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Socieconomic and demographic characteristics and retirement: a descriptive study

Características socioeconômicas e demográficas e aposentadoria: um estudo descritivo

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Abstract
This paper assesses the correlation between socioeconomic and demographic variables and the individuals' perceptions about retirement. Using data from the "Raio X do investidor", a survey conducted by the Brazilian Association of Financial and Capital Markets Entities (ANBIMA) in partnership with Datafolha, we use descriptive analysis and logistic regressions to study the perception of individuals regarding retirement. Our main results suggest that the genders have different perceptions about retirement. The study also reinforces that individuals with lower education and income levels are more likely to choose the social retirement system in Brazil, INSS, as a strategy. The findings support the existing inequalities in the country and are useful for political agents and future strategies of social security evaluation. This research contributes to personal finance studies, such as Potrich, Vieira, and Kirch (2015), with innovations focused on retirement.
Keywords: planning, retirement,. personal finances.

Resumo
O artigo avalia a correlação entre variáveis socioeconômicas e demográficas com as percepções dos indivíduos sobre aposentadoria. Para isso, a pesquisa faz uso dos dados da pesquisa "Raio X do investidor", realizada pela Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais (ANBIMA), com parceria do DataFolha. A investigação foi realizada por meio de análise descritiva e regressão logística, tendo como variável dependente perguntas sobre aposentadoria que captaram questões específicas sobre a temática, como estratégia de aposentadoria, padrão de vida esperado e idade que o indivíduo pretende se aposentar. Os principais resultados apontam para percepções distintas acerca da aposentadoria de acordo com o gênero dos indivíduos. O estudo também reforça que indivíduos com menores níveis de escolaridade e renda são mais propensos a escolher o INSS como estratégia para aposentadoria. Os achados reforçam desigualdades existentes no País e apresentam relevância para agentes políticos e estratégias previdenciárias. O artigo contribui ao complementar estudos de finanças pessoais, como Potrich, Vieira e Kirch (2015), inovando com o foco nas questões de aposentadoria.
Palavras-chave: planejamento, aposentadoria, finanças pessoais.

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1 Introduction

Financial planning is essential for achieving goals at different times in life. Potrich, Vieira, and Kirch (2015) mention that financial literacy is paramount in decision-making.

Individuals face daily financial decisions that can affect their quality of life in the present and the future. Is it necessary to think about the future when saving? How much should be saved? Which financial market investments should be chosen? What are the dangers presented by different loan modalities? By asking such questions, people with greater knowledge about finance can make more assertive decisions and avoid financial problems throughout their lives.

In this paper, we explore the perception of individuals regarding retirement. To this end, socioeconomic and demographic characteristics were investigated in relation to people's perceptions of financial planning for retirement. Potrich, Vieira, and Kirch (2015) point out that socioeconomic and demographic factors are related to individuals' financial literacy levels. In addition, Tokar Asaad (2015), confirming Potrich, Vieira, and Kirch (2015), specifies that variables such as gender, age, marital status, race, education, and individual and family income are related to people's financial decisions.

From an academic point of view, this paper adds to Tokar Asaad (2015), Shin, Kim, and Heath (2019), and Lusardi and Mitchell (2007) by directly relating a set of socioeconomic and demographic characteristics to the decisions people make about retirement. The studies above emphasize the individual's financial literacy level and do not approach financial choices in isolation. On a practical level, this research is relevant due to recent retirement-related developments in Brazil. In 2019, the Proposal for Amendment to the Constitution No. 6 (PEC 6/2019) was approved, becoming Constitutional Amendment No. 103 of 11/12/2019, which changed part of the social security system. The main alteration produced by the Amendment increases the contribution time for retirement, which concerns all Brazilians who rely on the current pension system.

To mitigate the effects of the Amendment, individuals can finance their retirement through financial investments, but, as noted by Lusardi and Mitchell (2007), few people plan for retirement as they lack sufficient knowledge and skills for doing so; this presents an even more complex scenario for blacks and women. In addition, Shin, Kim, and Heath (2019) show that of the group of people who do save, most do not invest enough.

Hence, based on the referenced literature, we investigate socioeconomic and demographic variables to determine those that principally contribute to Brazilians' retirement planning. We use data from the "Raio X do investidor", a survey carried out in 2017, 2018, and 2019 by the Brazilian Association of Financial and Capital Market Entities (ANBIMA) in partnership with Datafolha.

The study was carried out nationwide and captured more than 3,000 respondents per survey. The questionnaires for the interviews, in general, retained the same content, facilitating comparisons across the years. Briefly, the questions captured personal profiles, Brazilians' relationships with money, investment profiles, levels of financial education, and specific issues about retirement.

Therefore, the surveys were interconnected and compared among the 2017, 2018, and 2019 administrations to capture a behavioral trend that describes the poor financial planning characteristic of Brazilians' retirement. Specifically, we aim to answer the following question: What are the socioeconomic and demographic variables that correlate with individuals' perceptions of retirement?

