Investor level of diversification, quality of life and health, and financial well-being: a regional analysis

Nível de diversificação, qualidade de vida e saúde e bem-estar financeiro do investidor: uma análise regional

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Resumo
Este estudo tem como objetivo investigar a associação entre diversificação e as variáveis de Bem-Estar Financeiro, qualidade de vida e saúde, depressão e ansiedade dos investidores (Sudeste *versus* demais regiões). Utilizaram-se como *proxies* a soma dos ativos para diversificação; a escala de WHOQOL-100 para qualidade de vida e saúde; e o inventário de Beck para ansiedade e depressão; e como indicador de bem-estar financeiro adotou-se o conceito do serviço de Proteção ao Crédito. Por meio da modelagem de equações estruturais e teste de invariância, os resultados apontaram uma relação positiva entre diversificação e bem-estar financeiro. Ademais, o bem-estar financeiro revelou uma relação positiva com a qualidade de vida, em contrapartida, apresentou uma relação negativa com as escalas de ansiedade e depressão. Em relação aos testes de invariância, os resultados indicaram que não há diferenças significativas entre os investidores do Sudeste e os aplicadores das demais regiões.
Palavras-chave: diversificação de ativos, qualidade de vida e saúde, bem-estar financeiro.

Abstract
This study aims to investigate the association between diversification and the variables financial well-being, quality of life and health, depression and investor anxiety (Southeast versus other regions). The sum of assets for diversification were used as proxies, the WHOQOL-100 scale was used for quality of life and health, and the Beck inventory was used for anxiety and depression. The concept of the Credit Protection service was adopted as an indicator of financial well-being. Through structural equation modeling and invariance testing, the results showed a positive relationship between diversification and financial well-being. Furthermore, financial well-being had a positive relationship with quality of life; on the other hand, it had a negative relationship with the anxiety and depression scales. The results of the invariance tests indicated that there are no significant differences between investors from the Southeast and investors from other regions.
Keywords: asset diversification, quality of life and health, financial well-being.

1 Introduction

Brazil is currently experiencing one of the lowest interest rates in history, set at 3.5% in May 2021, according to information from BACEN (2021). This has made fixed income investments less interesting.

In this scenario, there was a substantial increase in the number of individual investors in the stock exchange, from 813,291 at the end of 2018 to 3.5 million individuals at the beginning of 2021 (B3, 2021).

The year 2020 in Brazil was marked by economic recession due to the Covid-19 pandemic. This context of uncertainty and falling interest rates has made investors look for a rational investment analysis and for more efficient portfolios through diversification (B3, 2021; Bertucci, Souza & Félix, 2006).

Diversification is an investment practice that seeks to minimize the risks and maximize the returns of an asset portfolio (Markowitz, 1999), and has attracted the attention of many researchers (Calvet, Campbell & Sodini, 2007; Goetzmann & Kumar, 2008; Guiso & Jappelli, 2008; Hanson & Kalthoff, 2018). However, the literature indicates that individuals are not very diversified (Goetzmann & Kumar, 2008; Guiso & Jappell, 2008; Hanson & Kalthoff, 2018), leaving them exposed to excessive risks (Guiso & Jappelli, 2008).

There is evidence that participation in the stock market, bonds and mutual funds are associated with financial well-being (Collins & Urban, 2018), since investment strategies are capable of reducing or increasing an individual's wealth and well-being (Feng et al., 2019). In addition, well-being encompasses factors such as health, family and other non-financial elements (Collins & Urban, 2018), as well as quality of life (Skevington & Böhnke, 2018), and has become an increasingly relevant topic, as financial markets are becoming increasingly complex (Vieira, Bressan & Fraga, 2021).

Several authors have analyzed how financial well-being is related to strategies and errors/returns on investments (Calvet, et al., 2007; Feng et al., 2019) and the stock market (Collins & Urban, 2018). Studies have shown that bad financial decisions are negatively related to well-being and health (Guiso & Jappelli, 2008; O'Neill et al., 2005a).

Bressan, Pace e Pelizzon (2014) explained that the relationship between health status and investment choices is discussed in the literature (Bressan, Pace & Pelizzon, 2014; Patterson & Daigler, 2014). O'Neil et al. (2005) highlighted the need for research about the effects of personal finance on mental health. Furthermore, Richardson et al. (2017) commented on the existence of a bidirectional relationship between personal finance and mental health.

The topic of mental health (depression and anxiety) has become a growing concern in recent years when it comes to psychological illnesses (MS, 2020). In the Brazilian context, researchers (Campara, Vieira & Potrich, 2017; Silva, Armada & Rogers, 2020) have analyzed financial behavior, financial well-being and psychological variables from different perspectives. Silva et al. (2020) found a negative relationship between the level of financial well-being and an individual's mental health, and a positive relationship between FWB and quality of life and health.

Despite this scenario, no studies were found that jointly addressed the relationship between diversification and quality of life and health (depression and anxiety), which indicates a gap to be filled. In addition, this study intends to outline a regional overview of the variables of interest. Bhavsar et al. (2019) state that the specific characteristics of regions and society may be related to mental health. Joo (2003) reported that socioeconomic factors influence the behavior of individuals in a region. Complementarily, D'Agostino, Rosciano e Starita (2021)

reported that financial well-being is different in specific regions of European countries. According to Song, Wu e Zhou (2020), some regions can instigate the likelihood and intensity of investment on assets.

These studies have become drivers of a new line of research to determine whether these differences exist in Brazil. Therefore, this study intends to compare the relationships of interest (between diversification, QLH and FWB) in the Southeast region to the other regions in Brazil, given that the Southeast has the best statistics in terms of economic development indicators, GDP and number of individual investors in the country (B3, 2021).

