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Payroll Loans and Debt Among Public Servants in Brazil

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Abstract

This paper analyzed the effect of sociodemographic variables on the probability of indebtedness of public servants, focusing on the contracting of payroll loans by NEDF servants in the period from 2013 to 2019. Our main contributions to the literature were the use of hard-to-access database, consisting of information obtained from official systems of the Brazilian federal government and the addition of a new variable, alimony deduction, not previously considered by the literature. Our main conclusions are that older individuals, with a greater number of dependents, with higher real income and who pay alimony are more likely to have taken out a loan. Females, on the other hand, are less likely to have taken out a loan. Marital status can also affect this probability, with committed individuals with a higher chance of contracting a loan compared to single individuals.

Keywords: debt, Brazil, public servants

1. Introduction

In Brazil, there are few studies dealing with the study of public servants' indebtedness, especially from the perspective of payroll loans, given the difficulty in obtaining data. Usually, this type of data is of restricted access, as it involves personal information. In addition, none of the works found on the subject in the national literature, used official data organized in a panel format. Therefore, this is an innovative study, in that it proposes to verify the applicability of hypotheses already established in the scientific community on the subject to the case of public servants, using an official and unprecedented database, originating from government institutional systems.

The article is divided into five sections, in addition to this brief introduction. Section one shows how our contribution is related to the relevant literature, while section two describes our empirical strategy, section three our data and section four our results. Section five brings our final comments.

1.1 Literature Discussion

According to Vandone (2009), there are four main approaches to the issue of credit and debt in the literature: a management approach, which focuses on the characteristics of the credit industry; a legal approach, focusing on regulatory issues; a sociopsychological approach, focusing on the effects of the debt process on individuals; and, finally, an economic approach, focusing on the determinants of the indebtedness process, based on individual characteristics. This article fits into the latter approach. Therefore, our discussion will predominantly address works that have this bias.

Flores (2012) points out that the concept of indebtedness is related to two aspects: macroeconomic and microeconomic. From the macroeconomic point of view, broad variables are considered, related to changes in the environment, such as interest rates and inflation. In this context, indebtedness is studied from the perspective of a country or an economy. Under the microeconomic aspect, the study of indebtedness seeks to investigate personal factors, disregarding external characteristics.

In this sense, Potrich et al. (2016) state that to understand the causes of indebtedness, one must go beyond economic factors, since behavioral and sociodemographic factors are also associated with the theme. Thus, the study of personal factors related to indebtedness becomes relevant insofar as it enables the adoption of actions, whether by public or private organizations, aimed at reducing the negative consequences of credit expansion, such as excessive debt and default. For these authors, however, there is no consensus in scientific research on

which factors and variables explain the increase in indebtedness.

Table 1 summarizes the objectives, database and methodologies used in studies on indebtedness in Brazil and worldwide.

Table 1. Studies carried out on indebtedness in Brazil and in the world

Authors	Focus	Sample	Data Collection	Method
Baek and Hong (2004)	Debt in different life stages and determinants for each type of debt	3,974 households - US	Survey	Double-Hurdle Regression
Frade et al (2008)	Describe over debt individuals and analyse credit aversion	2,120 households - Portugal	Survey	Descriptive Statistics
Gathergood (2012)	Financial education and debt	3,000 households - UK	Survey	Probit
Lin et al (2019)	Determinants of Credit card debt	1,290 households - China	Survey	Linear Regression
Norvilitis et al (2006)	Determinants of Credit card debt	448 students - USA	Survey	Linear Regression
Ponchio (2006)	Materialism and credit	450 low income households - Brazil	Survey	Logit
Potrich et al (2016)	Behavioral and socioeconomic factors and debt	2,391households - Brazil	Survey	Multinomial Logit
Vieira et al (2013)	Risk perception of public servants versus the rest of the population	1,292 households - Brazil	Survey	Linear Regression
Wang et al (2011)	Behavioral and socioeconomic factors and debt	Chinese bank clients.	Survey	Anova

Table 2 presents a summary of variables analyzed by the literature.