Our findings confirm the results of some cited studies about financial education focusing on retirement. Regarding the desire to retire through the social system (Instituto Nacional do Seguro Social – INSS), the variables of gender, having children, region, professional occupation, income, and education are relevant. Regarding the degree to which individual financial contributions to the INSS serve as a savings strategy for retirement, we find that region, employment characteristics, income, and education are relevant predictors.

People were also asked about their perceptions of a better future standard of living. On this subject, we find that age, gender, having children, marital status, region, and occupation are relevant predictors. Finally, regarding the age at which the individual wishes to retire, we find that gender, region, work, and education are important variables.

2 Literature Review

Financial literacy is paramount for individuals to make coherent financial decisions, in addition to serving as a parameter by which to classify the country's development. Lusardi and Mitchell (2014) found that in several countries, the population has a low financial education level. In Brazil, such low financial education is evident, and according to Potrich, Vieira, and Kirch (2015), the worst rates are present in black women with low incomes and lacking in academic training. As a result, this group is furthest from achieving financial well-being.

Financial behavior, in turn, describes the set of actions taken regarding using money in everyday life. Such attitudes are influenced by the relationship between the level of confidence (overvaluing one's opinion) and the individual's knowledge. Specifically, confidence needs to be less than knowledge, since its excess creates risky behavior (Tokar Asaad, 2015).

Thinking about the impacts of education and financial behavior on retirement, Dos Santos et al. (2017) note that most people who finance their retirement have completed higher education level and consider age an essential factor in retirement planning. In addition, Shin, Kim, and Heath (2019) find that monthly retirement savings are below the recommended level. The researchers realized that saving money for retirement can be considered an expense in the eyes of many individuals.

Recognizing the value that financial planning has on retirement is of interest to others, not merely to future retirees. The lack of resources makes people more dependent on public support, which may not have the capacity to support such a volume of dependents (Van Rooij, Lusardi, & Alessie, 2012). Additionally, Lusardi and Mitchell (2014) determine that government assistance can interfere with how the population accumulates its savings, causing them to be supported only by the social security system. In Brazil, however, the pension system has suffered budget cuts, which has consequently placed more responsibility for retirement planning into the hands of individuals (Silva et al., 2017).

Lusardi and Mitchell (2014) acknowledge that saving money and thinking about the future is not something trivial, as it is necessary to know financial market products in theory and practice and to identify the individual's financial shortcomings. In this way, government interventions may be inefficient, as financial education should be aligned with personal expectations on the subject (Fernandes, Lynch Jr., & Netemeyer, 2014).

Gender differences, however, are still considered important factors in describing financial knowledge, as demonstrated in several studies (Lusardi & Mitchell, 2014; Potrich, Vieira, & Kirch, 2015; Shin, Kim, & Heath, 2019).Women have longer life expectancies, so they would need to consider this variable in their planning; however, culturally, they are more often tasked with housework than managing the family's money (Bucher-Koenen et al., 2017).

There is, however, a conflict between saving money for the future and present spending. With the credit market's expansion and the creation of new financial products, people must balance current consumption, indebtedness, and planning against future consumption (Martins & De Araújo Ferraz, 2018). Soman and Cheema (2002) explain that with credit availability, spending becomes more attractive than saving, especially for younger people and those with low educational levels.

Klapper, Lusardi, and Panos (2013) confirmed that, in times of crisis, the difficulty of saving is related to a low level of financial literacy, just as the propensity for saving is related

to high levels of financial education. Nevertheless, the quality of financial education has a strong relationship with the individual's income level. In addition to income, Vieira, Moreira, and Potrich (2019) demonstrated that the highest levels of financial education are evident in those familiar with financial mathematics and investment products.

As the previous literature highlights, socioeconomic and demographic characteristics are related to people's levels of financial literacy. Taking such findings into account, we intend to explore the issue of retirement and advance the field's knowledge of its predictors. Unlike previous works, this study addresses individuals' perceptions of retirement in the context of regional variability across Brazil.

3 Data

Was used the data made available by ANBIMA, known as "Raio X do investidor", to carry out the empirical analysis of retirement. The survey, which had a nationwide reach, was carried out with the support of the Datafolha research institute and presents statistical information regarding individuals' savings and decision-making habits in situations involving money.

The "Raio X do investidor" aimed to capture the financial journey of Brazilians and monitor their progress annually. The survey, lasting an average of 15 minutes, sought to segment people into investor profiles, with individual information referencing the previous year. Hence, the '2018 Raio X do investidor' was carried out in 2017 and published in April 2018; the '2019 Raio X do investidor' was conducted in 2018 and published in March 2019; and finally, the '2019-2020 Raio X do investidor' was carried out in 2019 and published in June 2020.

According to ANBIMA (2018), telephone checks were conducted on approximately 20% of the surveys, guaranteeing a margin of error of 2 points, with a confidence level of 95%, to ensure the accuracy of the data. The final datasets contained 3,374, 3,452, and 3,433 respondents in 2017, 2018, and 2019, respectively. In addition to direct questions related to finance, the questionnaires included items to collect socioeconomic information, such as city, age, gender, social class, marital status, number of children, and education.