The following research questions arose based on the aforementioned context: How is the level of diversification related to the financial well-being, quality of life and health, depression and anxiety of investors in the Southeast region? Are there differences in these relationships for investors in other Brazilian regions?

In this context, the main goal of this study is to investigate the association between diversification and the variables of FWB, quality of life and health, depression and anxiety for investors in the Southeast region compared to other regions. Most of the studies on this topic were carried out at the country level, while this study furthers the literature by addressing the regional level.

This research is relevant for governments, brokerage agencies and financial institutions, as it offers a line of reasoning that enables more familiarity with the profile of investors in terms of degree of diversification, financial well-being, and mental, physical and social aspects, in order to help organizations make better decisions about concessions and credit conditions. In addition, this study will allow a better relationship between theory and practice by providing a greater understanding of the subject and enabling a vision of both the national and regional scenario, in order to facilitate the implementation of the models in future research, since few Brazilian studies have researched the topic.

2 Theoretical Framework

2.1 Asset Diversification and Financial Well-Being

Since 2016, the macroeconomic context in Brazil has seen several decreases in interest rates, with a rate of 7.10% in 2017, 6.50% in 2018, and 4.68% in 2019(ADVFN, 2020). In addition, the GDP (Gross Domestic Product) has grown by 1.06%, 1.12% and 1.14% in the same years respectively (IBGE, 2018), which caused the investment industry to amount to R$ 3.3 trillion in 2019 (ANBIMA, 2020). However, in 2020, a recession in the Brazilian economy caused by the Covid-19 pandemic led to accelerated inflation (measured in Brazil by the IPCA), with high food prices, decreases in the benchmark interest rate Selic (ADVFN, 2020), and a 4.1% drop in the GDP (IPEA, 2020a). In turn, 2021 saw an increase in the Selic rate, which reached 4.25% in July with elevation prospects by the end of the year, and projection of 5.3% for the GDP (ADVFN, 2021). In turn, 2021 saw an increase in the Selic rate, which reached 4.25% in July with elevation prospects by the end of the year, and projection of 5.3% for the GDP (ADVFN, 2021).

In this context, the changes in interest and inflation rates are essential factors to determine which segment to apply resources in (Bertucci, et al., 2006). Additionally, the risk/return ratio guides decisions on how to build investment portfolios (Bertucci, et al., 2006).

Historically, these indicators are the result of Markowitz's study (1999), which explained the importance of portfolio diversification in investment analysis, a strategy employed for rational investment analysis that enables a set of efficient portfolios.

Given the above, the topic of diversification has attracted the attention of many researchers (Goetzmann & Kumar, 2008; Guiso & Jappelli, 2008; Hanson & Kalthoff, 2018). However, Guiso and Jappelli (2008) and Hanson and Kalthoff (2018) highlighted that investors have been adopting a non-diversification apporach in their portfolios due to behavioral factors and a low level (or absence) of financial knowledge, a fact that makes them more exposed to excessive risks. Calvet et al. (2007) argue in their study that not participating in asset markets is a serious investment error.

Several factors can influence the investment decisions of families, including the demographic characteristics of their members (age, gender, etc.), financial resources available to the family (indicators of wealth and income), health conditions, and more (Rosen & Wu, 2004). In addition, bad financial decisions are negatively related to well-being and health (Guiso & Jappelli, 2008; O'Neill et al., 2005a).

Financial well-being has become an increasingly relevant topic, as financial markets are becoming increasingly complex due to the amount of options for investment and loan (Vieira et al., 2021).

In this context and considering the literature presented, the first hypothesis of this study is:

H1: A positive relationship is expected between investor diversification and financial well-being.

2.2 Financial Well-Being and Quality of Life/Health:

Financial well-being can be measured by objective indicators related to income and wealth, and involves financial and subjective results associated with financial capacity and satisfaction/situation, as well as other non-financial factors such as health, quality of life and happiness (Mahendru, 2020).

The international literature includes studies that investigated the financial well-being (Collins & Urban, 2018; Gutter & Copur, 2011; O'Neill et al., 2005a;), mental health and finances (Bressan et al., 2014; Patterson & Daigler 2014). In addition, there are Brazilian researchers who analyzed the well-being of individuals (Campara et al., 2017; Silva et al., 2020). Additionally, D'Agostino, et al. (2021) reported that the degree of financial well-being is not directly related to wealth, due to the socioeconomic characteristics of the population and the cultural elements of a country.

Meanwhile, Bressan et al. (2014) explained that the relationship between health status and investment choices is discussed in the literature (Bressan et al., 2014; Patterson & Daigler, 2014). Researchers such as Bressan et al. (2014), and Patterson and Daigler (2014) indicated an association between mental health and investment choices.

On the same subject, Richardson et al. (2017) highlighted the existence of a bidirectional relationship between mental health variables (depression and anxiety) and financial situation. The same topic was addressed by O'Neill et al. (2005a), who reported on the need for research to determine the relationship between personal finance and mental health (depression and anxiety) and vice versa. It is clear from the literature presented that there is a lack of research to determine how the diversification of the investment portfolio is related to well-being and quality of life and health, anxiety and depression. In this respect, this study created the following hypotheses:

H2: An inverse relationship is expected between the level of diversification of investors and their anxiety rating.

H3: An inverse relationship is expected between the level of diversification of investors and their depression rating.