Table 2. Variables analyzed by the literature

Variable	Hypothesis	Authors
age	H1 – Younger individuals are more susceptible to debt.	Flores (2012), Potrich et al. (2016); Ponchio (2006); Vieira et al. (2014); Gathergood (2012); Baek and Hong (2004); Norvilitis et al. (2006)
	H1a – Older individuals are more susceptible to debt.	Oliveira et al. (2017)
Marital status	H2 – Non committed individuals are more susceptible to debt.	Flores (2012); Oliveira et al. (2017); Vieira et al. (2014)
Sex	H3 – Men are more susceptible to debt.	Baek and Hong (2004); Flores (2012); Oliveira et al. (2017); Wang et al. (2011)
	H3a – Women are more susceptible to debt.	Ponchio (2006)
Financial dependents	H4 – Individuals with dependents are more susceptible to debt.	Potrich et al. (2016); Deng and Yu (2021)
	H4a – Individuals without dependents are more susceptible to debt.	Vieira et al. (2014)
Income	H5 – Lower income individuals are more susceptible to debt.	Davies and Lea (1995); Potrich et al. (2016); Oliveira et al. (2017); Arango and Quevedo (2022)

We decided to include one more new variable not considered by the literature presented here: the alimony deduction. In Brazil, alimony that is judicially defined is automatically deducted from the paying parent paycheck. This reduces that parent disposable income.

Thus, this article aims to assess whether the variables age, marital status, gender, financial dependents, income, and alimony discount influence the probability of public servants getting into debt by contracting payroll loans. Therefore, our research hypotheses are listed below:

H1: Older individuals are less susceptible to debt.

H2: Females are less susceptible to debt.

H3: Individuals with dependents are more susceptible to debt.

H4: Non committed individuals (widowed, single and divorced) are more susceptible to debt.

H5: Higher income individuals are less susceptible to debt.

H6: Individuals with alimony discounts in their paychecks are more susceptible to debt.

2. Method

We considered all active and retired servants of the NEDF staff, from January 2013 to December 2019. The Integrated Personnel Administration System (SIAPE) is responsible for processing the payroll of all bodies of direct, foundational and autarchic administration of the executive power that depend on the national treasury to cover their personnel expenses.

The first part of data collection consisted of identifying the codes of payroll loans that were used by the system in the period considered for this research. Each financial agent that grants payroll loans (for example, a bank) has a distinct item code, consisting of five digits, which had to be identified.

It is noteworthy that to obtain the database, search parameters were not used within the systems that allow the nominal identification of research participants. Individualized information, when necessary, was obtained through a coded identification attribute. After extracting the final database, each of these attributes received a random identification number. In this way, the total secrecy of personal information was preserved.

2.1 Research Design

The goal of this study is to evaluate the chance of an employee acquiring a payroll loan in a given time interval, depending on the sociodemographic variables (age, marital status, sex, number of dependents, income and alimony discount). Therefore, the following model is suggested:

$$P(Loan)_i^t = \beta_0 + \beta_{age}Age_i^t + \beta_{fem}Fem_i^t + \beta_{\#dep}\#dep_i^t + \beta_{inc}Income_i^t + \beta_{alim}Alimony_i^t + \beta_{sing}Single_i^t + \beta_{div}Divorced_i^t + \beta_{wid}Widow_i^t + \in_i^t \quad (1)$$

where i = 1, … ,1051 represent public servants between the years 2013 to 2019;

t = 1, ... ,84 indicates the period (in months) between January 2013 (1) and December 2019 (84);

Age_i^t is a continuous variable that represents the i's age in period t;

Fem_i^t is a binary variable in which $Fem_i^t = 1$ if i is female;

$\#dep_i^t$ is a continuous variable that represents the i's number of dependents in period t;

$Income_i^t$ is a continuous variable that represents the i's real income in period t;

$Alimony_i^t$ is a binary variable in which $Alimony_i^t = 1$ if i faces alimony discounts in their income;

$Single_i^t$ is a binary variable in which $Single_i^t = 1$ if i is single;

$Divorced_i^t$ is a binary variable in which $Divorced_i^t = 1$ if i is divorced;

$Widow_i^t$ is a binary variable in which $Widow_i^t = 1$ if i is widowed ($Married_i^t$ is the reference category).

We also considered the following specification

$$P(Loan)_i^t = \beta_0 + \beta_{age}Age_i^t + \beta_{fem}Fem_i^t + \beta_{\#dep}\#dep_i^t + \beta_{inc}Income_i^t + \beta_{valim}VAlimony_i^t + \beta_{sing}Single_i^t + \beta_{div}Divorced_i^t + \beta_{wid}Widow_i^t + \in_i^t \quad (2)$$

In which $VAlimony_i^t$ is a continuous variable that represents how much alimony is discounted from i's paycheck in period t. All other variables are as described before.