First, we searched for specific retirement questions in the dataset. Such questions were later used as a dependent variable in our empirical models. The questions were as follows: i) "Are you currently a contributor to the INSS?"; ii) "Do you plan to retire using the INSS system?"; iii) "Do you plan to retire by age 65?"; and iv) "Compared to your current standard of living, do you believe your retirement period will be better?"

The regional representativeness of the respondents in our data consisted of 45.9% from the Southeast, 17.6% from the Northeast, 15.8% from the South, 12.3% from the Midwest, and, finally, 8.3% from the North. The audiences for each state were distributed as follows: 68.9% were between 20 and 50 years old, 53.5% were male, 49% of respondents had completed high school, and 49% were married.

One can see that the survey respondents were principally male, married, young, and low-income.

Table 1 shows the correlation matrix of the main study variables, classified as female gender; having children; Northeast and Southeast regions; salaried and unemployed occupations, income of up to R$998.00, and having **incompleted** primary education. The correlation values are low, which suggests no problems with collinearity. The highest correlations occur between an income of up to $998.00 and being unemployed (0.20),

incomplete primary education and having children (0.19), and an income of up to $998.00 and being female.

Table 1 – Correlation Matrix

	Women	Have children	Northeast	Southeast	Salaried	Unemployed	Income - up to 998	Elementary School - Incomplete
Women	1.00	0.07	-0.02	0.03	-0.01	0.07	0.14	-0.03
Have children		1.00	0.004	-0.02	-0.10	-0.04	-0.09	0.19
Northeast			1.00	-0.43	-0.08	-0.01	0.07	-0.01
Southeast				1.00	0.02	0.05	-0.02	-0.01
Salaried					1.00	-0.33	-0.06	-0.05
Unemployed						1.00	0.20	0.02
Income - up to 998							1.00	0.09
Elementary School - Incomplete								1.00

Source: Own elaboration

Table 2 shows the number and frequency of responses for all respondents in 2017, 2018, and 2019, considering each question about retirement available in the database.

Table 2 – Answers to questions regarding retirement

Variable		Answers (number)	Yes (%)
Do you plan to retire using the INSS system?	Não	No	3,377
	Yes	4,343	56.26
Are you currently a contributor to the INSS?	No	4,567	44.52
	Yes	5,692	55.48
Do you believe your retirement period will be better?	No	4,711	54.91
	Yes	3,868	45.09
Do you plan to retire until 65?	No	795	12.01
	Yes	5,825	87.99

Source: Own elaboration

The information in Table 2 reveals that most respondents were contributors to the pension system, wished to retire through the *INSS*, and intended to retire by age 65. In addition, the responses showed that the expectation for the standard of living in retirement was no better than the respondent's current situation. Such findings corroborate those of Lusardi and Mitchell (2014) in the Brazilian context, showing the population's dependence on the social security system.

Table 3 illustrates the responses on retirement considering gender, region, occupation, and income. It is possible to verify that the percentage of women who wanted to retire through

the *INSS* and intended to retire up to 65 years of age was greater than that of men. However, the percentage of women having declared to contributing to the *INSS* was lower.

One can observe a similar result regarding the expectation of improvement in the future standard of living. With respect to region, living in the South and Northeast stood out as being more preferentially associated with retiring through the *INSS*. The Northeast region, however, had the lowest percentage of respondents who declared contributions. In addition, the five regions reported similar response patterns for the desire to retire by age 65.

The breakdown by occupation reveals that the salaried and public agent profiles were more inclined to report retiring through the *INSS* and contributing to that end. However, unemployed people were more likely to expect improvement in their future standards of living. Differentiation by income level indicated that individuals in the lowest income bracket (i.e., monthly income up to R$998) had a greater preference for INSS retirement and anticipated improvements in their future standards of living. This range, however, showed only a minor contribution to the response pattern.

Table 3. Answers about retirement differentiated by gender, region, occupation, and income.

	Panel A			
	Do you plan to retire using the INSS system?		**Do you believe your retirement period will be better?**	
	Answers (number)	**Yes (%)**	**Answers (number)**	**Yes (%)**
Gender				
Man	4,218	53.70%	4,610	47.70%
Woman	3,502	59.28%	3,969	42.05%
Region				
Midwest	964	56.63%	1,086	46.50%
North East	1,344	59.22%	1,513	46.59%
North	711	53.30%	784	52.16%
Southeast	3,474	54.28%	3,852	43.35%
South	1,277	59.98%	1,344	43%
Occupation				
Salaried	3,808	58.53%	4,204	45.96%
Freelance	2,309	50.58%	2,613	45.50%
Unemployed	1,230	51.30%	1,400	50.14%
Entrepreneur	818	41.56%	881	49.37%
Public agent	1,139	59.26%	1,213	41.71%
Income				
Over 4,990	815	43.19%	2,234	47.04%
From 2,995 to 4,990	1,062	47.77%	2,365	45.83%
From 1,997 to 2,994	1,511	54.86%	2,326	44.62%
From 999 to 1,996	3,452	58.86%	3,909	43.33%
Up to 998	1,668	61.09%	1,950	50.87%
	Panel B			
	Do you plan to retire until 65?		**Are you currently a contributor to the INSS?**	
	Answers (number)	**Yes (%)**	**Answers (number)**	**Yes (%)**
Gender				
Man	3,644	86.69%	5,488	56.76%