It is important to understand that depression and anxiety have been some of the greatest health concerns in Brazil and worldwide. According to statistics from the World Health Organization (WHO), depression is predicted to be the most common disease by 2030; it has also been considered the evil of the 21st century, reaching more than 264 million people of all ages globally (OMS, 2021).

There has been research (Catunda & Ruiz, 2008; Gutter & Copur, 2011) indicating the need for studies on the effects of financial condition/behaviors on quality of life, anxiety and depression. Considering the above, the fourth hypotheses in this study is proposed: Considering the above, the fourth hypotheses in this study is proposed:

H4: An inverse relationship is expected between the level of diversification of investors and their quality of life and health.

The literature explored on this topic revealed a lack of studies addressing quality of life and health (depression and anxiety) jointly, together with financial well-being and diversification, using the research by Campara et al. (2017) and Silva et al. (2020). Given this gap in the literature, we present the Conceptual Model adopted in this research below.

Figure 1 – Conceptual Research Model
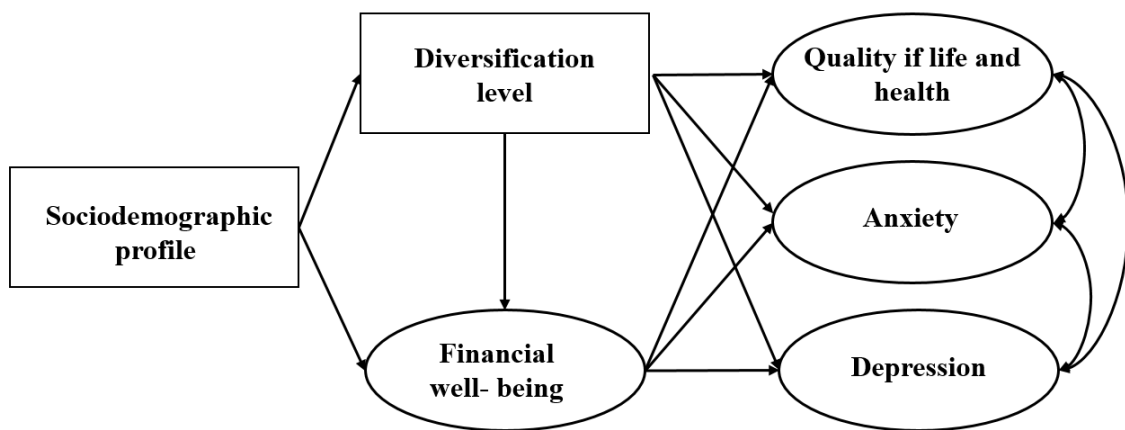
Source: Elaborated by the authors
Note: Sociodemographic profile: Separate variables for sex, age, education, income, number of dependants, and marital status.

Additionally, Song et al. (2020) explained that studies on how regional characteristics can affect portfolio decisions are still recent, and that little attention has been given to regional factors within a country. The authors conducted a study in China and highlighted that inequality

of opportunities (social class, jobs, income, etc.) in certain regions influences the likelihood and intensity of investment on assets.

2.3 Regionality in Brazil

Studies on regionality have gained prominence in the area of administration in recent years, especially at the end of the twentieth century, becoming a trend among academics and enabling comparisons between the regions of the country. (Gil, Oliva & Gaspar, 2008). Given the regional differences, Gil, Oliva and Gaspar (2008) mentioned a trend of studies on regionality, seeking to improve research on regional management and development. However, Song et al. (2020) reported that studies analyzing portfolio decisions in the regional context are still considered scarce.

From the perspective of regional economic development, it is clear that the most developed regions attract more capital and qualified work than less developed regions. (Hirschman, 1958). Economic development in Brazil in concentrated in the Southeast region, where the states of São Paulo and Rio de Janeiro are located, which is home to large industrial parks in the country (ANBIMA, 2020). In addition, the Southeast region has the largest volume and the largest number of bank accounts in the country. The region accounts for R$ 1.2 trillion in retail investments, and the state of São Paulo alone represents 39.1% of all investments of Brazilians (ANBIMA, 2020).

In addition, the state of São Paulo has the largest level of industrial production and the largest GDP in the country (IBGE, 2018). In 2016, the economy of São Paulo accounted for about 32.5% of the total wealth produced in the country, ranking 2nd in the national ranking of the Human Development Index (HDI) (IBGE, 2010a). Until May 2020, investments in the State of São Paulo were ranked first in terms of the volume of individual investors in the stock exchange (B3, 2020). In turn, the state of Rio de Janeiro has the second largest economy in Brazil, ranking second in terms of GDP. (IBGE, 2010b). It is ranked fourth in relation to the HDI. (IBGE, 2003a, 2010c). Regarding the number of individual investors, Rio de Janeiro comes in 2nd place with 15.32% of investors (B3, 2021).

Furthermore, the state of Minas Gerais ranks third in terms of GDP and ninth when it comes to the Human Development Index. (IBGE, 2010d). Until December 2020, the state was third in relation to the volume of individual investors in the stock exchange in the investment history (B3, 2020). Lastly, the state of Espírito Santo ranks 14th in the Brazilian GDP and seventh in relation to the HDI. It also ranks ninth in number of individual investors, with 1.26% of the country's total (B3, 2021).