In addition, the effects of these variables on the amount contracted for the loan will also be investigated. In this case, the following models are suggested:

$$VLoan_i^t = \beta_0 + \beta_{age}Age_i^t + \beta_{fem}Fem_i^t + \beta_{\#dep}\#dep_i^t + \beta_{inc}Income_i^t + \beta_{alim}Alimony_i^t + \beta_{sing}Single_i^t + \beta_{div}Divorced_i^t + \beta_{wid}Widow_i^t + \in_i^t \quad (3)$$

$$VLoan_i^t = \beta_0 + \beta_{age}Age_i^t + \beta_{fem}Fem_i^t + \beta_{\#dep}\#dep_i^t + \beta_{inc}Income_i^t + \beta_{valim}VAlimony_i^t + \beta_{sing}Single_i^t + \beta_{div}Divorced_i^t + \beta_{wid}Widow_i^t + \in_i^t \quad (4)$$

In which $VLoan_i^t$ is a continuous variable that represents the amount of borrowed money that is discounted from i's paycheck in period t.

The data was deflated using the General Price/Internal Availability Index (IGP-DI) (to January 2013 values), from the Getúlio Vargas Foundation (FGV), which measures the variation of prices in general in Brazil.

2.2 Sample Description

Figure 1 shows loans as a percentage of income for the sample considered.

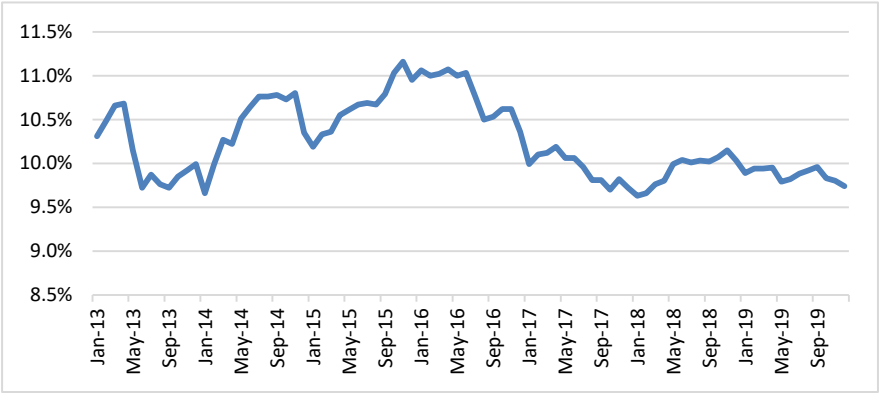

Figure 1. Loan as percentage of income (average)

Source: SIAPE/2020.

Until October 2015, the payroll loan limit was 30% of gross remuneration, when it was increased to 35%. In our sample, the number of individuals that reached these limits was not very high. Table 3 shows the percentage of individuals with loans versus individuals with no loans for each of the variables considered in the sample.

Table 3. Percentage of Loans X No Loans per variable in the sample

	With Loan	No Loan
Up to 30 years (Note 1)	47.8%	52.2%
31 to 45 years	46.2%	53.8%
46 to 60 years	70.5%	29.5%
over 60 years old	57.1%	42.9%
Single	54.5%	45.5%
Married	55.8%	44.2%
Separate	65.0%	35.0%
Widower	74.1%	25.9%
Men	61.2%	38.8%
Women	54.6%	45.4%
No Dependents	54.1%	45.9%
With Dependents	61.5%	38.5%
Lower income bracket (Note 2)	50.1%	49.9%
Intermediate income bracket	58.7%	41.3%
Higher income bracket	65.9%	34.1%

Source: SIAPE/2020.

Public servants over 46 years old are among those who use payroll loans the most, especially when compared to civil servants between 31 and 45 years old. As in the group of older civil servants there are both retired individuals and those who are closer to retirement, this can be related to the financial planning related to retirement pension schemes. Divorced and widowed individuals were those who had more debt. The data also show a higher percentage of men who have payroll loans during the analyzed period. In addition, the percentage of servants with payroll loans is higher for the group that has economic dependents. A higher salary also seems to mean more payroll loans. Finally, the data show that individuals who have financial commitments resulting from child support are more likely to acquire payroll loans compared to those who do not have the item on their paycheck. This result suggests that a reduction in the server's disposable income may increase the probability that a server will acquire a loan.

3. Results and Discusssion

Table 4 shows the results of the logit and probit models and the two child support specifications we used.