Woman	2,976	89.58%	4,711	54.01%
Region				
Midwest	829	85.52%	1,266	59.95%
North East	1,209	89.90%	1,810	49.72%
North	628	89.80%	850	52.94%
Southeast	2,924	87.82%	4,714	54.94%
South	1,030	87.08%	1,619	61.33%
Occupation				
Salaried	3,235	88.43%	5,701	62.49%
Freelance	1,938	86.58%	4,165	32.77%
Unemployed	1,085	85.71%	2,827	21.20%
Entrepreneur	653	84.99%	2,331	29.98%
Public agent	993	88.31%	2,671	34.48%
Income				
Over 4,990	663	88.98%	1,193	55.90%
From 2,995 to 4,990	882	87.52%	1,467	59.44%
From 1,997 to 2,994	1,280	89.37%	2,059	61.34%
From 999 to 1,996	2,954	87.67%	4,548	55.76%
Up to 998	1,449	88.68%	2,328	38.57%

Source: Own elaboration

4 Empirical Model

We used the information on each individual, such as age, gender, occupation, marital status, income, and education, to study the previous questions about retirement using multiple regressions. We classified the information that represents the answers about retirement as binary variables in our database (1 for yes and 0 for no).

First, we investigated the association between the socioeconomic and demographic answers and the individuals' perceptions regarding the income they should earn during their retirement. We then reperformed the analysis by changing the dependent variables, i.e., focusing on the INSS contribution, the respondent's perception of the standard of living they expect to enjoy during their retirement, and if they want to retire before the age of 65.

We used logistic regressions in our study. This statistical model was estimated by assigning the regression residuals to a logistic CDF (cumulative distribution function). According to the retirement questions, the dependent variables were binary and different in each regression. Thus, we used the following econometric specification for the regressions:

$$Prob\,(y = 1|x) = \beta_0 + \beta_1 Age + \beta_2 Age^2 + \beta_3 Gender + \beta_4 Marital\ status + \beta_5 Income + \beta_6 Region + \beta_7 Education + \beta_8 Ocupation + \beta_9 Have\_Children + u_i \quad (1)$$

In the first regression, we had Y = 1 if the individual responded that his retirement income would come from the INSS and Y = 0 otherwise. In the second regression, we had Y=1 if the individual contributed to the INSS. In the third regression, we used Y = 1 if the individual answered that his standard of living would be better than the current standard of living in the retirement phase. In the fourth regression, we had Y = 1 if the individual answered that he will retire before age 65. Otherwise, the variable assumed a zero value for all regressions mentioned above.

For the binary independent variables, the results obtained were evaluated by comparison. That said, we assigned the male gender, marital status of "other" (union of the variables widowed and divorced), Midwest region, businessman occupation, income above R$ 4,990.00, and higher education to be hidden and serve as a comparison group for the other levels of the variables.

5 Results

First, we conducted a multicollinearity test known as the variance inflation factor and observed that the values were less than 10, indicating that there were no multicollinearity problems.

Table 4 shows the results for the question "Do you plan to retire using the *INSS* system?" as the dependent variable. With a statistical significance of 5%, on average, female individuals were 3% more likely to want to retire through the *INSS* than males.

In addition, we can verify that the variables "having children" and "living in the south of the country" contributed to this choice. On average, individuals classified as self-employed, salaried, unemployed, or public agents were more likely to choose retirement through the *INSS* than entrepreneurs. The most significant difference was found comparing public agents and entrepreneurs, with an average slope of 25%.

It is possible to verify that all classes with monthly income below R$4,991 had, on average, a greater inclination to retire through the *INSS*. The main difference was in comparison with individuals who declared lower income (up to R$998), with a slope of 22%. Finally, the analysis of education found that individuals who only attended elementary school (complete and incomplete) were more likely to choose retirement through the INSS compared to individuals who completed a college education. We found no statistical significance in comparing high school- and college-educated respondents.

Table 4 – Do you plan to retire using the INSS system?