2.4 Empirical Studies on Regionality

In the regional context in Brazil, Vidigal, Kassouf and Vidigal (2017) sought to determine the levels of economic well-being and compare them among Brazilian states. The results indicated that São Paulo ranked second in economic well-being in 2008, Minas Gerais ranked fifth, Rio de Janeiro ranked fourteenth, and Espírito Santo ranked tenth. From another point of view, Maragno et al. (2006) investigated the prevalence of common mental disorders (CMD) based on the coverage of the governmental initiative Family Health Program (Programa Saúde da Família – PSF), and found that there is no significant difference between the sociodemographic characteristics of the populations of the analyzed regions.

p. 6

In the international context, Stevanovic et al. (2017) evaluated the cross-cultural measurement invariance of the Children's Anxiety and Depression Scale (RCADS), which has 47 items divided into separation anxiety disorder (7 items), social phobia (9 items), generalized anxiety disorder (6 items), panic disorder (9 items), obsessive-compulsive disorder (6 items) and major depressive disorder (10 items) in 11 countries. The results showed that 4 items of the anxiety and depression scale (generalized anxiety, obsessive-compulsive disorder, social phobia and major depression) are not invariant, especially when considering two different cultural/ethnic groups, which indicates solid cross-cultural validity.

D'Agostino et al., (2021) researched well-being in European countries and found that northern European countries have the highest levels of general well-being. The results showed that, in most countries, better working conditions and higher levels of income and education are accompanied by higher levels of well-being.

Based on the literature above, this study sought to determine whether the results measured for the relationship between diversification/QLH/FWB in the national context are confirmed for the Southeast region. Therefore, we developed the following research hypothesis:

H5: There is no structural invariance between the Southeast group and other regions.

3 METHODOLOGY

3.1 Sample and Data Sources

In order to achieve the research objectives proposed, the basis for this study was a questionnaire prepared and tested previously by Silva et al. (2020) with investors registered with the Brazilian Securities Commission (Comissão de Valores Mobiliários – CVM). The sample had a total of 1047 individuals, divided into groups according to regions: The group representing the Southeast region had 670 individuals (148 from Rio de Janeiro, 415 from São Paulo, 19 from Espírito Santo, and 88 from Minas Gerais), and there were 377 respondents from other regions. The methods used and analyzed in this research were based on the original data prepared and examined previously by Silva et al. (2020), with treatments for missing and outliers, as well as reliable fits for estimation and validation of the model scales.

3.2 Analysis of the Variables and Scales Used

Depression and anxiety scales widely known in the literature were adopted to measure financial well-being, quality of life and health. The questionnaire used the Beck Depression and Anxiety Inventories (BDI and BAI), which have been applied in Brazil and presented construct and discriminant validity (Gorenstein & Andrade, 1998). The BDI scale has individual scores from 0 to 3 points, except for one question ranging from 0 to 6 points. The total score for each questionnaire is used to classify respondents into levels of depression: 0 – 13 minimal; 14 – 19 mild; 20 – 28 moderate; and 29 – 66 severe.

In turn, the Beck Anxiety Inventory (BAI) is a self-report scale with good reliability coefficients greater than 0.80, and the total score of each questionnaire is used to classify respondents into anxiety levels: 0 to 10 minimal; 11 – 19 mild; 20 – 30 moderate; and 31 – 63 severe.

This study also used the WHOQOL-Bref quality of life scale (an abbreviated instrument of the WHOQOL-100), which is recognized by several authors and has satisfactory

psychometric characteristics (Fleck et al., 1999). The WHOQOL-Bref has 26 questions about 4 health domains (physical health, psychological, social relationships and environment), with Likert-type answers: 1 for poor quality of life and 5 for excellent. Scores are normalized to a base of 100 for interpretation purposes.

To measure the financial well-being of the sample, the Financial Well-Being Indicator (Indicador de Bem-Estar Financeiro – BEF) of the Credit Protection Service (Serviço de Proteção ao Crédito – SPC Brasil) was used, which follows the concept proposed by the Consumer Financial Protection Bureau (CFPB). The instrument was performed in Brazil and validated on a national scale (Silva et al., 2020). The indicator has only one factor, with 10 questions supported by four pillars: (i) control over finances; (ii) protection against unforeseen events; (iii) financial goals; (iv) and freedom to make choices.

To analyze the degree of asset diversification, this study used the number of types of assets in the portfolio; according to the research instrument, these could be: savings, stocks, public securities, bank deposit certificates (CDB), real state and agricultural credit bills (LCI/LCA), debentures, fixed income funds, multimarket funds, equity funds, real estate investment funds, certificate of structured operations (COE), options, gold, exchange, other types of investments, and no type of investment. This procedure was also adopted by Mendes and Abreu (2006), who used various assets such as deposits, treasury bills and public debt certificates, stocks, bonds, investment funds or derivatives to measure the level of asset diversification.

3.3 Methodological Procedures and Data Analysis

This study sought to test hypotheses based on statistical procedures, such as Structural Equation Modeling (SEM) and multigroup analysis (Invariance Test), aiming to determine whether the SEM structure is equivalent (invariant) in different groups with different characteristics. We then employed the Cronbach's Alpha and McDonald's Omega reliability tests.

The Robust Diagonal Weighted Least Squares (DWLS) method was used to analyze the model due to the assumptions of normality not being met (Mîndrilă, 2010) in the JASP software. The following fit indices we adopted for a better evaluation of the models: (I) Comparative Fit Index (CFI) with target values above 0.95; and (ii) Root Mean Square Error of Approximation (RMSEA) with target value between 0.06 and 0.08 (90% CI). The RMSEA limits must be less than 0.10 with a 90% confidence interval (Brown, 2006).

