledge.

Financial knowledge has also been shown to reduce the risk of indebtedness, although it was less relevant than the other dimensions. The respondents answered approximately half of the questions correctly, which can be considered an unsatisfactory result due to the low complexity of the questions. The results suggest that actions that cover the three dimensions of financial literacy are necessary to improve financial literacy and reduce the risk of indebtedness of Brazilian Gen Z, as suggested by the OECD (2020).

Future generations should face more financial risks than the current generation, given longer life expectancy and changes in social security schemes. There is a strong tendency to widen social and economic inequalities if they do not receive adequate financial literacy interventions (OECD, 2020). According to the present study, this is especially alarming for the most vulnerable populations with worse financial literacy rates (Lusardi and Mitchell, 2014; OECD, 2016) and a greater propensity to indebtedness.

Reiterating the OECD (2020) also recommends actions aimed at financial education in schools, reducing disparities in financial literacy due to socioeconomic factors and potentially reducing inequalities when becoming adults, as these kind of intervention in schools present significant and intense results in financial knowledge and financial behavior of students (Kaiser and Menkhoff, 2020).

To achieve a homogeneous effect in an intervention that aims to reach schools, especially after the COVID-19 disruptions in the schools and study systems around the world causing learning disparities, it's crucial to assess learning levels regularly, prioritize teaching the fundamentals and increase the efficiency of instruction (Alejo et al., 2023).

Interventions for financial education in young people have proven to have strong and significant effects on financial knowledge, behavior, preferences, and personal traits. These effects are more pronounced compared to interventions aimed at improving academic performance. The effectiveness of these interventions is primarily driven by their compulsory incorporation into the curriculum. Therefore, it is recommended that financial education be made a mandatory part of the curriculum to achieve optimal outcomes (Frisancho, 2020).

Financial literacy (Lyons and Kass-Hanna, 2021) and financial well-being (CFPB, 2015) are some drivers of financial inclusion. Gen Z is being subjected to the offer of increasingly complex financial products in a scenario of digitization of financial services (Tay et al., 2022), increasingly requiring financial knowledge and skills for citizens to minimize the risks and maximize the benefits of their financial decisions (Lusardi and Messi, 2023). Thus, actions are suggested in different environments that encompass the three dimensions of financial literacy to build public policies directed mainly to young people with low income and education, identified as more vulnerable to the risk of indebtedness.

The study has limitations because it is a research survey, where respondents could not provide accurate, honest answers or choose more socially accepted alternatives. It’s recommended that future studies conduct research with different generations to compare the risk of indebtedness and include behavioral factors in the survey which can compromise financial literacy and therefore increase the risk of indebtedness, such as compulsive buying (Aw et al., 2018), social and psychological aspects (Bamforth et al., 2017), parental direct teaching (Mahapatra et al., 2023), involvement in saving money (Te-eni-Harari, 2016) and cultural factors (Sachitra, 2019).

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