Variables	Coefficient	Standard Error	Marginal Effect	
Constant	−1.32031	0.299027		***
Age	−0.00645400	0.0131653	−0.00157828	
Age^2	0.000270816	0.000162952	0.00	*
Women	0.132322	0.0519074	0.03	**
Have children	0.168471	0.0669128	0.04	**
Married	−0.0121149	0.0890079	−0.00296270	
Single	−0.0700888	0.0978356	−0.0171524	
Northeast	0.0785016	0.0925048	0.02	
North	−0.106030	0.108118	−0.0260786	
Southeast	−0.0970766	0.0785915	−0.0237491	
South	0.180917	0.0942467	0.04	*
Freelance	0.271737	0.117921	0.07	**
Salaried	0.738955	0.114284	0.18	***
Unemployed	0.304752	0.134068	0.07	**
Public agent	1.15463	0.134021	0.25	***

Income - up to 998	0.992161	0.119634	0.22	***
Income - from 999 to 1,996	0.753922	0.107019	0.18	***
Income - from 1,997 to 2,994	0.554919	0.110706	0.13	***
Income - from 2,995 to 4,990	0.289498	0.115228	0.07	**
Elementary School - Incomplete	0.32232	0.103979	0.08	***
Elementary School	0.251273	0.0944214	0.06	***
High school	0.0527398	0.0741182	0.01	
Pseudo-R-squared	0.040378			
Observations	7137			
Sensitivity	82.09%			
Specificity	34.01%			
Correct rating	61.43%			

Note: This table presents the logistic regression results. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For the dependent variable, Y = 1 if the individual responded that his retirement income íduo responde que sua renda para aposentadoria virá do INSS e Y = 0, caso contrário.

Table 5 shows the results of the variable "*INSS* contributor", which indicates which surveyed individuals reported contributing to the INSS. Using this variable, we can verify that individuals tended to contribute more with advancing age, while noting the sign inversion of the contribution as generation reaches higher values (a characteristic evident via the age-squared variable). On average, individuals residing in the Northeast were almost 4% less likely to contribute than those from the Midwest region. In comparison, individuals from the South were 8% more likely to contribute, too, using the same comparison.

With respect to the occupation of the respondents, salaried workers reported a 27% greater chance of contributing; freelance, 20% less; unemployed, 34% less; and public agents, a 5%-less likelihood of contributing, all compared to entrepreneurs. Income was also relevant, with those earning up to $998.00 having, on average, an 18%-lower chance of contributing to the *INSS* when compared to those earning more than $4,991. Regarding education, Table 5 reveals that the opportunity to contribute to the *INSS* was, on average, lower for individuals with education up to primary education (complete elementary school, incomplete elementary school, and high school) than for individuals with a college education.

Table 5 - Are you currently a contributor to the INSS?

Variables	Coefficient	Standard Error	Marginal Effect	
Constant	−2.52997	0.309454		***
Age	0.163356	0.0128357	0.0357374	***
Age^2	−0.00168364	0.000150182	−0.000368331	***
Women	−0.0836556	0.0570707	−0.0183217	
Have children	0.121732	0.0750682	0.0267866	
Married	0.0283343	0.0948403	0.00619736	
Single	−0.0313230	0.105043	−0.00685869	
Northeast	−0.172779	0.0991318	−0.0385149	*

North	−0.138666	0.117965	−0.0309270	
Southeast	−0.00122378	0.0866861	−0.000267731	
South	0.382369	0.106173	0.0793859	***
Freelance	−0.866135	0.120872	−0.198927	***
Salaried	1.28254	0.124692	0.270205	***
Unemployed	−1.44084	0.141798	−0.342948	***
Public agent	−0.232148	0.136807	−0.0523484	*
Income - up to 998	−0.776521	0.128119	−0.180367	***
Income - from 999 to 1,996	−0.188946	0.117129	−0.0414821	
Income - from 1,997 to 2,994	0.15445	0.124284	0.0331637	
Income - from 2,995 to 4,990	0.182539	0.13074	0.0388825	
Elementary School - Incomplete	−0.588191	0.111395	−0.136691	***
Elementary School	−0.432749	0.104308	−0.0988237	***
High school	−0.150841	0.0852238	−0.0329605	*
Pseudo-R-squared	0.040603			
Observations	7137			
Sensitivity	85.78%			
Specificity	56.50%			
Correct rating	75.18%			

Note: This table presents the logistic regression results. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For the dependent variable, Y = 1 if the individual responded to currently be a contributor to the INSS, and Y = 0 otherwise.

The "Future Better Standard of Living" regression describes the trend of belief that the standard of living in retirement would be better than that in the current moment. Table 6 shows that men were more optimistic than women about the standard of living after retirement, with a difference of 6%. Similar to the previous results, region also significantly contributed to individuals' evaluation of the standard of living in the future. Regarding the respondents' incomes and education levels, we did not find statistical significance concerning their influence in predicting the standard of living.

Table 6 - Do you believe your retirement period will be better?