To verify unidimensionality, all models were estimated using bootstrap. Regarding the (single) unidimensional item congruence, the values showed estimates greater than 0.95 for all scales. Concerning the Common Explained Variance (CEV) and the Common Explained Variance of the item (I-CEV), the estimates were also considered satisfactory, with values greater than 0.85. With respect to the Mean of Item Residual Absolute Loadings (MIREAL) and the Item Residual Absolute Loadings (I-REAL), the values were lower than 0.300. Therefore, the estimates indicated that the data can be treated as one-dimensional (Ferrando & Lorenzo-Seva, 2018).

Lastly, we sought to prove whether the structural model is confirmed in the regional context, that is, whether there is any difference for the rest of the sample. To that end, the $\Delta\chi^2$ test and the CFI test were used, since the $\Delta\chi^2$ are sensitive and influenced by the sample size (Cheung & Rensvold, 2002). The recommendation of comparing the models (between groups) through CFI variation is considered a robust fit statistic (Cheung & Rensvold, 2002) to

determine the invariance of each model tested. To determine the invariance of the measurement, the tested model must present CFI differences (ΔCFI) lower than 0.01 (Cheung & Rensvold, 2002).

4 RESULTS

4.1 Sample profile

The descriptive analysis in Table 1 shows the profile of the respondents.

Table 1 – Profile of respondents in the Southeast region

Variables	n	N	%	Variables	n	N	%
Sex				**Anxiety rating**			
				Minimal		502	74.9
Male		536	80	Mild		93	13.9
Female		134	20	Moderate		61	9.1
				Severe		14	2.1
Age				**Depression rating**			
				Minimal		501	74.8
Minimum	20	1	0.1	Mild		97	14.5
Min. to Average	21-47	359	54	Moderate		52	7.8
Average to Max.	47-86	310	46	Severe		20	3.0
Education level				**No. of assets**			
Elementary and							
high school		56	11.1	Minimal	0	79	11.8
Undergraduate		267	39.9	Min. to Average	1-4	332	49.5
degree		347	51.8	Average to Max.	5-14	259	38.7
Graduate degree							
No. of dependants				**Financial well-being**			
None		226	33.7				
1		184	27.5	Minimum	0	3	0.4
2		121	18.1	Min. to Average	1-26	329	49.6
3		86	12.8	Average to Max.	27-40	338	50
4, 5 or more		53	7.9				
Income				**Quality of life**			
Up to 2 MW		45	6.7				
2 to 4 MW		101	15.1	Minimum	15	1	0.1
4 to 10 MW		237	35.4	Min. to Average	16-67	306	45.9
10 to 20 MW		160	23.9	Average to Max.	68-97	363	54
> 20 MW		127	19				

Source: Research results.
Grade: n: Corresponds to intervals; N: Corresponds to the number of individuals

The description indicated that 415 individuals are from the state of São Paulo (61.9%), 148 are from Rio de Janeiro (22.1%), 88 are from Minas Gerais (13.1%), and 19 are from Espírito Santo (2.8%). The description also indicated that most respondents (66%) are married or in a stable relationship, and do not have dependants (33%). Regarding the number of assets in the portfolio (level of diversification), the results showed that 49% of individuals in the sample invest in stocks, 42% invest in savings, 43% in public securities, and 40% in fixed income funds. CDBs represent 36% of investments, multimarket funds represent 31%, LCIs/LCAs represent 28%, real estate funds represent 26%, and stock funds represent 22%.

Additionally, debentures account for 16%, options account for 14%, and COEs account for 10% of investment options.

4.2 Bivariate Analysis

This study adopted Spearman's correlation, and the results indicated that age was significant for all variables. The QLH scale (0.432 p< 0.001) showed a positive correlation with FWB and with portfolio diversification (0.237 p< 0.001); that is, the higher the FWB, the greater the quality of life and the greater the level of diversification. Depression (-0.343 p< 0.005) and anxiety (-0.284 p< 0.001) showed a negative correlation with FWB. Diversification showed a negative correlation with anxiety (-0.185 p< 0.001) and with depression (-0.198 p< 0.001). That is, the higher the FWB and the number of assets in the portfolio, the lower the anxiety and depression ratings.

4.3 Models Tested

Based on the analysis of the initially proposed prototype (conceptual model), it was found that the quality of life, depression and anxiety scales were significant in relation to diversification and FWB. On the other hand, the sociodemographic profile of each of the variables separately indicated that age and education were not significant for FWB, and marital status did not show a significant relationship with any of the FWB and diversification variables, as shown in Figure 2.