Table 4. Logit and Probit Regression Results

	Loan Probit	Loan Logit	Loan Probit	Loan Logit
Age	0.0339***	0.0315***	0.0632***	0.0647***
	(0.00401)	(0.00373)	(0.00624)	(0.00584)
Gender	-0.863***	-1.137***	-1.398***	-1.433***
	(0.119)	(0.111)	(0.228)	(0.210)
Number of dependents	0.281***	0.281***	0.492***	0.490***
	(0.0287)	(0.0284)	(0.0541)	(0.0533)
Real income	0.000187***	0.000191***	0.000342***	0.000346***
	(0.00000827)	(0.00000812)	(0.0000143)	(0.0000141)
Alimony	0.398***		0.753***	
	(0.0993)		(0.181)	
Divorced	0.0146	0.0251	0.0427	0.0580
	(0.0701)	(0.0690)	(0.127)	(0.124)
Single	-0.628***	-0.631***	-1.102***	-1.102***
	(0.0562)	(0.0555)	(0.0987)	(0.0975)
Widow	0.259*	0.266*	0.494*	0.497*
	(0.125)	(0.124)	(0.211)	(0.210)
Alimony - real value		-0.0000628		0.0000430
		(0.0000593)		(0.000114)
Time Dummies	YES	YES	YES	YES
Constant	-3.106***	-2.707***	-6.150***	-6.127***
	(0.231)	(0.217)	(0.410)	(0.383)
Observations	79,683	79,683	79,683	79,683
Wald chi2(14)	1261.53	1340.99	1455.09	1514.23
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Log likelihood	-17.808.754	-17.808.724	-17.860.654	-17.868.413

Results are consistent in the 4 models, showing that older individuals, with a greater number of dependents, with higher real income and who pay alimony are more likely to have taken out a loan. It should be noted that only the alimony binary variable was statistically significant. Females, on the other hand, are less likely to have taken out a loan. Regarding marital status, our reference category was being married and it is observed that there is no statistically significant difference with being divorced but being single reduces the chance of having taken out a loan while being widowed increases it.

Table 5 shows the results of the fixed-effect panel models in which we used the real value of loans.

Table 5. Fixed-effect panel models' results

	Loan Value Random Effects	Loan Value Random Effects
Age	4.892***	4.936***
	-1.419	-1.419
Gender	-57.83	-63.47
	(44.98)	(44.95)
Number of dependents	6.197	6.713
	(5.62447)	(5.6225)
Real income	0.0852***	0.0857***
	(0.00158)	(0.00158)
Alimony	-18.67	
	(21.29)	
Divorced	-67.46***	-68.97***
	(13.40)	(13.39)
Single	-182.1***	-181.8***
	(12.57)	(12.57)
Widow	50.07*	50.12*
	(24.97)	(24.96)
Alimony - real value		-0.0721***
		(0.0111)

Time Dummies	YES	YES
Constant	-55.40	-55.14
	(79.31)	(79.27)
Observations	79,683	79,683
Within	0.0471	0.0476
Between	0.1143	0.1110
Overall	0.0817	0.0790
Wald chi2(14)	4013.93	4057.23
Prob > chi2	0.0000	0.0000

Here, we have some changes of statistical significance, but not signs. Age and real income continue to be statistically significant, that is, older individuals with higher real income tend to take out loans of higher amounts. However, being female, number of dependents and the child support binary variable are no longer statistically significant. The continuous variable of alimony amount becomes statistically significant, with a negative sign, suggesting that a higher amount of alimony discount reduces the loan amount. This may occur because there is already a large commitment of income for these individuals. Regarding marital status, our reference category continues to be married. Here, there are no changes to the previous models in relation to being single and being a widower, that is, being single reduces the chance of having taken out a loan while being widowed increases it. However, the variable being divorced becomes statistically significant with a negative sign, in other words, being single reduces the loan amount.

4. Final Comments

This paper analyzed the effect of sociodemographic variables on the probability of indebtedness of public servants, focusing on the contracting of payroll loans by NEDF servants in the period from 2013 to 2019. Our main contributions to the literature were the use of hard-to-access database, consisting of information obtained from official systems of the Brazilian federal government and the addition of a new variable, alimony deduction, not previously considered by the literature.

Our main conclusions are that older individuals, with a greater number of dependents, with higher real income and who pay alimony are more likely to have taken out a loan. Females, on the other hand, are less likely to have taken out a loan. Marital status can also affect this probability, with committed individuals with a higher chance of contracting a loan compared to single individuals. This is mostly consistent with other literature results.

The alimony deduction variable we introduced led to a positive effect, that is, those who pay alimony are more likely to have taken out a loan, which relates both with a lower disposable income but also with the individual's relationships, that is, his or her number of dependents and marital status.

For future research, we suggest the expansion of this database considering both public servants and non-public servants, to evaluate if job status also affects debt patterns. This could improve one of the limitations of this study, which focused on public servants, a category of individuals who have secured jobs and future incomes, therefore, can plan in an easier way debt in the long run.

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Notes

Note 1. Age was grouped into four categories for this descriptive analysis but was considered as a continuous variable in the econometric exercises.

Note 2. Income was grouped into three categories for this descriptive analysis but was considered as a continuous variable in the econometric exercises.