Variables	Coefficient	Standard Error	Marginal Effect	
Constant	2.38289	0.279818		***
Age	−0.0828955	0.012205	−0.0204743	***
Age^2	0.000716373	0.000150614	0.00	***
Women	−0.224340	0.0490826	−0.0552980	***
Have children	−0.160385	0.0627889	−0.0396820	**
Married	−0.221748	0.0835369	−0.0546824	***
Single	−0.159315	0.0917016	−0.0392768	*
Northeast	−0.0654152	0.0861362	−0.0161160	
North	0.23098	0.102005	0.06	**
Southeast	−0.153896	0.073671	−0.0379643	**

South	−0.179350	0.0881379	−0.0439261	**
Freelance	−0.142945	0.111872	−0.0351526	
Salaried	−0.218614	0.108486	−0.0539011	**
Unemployed	−0.0902394	0.126775	−0.0221933	
Public agent	−0.376235	0.12684	−0.0906382	***
Income - up to 998	0.176876	0.11405	0.04	
Income - from 999 to 1,996	−0.106041	0.103586	−0.0261676	
Income - from 1,997 to 2,994	0.0477857	0.10732	0.01	
Income - from 2,995 to 4,990	0.148257	0.112301	0.04	
Elementary School - Incomplete	0.0122464	0.0966075	0.00	
Elementary School	−0.140530	0.0896518	−0.0345024	
High school	0.0391013	0.0711616	0.01	
Pseudo-R-squared	0.038278			
Observations	7919			
Sensitivity	41.40%			
Specificity	77.36%			
Correct rating	61.28%			

Note: This table presents the logistic regression results. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For the dependent variable, Y = 1 if the individual responded is more optimistic about the standard of living after retirement, and Y = 0 otherwise.

Finally, in Table 7, the dependent variable captures those who wished to retire between 40 and 65 years old (lower ages were discarded). In this case, we see that women had, on average, a 3% greater chance of wanting to retire by age 65. Regarding age, those who lived in the Northeast had a 4% higher chance, 3.8% in the North and 2.7% in the Southeast of wanting to retire up to 65 years old – all compared to the Center-West region.

Occupation as a predictor variable was relevant only for wage earners and public agents, at 3.4% and 3.6% more than entrepreneurs. Finally, those with incomplete primary education were, on average, 3.6% more likely to anticipate opting for retirement in this age interval.

Table 7 - Do you plan to retire until 65?

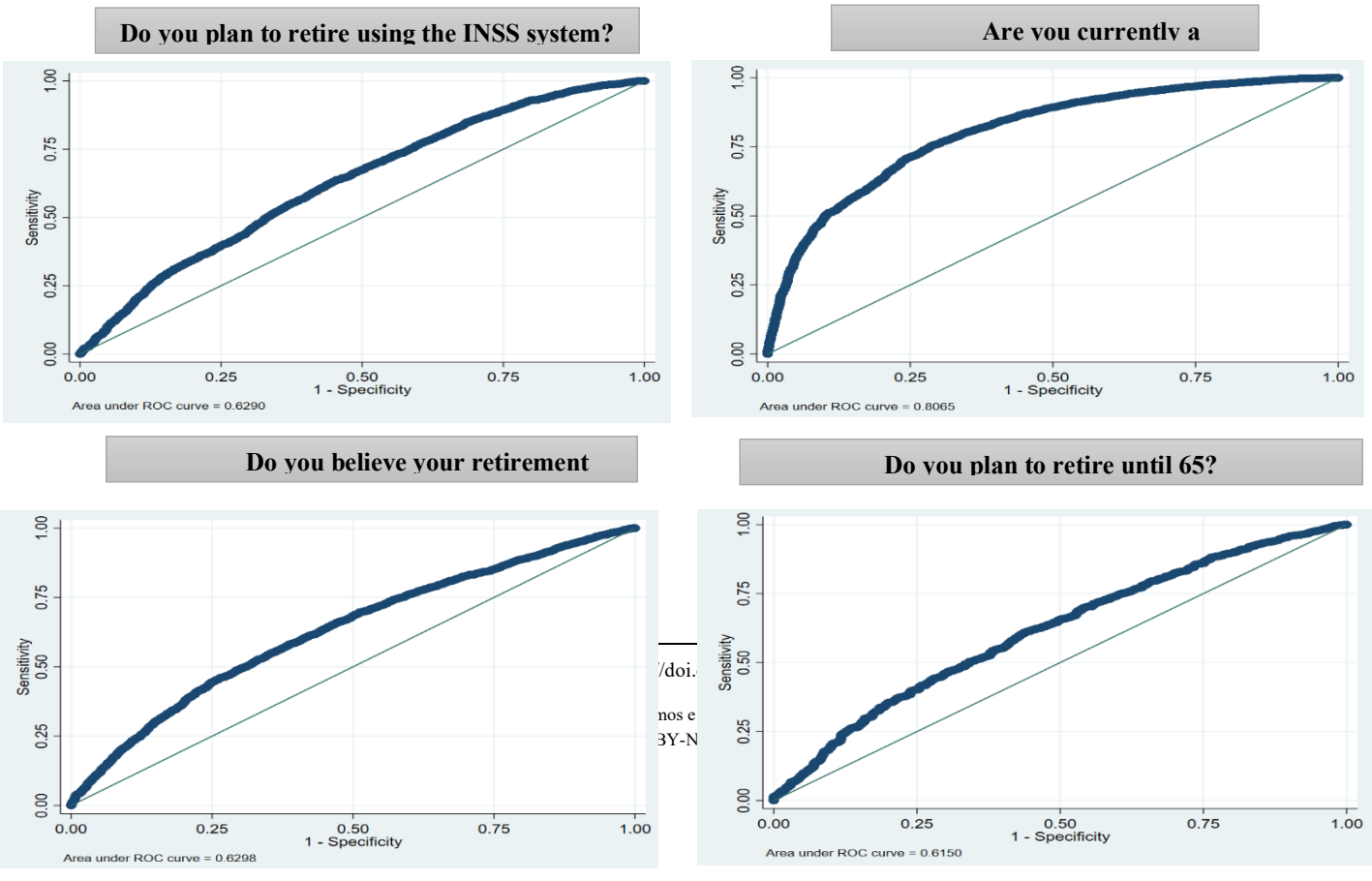
Variables	Coefficient	Standard Error	Marginal Effect	
Constant	−0.461230	0.463665		
Age	0.112061	0.0201447	0.0111748	***
Age^2	−0.00144166	0.000246587	−0.000143763	***
Women	0.281738	0.0853436	0.0278235	***
Have children	0.128784	0.109532	0.0130333	
Married	−0.0295813	0.150935	−0.00295075	
Single	−0.255577	0.164201	−0.0259571	
Northeast	0.464181	0.146055	0.0413637	***
North	0.431738	0.175129	0.0375722	**
Southeast	0.274209	0.119999	0.0270852	**
South	0.133962	0.142826	0.0128866	