Figure 2. Initial Model
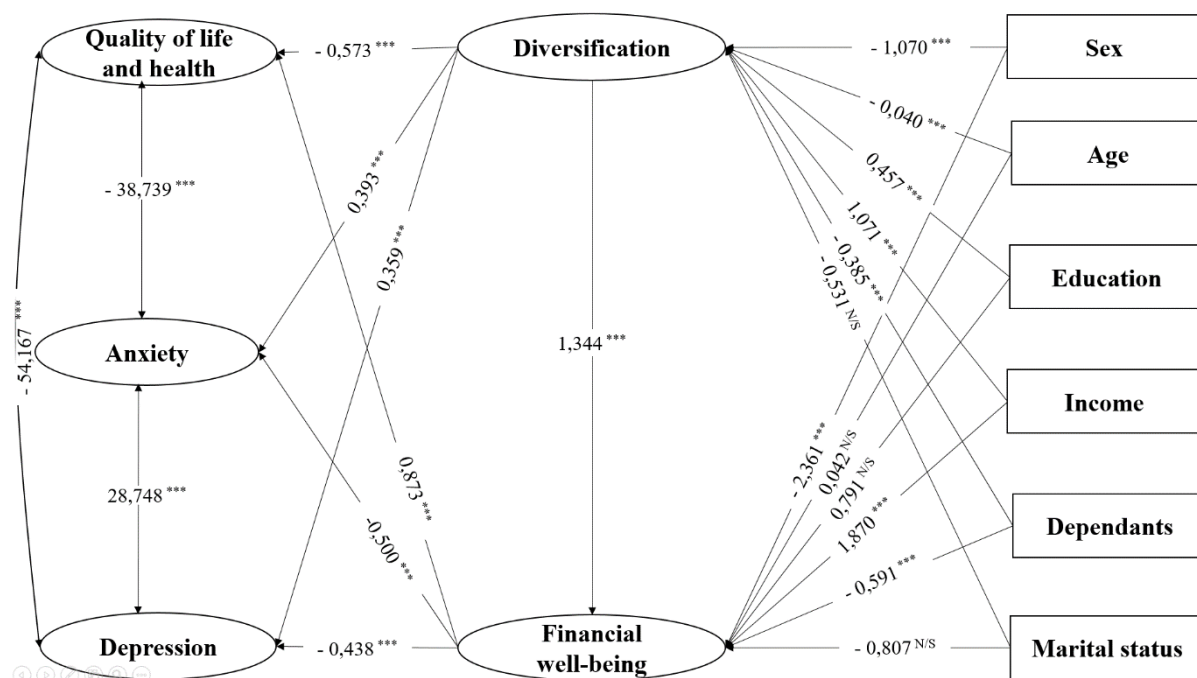
Source: Research results.

The estimates of the initial model required some changes (modification index), which were implemented as they were considered plausible from a theoretical point of view. A new

p. 10

model excluded non-significant paths, that is, less than 0.5 (HAIR et al., 2009), including age and education in relation to FWB.

The model confirmed that marital status has no statistical relationship with FWB and diversification; therefore, it was decided to remove the variable from the study. After these changes, a new path was included from age to QLF, anxiety and depression, as Silva et al. (2020) indicated the existence of a significant relationship between these variables, in addition to the significant correlations found in this study.

These changes enabled the validation of the final model, which was more parsimonious and had more acceptable values for the fit indices compared to the initial model. The CFI and TLI indices were more satisfactory in the final model (Table 2), with values within the limit considered ideal even though the chi-square statistic remained significant (p=0.000). The results found for the χ^2 difference showed that the model with the lowest χ^2 had a statistically better fit. (Milfont & Fischer, 2010). Regarding the χ^2/degrees of freedom ratio, the final model presented a value lower than 3, which is considered acceptable (Brown, 2006; Hair et al., 2009). For the RMSEA measurements, values below 0.05 are acceptable (Hair et al., 2009).

Table 2 – Fit Indices

Fit Indices	Initial Model	Final Model
(χ^2) Chi-square (value)	123.322	41,357
df Degrees of freedom	27	18
(χ^2/*df*) Chi-square/Degrees of freedom	4.56	2.29
P-value (χ^2)	0,001	0,001
CFI	0,966	0,992
TLI	0,930	0,979
RMSEA (90% CI)	0.058 [0.069, 0.048]	0.035 [0.049, 0.021]

Source: Research results.

The results of the final model were satisfactory in terms of global fit indices, as shown in Table 2.

4.4. Structural Model: Invariance Analysis

The good global fit indices found enabled the structural invariance analyses (Brown, 2006). We sought to determine whether the proposed model is fully fit for both regions, that is, whether there is invariance in the modeling.

The first step was to measure the invariance levels in the structural model for the Southeast states and other states.

The first model to be tested is called an unconstrained model, that is, no structural parameter is specified as invariant between groups (Cheung & Rensvold, 2002).

Figure 3 shows the non-standardized estimates. It is worth noting that diversification did not show a significant relationship with QLH, anxiety or depression, only with FWB. QLH and diversification showed non-significant and opposite estimates (-0.253 N/S Southeast and 0.197 N/S other regions).

**Figure 3. Configural Invariance**
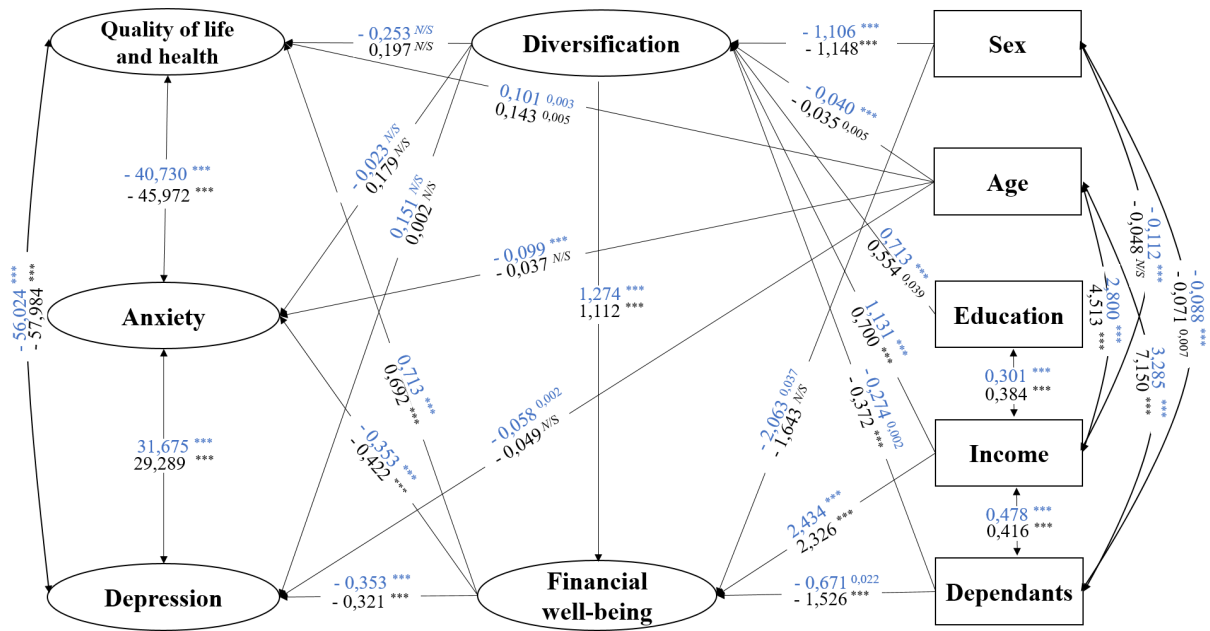
Source: Research results.
Notes: Group 1: Other regions; Group 2- Southeast.

Afterwards, the non-standard constrained model (regressions and intercepts) was performed to determine whether the model obtained was invariant between groups (Southeast and other regions). Figure 6 shows the regression weights with constrained groups.

Figure 6. Latent Mean Invariance
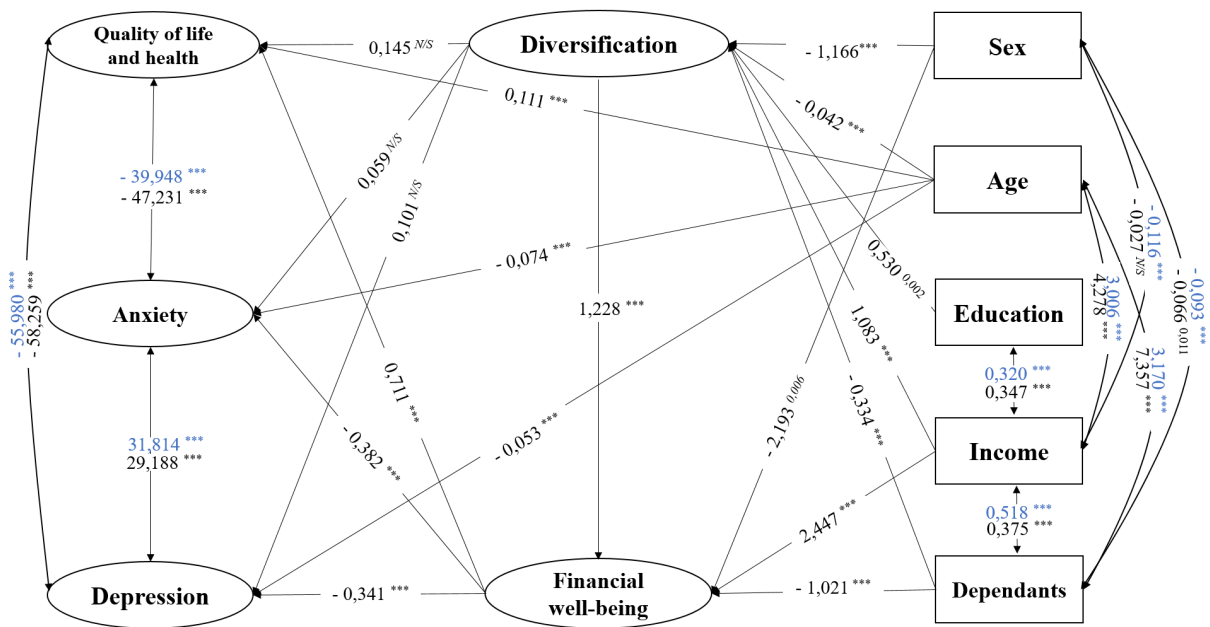
Source: Research results.
Notes: Group 1: Other regions; Group 2- Southeast.

Subsequently, analyzes of the goodness of fit for Model 1 (unconstrained) (Figure 3) and the constrained model (Figure 4) were performed in order to measure the configural, structural and latent mean invariance, which demonstrated acceptable indices of adequacy and fit, as shown in Table 3.

Table 3 – Fit Indices – Invariance Test

Fit Indices	Configural Invariance	Structural Invariance	Latent Mean Invariance
χ2: Chi-squared	54.269	80.092	101.771
df: Degree of freedom	36	54	64
Ratio: (χ2/*df*	1.50	1.48	1.59
p-value (χ2)	0.026	0.012	0.002
CFI	0.993	0.990	0.986
TLI	0.983	0.984	0.980
RMSEA (90% CI)	0.032[0.048,0.011]	0.031[0.044,0.015]	0.035 [0.049, 0.021]

Source: Research results.

The values in Table 4 indicated that the analyzes for measuring the invariance (χ2Structural - χ2de Configural) indicated invariance with a p-value of 0.104, that is, the model with fixed factorial weights fits both groups as well as the model with free factorial weights, demonstrating an equivalence in the measurement model for the regions. Subsequently, analyzes were carried out to test the invariance of the third model (χ2Latent Mean - χ2Configural), showing a difference with a statistically significant p-value of 0.012.

Despite the analysis of the chi-square invariance test, the analysis of the CFI variation was also performed in this study. Its results showed that ΔCFI = CFIR (0.990) – CFIU (0.993); since -0.003 is less than 0.01, we conclude that the model is invariant. To analyze ΔCFI = CFIR (0.986) – CFIU (0.993) = -0.007, the CFI variation indicated that there are no differences in the model, as it is less than 0.01.