Freelance	0.0951829	0.184379	0.00932243	
Salaried	0.33926	0.179203	0.034	*
Unemployed	0.0780378	0.207382	0.0076046	
Public agent	0.408855	0.211974	0.036	*
Income - up to 998	−0.0570661	0.199363	−0.00576729	
Income - from 999 to 1,996	−0.186489	0.179584	−0.0187807	
Income - from 1,997 to 2,994	−0.100330	0.187248	−0.0102600	
Income - from 2,995 to 4,990	−0.194138	0.191863	−0.0205235	
Elementary School - Incomplete	0.40137	0.172053	0.0356482	**
Elementary School	0.131721	0.151174	0.0126959	
High school	0.0794848	0.12041	0.00793593	
Pseudo-R-squared	0.024337			
Observations	6154			
Sensitivity	100%			
Specificity	0%			
Correct rating	88.12%			

Note: This table presents the logistic regression results. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. For the dependent variable, Y = 1 if the individual responded plans to retire until 65, and Y = 0 otherwise.

In addition to the percentages of sensitivity, specificity, and correct classification presented in each table above for the regressions, Figure 1 shows the ROC curve, providing evidence of good model fit. Collectively, it was possible to observe that gender, age, occupation, region, income, and education were relevant variables in the study.

Figure 1 – ROC curve for each logistic regression



Source: Own elaboration

The gender variable was statistically significant in three of the four questions about retirement. In particular, it was possible to observe that women preferred retirement up to 65 years of age and participation in the INSS. In addition, the results reveal that women were less optimistic about their standard of living in retirement.

Regarding the age variable, we noticed that the propensity to contribute to the INSS and the desire to retire before the age of 65 increase according to the individual's age but decreased after the individual reached a certain age.

The results by region were diverse and presented peculiarities for each state. For example, considering the future standard of living, individuals in the North region were, on average, more optimistic than those in the Midwest region. The opposite trend was observed for individuals residing in the Southeast and South regions.

All occupation classifications indicated greater interest in retirement through the INSS than the entrepreneurs. In particular, salaried individuals and public agents believed that their future living standard would be worse than that of entrepreneurs.

Regarding income, we noticed that individuals earning less than R$4,990, representing the four lowest income classification ranges, were more likely to anticipate depending on the INSS. However, the class with the lowest income level contributed, on average, approximately 18% less than individuals classified in the highest income range. Unsurprisingly, such a difference occurs since the discrepancy between the groups' remuneration is undoubtedly a relevant factor when making contributions. The result shows that the individuals most likely to depend on the INSS in the future are the most vulnerable with regard to income, with everyday complications and concerns that may gain prominence to the detriment of financial education and respect for their long-term financial situations.

Education was crucial for the different associations. Individuals with less academic education were more likely to depend on the INSS and contribute less than those with higher education. Regarding the age range for retirement, individuals who had not completed elementary school were more likely to seek retirement up to 65 years of age. Individuals with a lower degree of academic education were more inclined to seek resources through the INSS, contribute less to retirement in the current situation, and expect to retire earlier.