Table 4 - Invariance Test – Southeast and other regions – Chi-square and CFI variation

	Comparison Model	χ2	*df*	Δχ2	Δ*df*	p-val	CFI	ΔCFI
1- Configural Invariance		54.269	36	-	-	-	0.993	-
2- Structural Invariance	Model 2 versus Model 1	80.092	54	25.823	18	0.104	0.990	- 0.003
3- Latent Mean Invariance	Model 3 versus Model 1	101,771	64	47,502	28	0.012	0,986	- 0,007

Source: Research results.

In short, the CFI variation indicated that the models are equivalent, which does not confirm the fifth hypothesis of the study, as no invariance was expected for the Southeast groups in relation to the other regions, supporting the invariance of the model in all tests. Based on the CFI variation, it is possible to affirm the stability of the model in different groups.

5. Results Discussion

The evidence confirms the first hypothesis of this study, which predicted the positive relationship between diversification and FWB. In other words, the greater the diversification, the higher the financial well-being, corroborating Hanson and Kalthoff (2018), who mentioned that improving investment strategies increases an individual's financial well-being, while wrong choices can reduce wealth and well-being (Feng et al., 2019) (Mugenda, Hira & Fanslow,

1990). Regarding H2, H3 and H4, it could be inferred that diversification is directly related to quality of life, depression and anxiety. Notably, financial well-being had a significant relationship with QLH, anxiety and depression, confirming the findings of Silva et al. (2020); the higher the FWB, the greater the quality of life, and the lower the depression and anxiety ratings.

The invariance found in the structural model between the groups indicates the refutation of the fifth hypothesis. The chi-square differences for measuring the structural invariance that considered the invariant model for the Southeast region found a p-value of 0.104. Regarding latent mean invariance, the model indicated that there is no invariance with a statistically significant p-value of 0.012. The CFI variation was used for confirmation, and the results showed that the ΔCFI for the two models (structural and latent mean) indicated values lower than 0.01, confirming the invariance between regions; that is, indicating that there are no differences in the model.

Complementarily, these findings confirmed that there are no differences between the regions studied, and that FWB is an important variable for the sample with significant and positive estimates in relation to diversification and quality of life; that is, the greater the diversification, the higher the FWB, and the higher the FWB, the better the quality of life. On the other hand, the higher the FWB, the lower the anxiety and depression ratings.

Based on the scarce regional literature found, the responses in each group were expected to be non-equivalent (that is, non-invariant) because each regional group and/or each state has different political contexts and practices regarding economic and social development. In a similar study, researchers such as Song et al. (2020) reported that the development of the stock market (that is, investment in assets) is uneven in different regions of China.

The results of the study found structural invariance for both groups, indicating that inequalities between regions do not affect the variables of the studied groups, confirming in part the research by Maragno et al. (2006), who found that no significant difference in the prevalence of common mental disorders between the sociodemographic characteristics of São Paulo and its districts. Researchers such as Stevanovic et al. (2017) found evidence that a few items (5) of the Revised Children's Anxiety and Depression Scale are non-invariant, which indicates its solid cross-cultural validity and suitability for cross-cultural comparisons regarding symptoms of anxiety and depression.

In turn, given the scarcity of regional studies on the same subject (no regional studies were found on diversification, quality of life and health, and financial well-being), we were unable to make in-depth analyzes of the results, contrasting our results with other similar studies, which shows the contribution and innovative nature of this study. Song et al. (2018) also mentioned that little attention has been given to regional factors within a country, and their impacts in terms of personal finance.

6 Final Remarks

This research investigated the relationship between the level of investment diversification, financial well-being, quality of life and health, depression and anxiety in the regional context. The main work that served as inspiration was Silva et al. (2020), but this study innovated by incorporating the level of diversification into the model. The method adopted was structural equation modeling and multigroup analysis (Invariance Test). To determine the invariance, three models were analyzed for each group. The first model tested was the so-called

unconstrained model, the second model was the structural invariance, and the third was the latent mean invariance test.

It was found that diversification had a positive relationship with FWB, confirming the first hypothesis of the study. However, no significant relationship was found for quality of life and health, depression and anxiety in any of the groups (Southeast and other regions), preventing the confirmation of H2, H3 and H4. On the other hand, financial well-being showed a positive and significant relationship with quality of life and a negative relationship with anxiety and depression, in both groups studied. Based on these findings, it is possible to infer that high levels of FWB are probably not determinant for investors to develop symptoms of anxiety and depression, or to obtain quality of life.

To verify the invariance, the hypothesis suggested that: (H5) there is no structural invariance between the Southeast group and other regions. In general, it was found that the estimates are equivalent in different groups, since the ΔCFI suggested that the model was invariant for the Southeast groups in relation to other regions, as this coefficient was lower than the allowed cut-off reference point (ΔCFI < 0.01). Therefore, the estimates did not confirm the study's hypotheses, and the results confirmed the invariance of the groups when comparing the Southeast with other regions of Brazil.

It can be said that the findings of this study provide evidence that contributes to the literature by addressing mental health factors, enriching it by presenting the behavior of the scales of financial well-being, quality of life and health in the regional context. As a practical contribution, this research provides institutions with greater familiarity with the behavior of individuals in relation to pathological disorders in the face of financial decisions and their investment portfolios.

This study is relevant due to the joint investigation of financial and health variables and due to the lack of studies on diversification, financial well-being and quality of life and health. This work has some limitations, as the sample used includes individuals who mentioned the effects of pathological symptoms in the last two weeks, but the scales proposed can be used over time to measure the longitudinal invariance. It is suggested that future studies examine the invariance results using the scales separately to check for invariance between regions.

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