In sum, this paper makes relevant contributions to the literature and highlights the need for improvements in the perception of Brazilians about retirement. Although relevant studies, such as Skinner (2007), Van Rooji, Lusardi and Alessie (2012), Hauff et al. (2020), and Gallego-Losada et al. (2022), point to the growing need for individuals to use their own resources for financial planning aimed at retirement, the results in this paper reveal that this need does not translate to reality for most Brazilians. Thus, a valuable contribution of this study is the evidence it shows of the persistent dependence on aid from the social security system for thousands of individuals, with distinction being evident for different situations along socioeconomic and demographic dimensions. Moreover, the present study contributes to research focusing on the association of financial literacy to socioeconomic and demographic characteristics, especially in relation to Tokar Asaad (2015) and Potrich, Vieira, and Kirch (2015), by noting that gender, marital status, schooling, and income are also crucial predictors of retirement choices.

In addition, we emphasize the merits of the retirement theme highlighted in the research through the use of four specific questions for respondents across the national territory. By revealing that more vulnerable individuals (in terms of income and education) are more likely

to depend on the INSS, we illuminate the need for the topic of financial education (and especially retirement) to be disseminated among different social classes in Brazil, with a focus on basic education, since individuals with lower income and academic education appear more likely to depend on INSS resources. This fact supports the research of Klapper, Lusardi, and Panos (2013), Lusardi and Mitchell (2014), Potrich, Vieira, and Kirch (2015) and Shin, Kim, and Heath (2019) by revealing the specific topic of financial education as deserving more attention in Brazil.

Unlike Patrick, Vieira, and Kirch (2015), who assessed the level of financial education for 1,400 respondents residing in Rio Grande do Sul, this paper investigates long-term financial decisions regarding the timing of retirement. It evaluates such issues with the support of a broad database containing socioeconomic and demographic information on individuals from all regions of Brazil.

Lusardi and Mitchell (2007) emphasize the need for financial planning for retirement. In agreement with the researchers, our paper reinforces this need and elucidates the profile of Brazilians, who seem more distant from what is advocated in the literature. In particular, the results indicate that the inclination toward retirement through the INSS is more significant for women with less education, lower salaries, and children.

The difference found in the evaluation by gender is also present in other studies. Using data from the United Kingdom, Farrar et al. (2019) noted differences in the levels of financial planning between men and women, with lower levels of planning among women. Demirgüç-Kunt, Klapper, and Panos (2016) use information on retirement for individuals in more than 140 countries and find that only approximately 25% of adults emphasize retirement in their saving behaviors. The researchers suggest that men are more likely to save for retirement, especially in developed countries. Our study highlights the Brazilian reality and illuminates the preference for the public pension system via the INSS, especially for women and individuals with less education and lower income.

6 Final remarks

Although there is little research related to retirement planning in Brazil, the study was able to descriptively determine the socioeconomic and demographic variables that correlate with individuals' perceptions about retirement, considering the specificities found in Brazil, such as excessive government dependency.

We observe that women, while wishing to retire through the INSS, contribute less than men and still want to retire at the maximum age of 65. This result reinforces Potrich, Vieira, and Kirch's (2015) research and highlights the importance of financial literacy in Brazil.

When we refer to schooling, it is possible to observe that those who have incomplete or complete primary education tend to want to retire through the INSS when compared to those who have college education, as also observed by Dos Santos et al. (2017). Specifically, a finding that may differ in the Brazilian context that public agents and salaried individuals also tend to prefer this option.

Lusardi and Mitchell (2014) state that government assistance can interfere with personal retirement planning. Although public agents want to retire through the INSS, they believe that the future standard of living will be worse at retirement, which contrasts with the perceptions of entrepreneurs.

Brazilian men contribute more to the INSS, want to work more before retiring and expect a better standard of living than women. However, it is essential to consider that this may be a consequence of the family structure, in which, in most cases, the man is responsible for the family's financial management (BUCHER-KOENEN et al., 2017).

Finally, this paper contributes to analyzing demographic and socioeconomic variables, innovating with a focus on retirement issues. The analyses carried out in this study can serve to inform strategies to mitigate the future impact on social security of the aging of the population. Despite prior reform, changes are still needed to help future retirees. In addition, the study highlights the need to disseminate financial education knowledge in the country, especially to individuals with less education and lower income.

We believe several surveys have already evidenced the need for individual financial planning for retirement. Thus, future research may assess the association between financial education level and retirement planning. It is important to elucidate the level of planning in greater detail, including knowledge of the financial investment products chosen for this purpose. Researchers can also assess whether there is an association between the participation of different types of investment in an individual's portfolio and planning for retirement.

Research in Brazil still lacks exploration of the possible associations between psychological characteristics and retirement planning, similar to the study by Tomar et al. (2021), whose purpose was to assess relationships between cognitive traits and attitudes toward retirement. In addition, as a suggestion for future research, researchers can investigate how access to technological resources can contribute to investment choices, especially regarding retirement.

Finally, it should be noted that the study is descriptive and seeks only to uncover associations between the variables used. Later investigations of a causal nature can advance and provide greater precision for the findings of this study, in addition to assessing more assertive notes for the implementation of public policies.

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