

# Marginal propensity to save from workers of a commercialization and distribution business of mass products in Ciudad Del Este, Paraguay

## Abstract

**Background:** Keynes was the first economist to state that consumption depends fundamentally on income. Savings is equal to income minus consumption. Objective: To determine the behavior of the savings function of the workers of a company that distributes mass consumption products in Ciudad Del Este.

**Method:** The sample (191) was calculated according to the population. The approach is a mixed, descriptive study, using surveys, based on a non- experimental and correlational design. For the analysis, the Dispersion Diagram, Pearson's Coefficient and Simple Linear Regression by the Ordinary Least Squares Method were used with the help of GRETL software.

**Results:** The income obtained by the workers of a mass consumption products Distribution Company surveyed was identified and it was possible to recognize the expenses incurred by the members of the households. The relationship between income - savings expenditure and income - consumption has been analyzed and the existence of correlation between the variables studied was proved. The Marginal Propensity to save and the Marginal Propensity to Consume were determined.

**Conclusion:** There is a direct/positive relationship between the income variable and the savings variable.

**Keywords:** save and consume functions, Ciudad del Este, Pearson's correlation, simple linear regression, OLS

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## Introduction

People's behavior has been observed to be rather sloppy in terms of their relationship with saving and managing their personal finances on a day-to-day basis. In Paraguay, it is common for people to express their problems in managing their finances in the period between receiving their salary and waiting to receive their next disbursement. Therefore, in order to delve deeper into the issue, we felt the need to conduct an analysis in order to understand the reality of the citizens of Alto Paraná.

A series of questions were asked to the workers of a food distribution company in Ciudad Del Este to find out what is the reality they live with.

## Background and justification

John Maynard Keynes was the first economist to state that consumption depends fundamentally on income, he worked the consumption function as solely dependent on real disposable income, i.e.:  $C = f(Y_d)$ . There are official data that refer to the variables that we wish to study at the country level, but not at the city level. In Paraguay, the economy operates in a free market economic system. In the national accounts of the World Bank and the OECD we find that the behavior that has had the final consumption expenditure of households (% of annual growth) between 1991 - 2018, has reached a minimum value of -2.80 in the year 2002, while the maximum level has been in the year 2010 with 8.92. The reasons for conducting this research are justified primarily by the importance of savings in the lives of workers in their financial future prospects and the need to provide reliable data on these data in Alto Paraná Paraguay.

## Design of the research

This chapter describes the methodology applied in the research work.

## Statement of the problem

The main research question of the following research work is: What is the marginal propensity to save of the workers of a company that distributes and commercializes mass consumption products in Ciudad del Este, Paraguay?

To help solve the main question, other specific questions arise:

- 1) What is the average income of Workers of a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay
- 2) How is the expenditure of a Worker of a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay made up
- 3) To what extent do people resort to financial credit in a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay?

## Objectives of the research

### Main objective

Measure Marginal Propensity to Save from Workers of a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay.

## Specific objectives

- Estimate average wage from Workers of a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay
- Describe how Workers of a Commercialization and Distribution Business of Mass Products in Ciudad Del Este, Paraguay spend their incomes.
- Relate income and savings using the scatter plot.

## Research instruments

Data collection technique refers to the practical way of proceeding in concrete situations. In this work, closed questionnaire techniques were used.

## Methodology

In the research the methodology utilized is as follow:

### Approach

The approach used is the mixed approach, which can be understood as “a process that collects, analyzes and pours quantitative and qualitative data in the same study”.<sup>1</sup>

### Type

The type of scope is descriptive “With descriptive studies we seek to specify the properties, characteristics and profiles of people, groups, communities, processes, objects or any other phenomenon that is subjected to analysis”.

### Design

The design employed was non-experimental “Non-experimental research: Studies that are conducted without the deliberate manipulation of variables and in which only phenomena are observed in their natural environment in order to analyze them”.

## Data collection techniques and data collection instrument

Data collection will be carried out through the questionnaire instrument, which consists of questions related to the variables to be studied or measured.

## Data processing and analysis techniques

Regarding the analysis, the Dispersion Diagram and Pearson’s Coefficient have been used and a Simple Linear Regression using the Ordinary Least Squares Method has also been elaborated with the help of the GRETL software.<sup>2</sup>

## Population

The research is carried out in a population of 375 active workers of a company that sells and distributes mass consumption products in Ciudad Del Este, Alto Paraná, and Paraguay.

## Sample

The following formula has been applied to determine the sample size:

$$n = \frac{z^2 pqN}{Ne^2 + z^2 pq}$$

Where:

N, It is the complete collection of all the elements to be studied (population); n, A subset of selected members of a population (sample); p, probability of error; q, probability of success; z, level of confidence; e, sampling error.

The sample consisted of 191 workers from a company that sells and distributes mass consumer products in Ciudad Del Este, Alto Paraná, Paraguay, with a margin of error of 5% and a confidence level of 95%.<sup>3</sup>

## Hypothesis

The marginal propensity to save of the workers of a company that distributes and markets mass consumer products is low.

## Savings

Savings is the portion of income that the individual decides not to allocate today to consumption. This capital is then set aside out of any risk to cover a future need or contingency. It can even be left as an inheritance.

## Consumption

Consumption is the action of using and/or spending a product, good or service to meet both primary and secondary human needs. In economics, consumption is considered to be the final phase of the productive process, when the good obtained is capable of serving the consumer’s utility.<sup>4</sup>

## John Maynard Keynes

English economist. He received an elite education at Eton and Cambridge, turning to economics on the advice of his teacher, Alfred Marshall. After a brief period working in the British Indian Administrative Service, in 1909 he became a lecturer at King’s College, Cambridge, where he taught economics until his death. His decisive work was the General Theory of Occupation, Interest and Money (1936), with which he gave a definitive answer to the severe economic depression of the New York Stock Exchange in 1929.

## Marginal propensity to consume

The marginal propensity to consume measures the part allocated to consumption when income increases by one unit. It is a theoretical mathematical relationship, indicating to what extent we allocate to consumption or savings that part of income that increases.<sup>5</sup>

## Marginal propensity to save

The marginal propensity to save measures the share of income devoted to saving or investment when income increases by one unit; it measures the share that consumers, whether they are organizations, individuals or territories, devote to saving when their income increases.

## Scatter plot

According to the Guide to Statistical Analysis with R Commander, the scatter plot provides a picture of the shape of the relationship or association between the quantitative variables under study. This plot is an essential tool to start the analysis of the possible relationship between two quantitative variables.

## Variables

### Survey results

- In order to examine the proportion of the level of equitable access, the following statistical data are analyzed:

- 2) Among the respondents it is recorded that 53.9% possess between 18 and 23 years old, 40.8% possess between 24 and 29 years old, 3.7% possess between 30 and 34 years old, 1% possess between 35 and 39 years old and 0.5% possess between 40 and 45 years old.
- 3) 26.7% are in the logistics sector, 7.85% in the administrative sector, 21.47% in the sales sector, 3.14% in the marketing sector, 8.9% in the execution sector, 7.85% in the telesales sector, 5.24% in the human resources sector, 3.66% in the trade marketing sector, 3.66% in the planning sector and 5.24% in the sales administration sector.
- 4) It is recorded that 74.3% occupy the position of assistant, 20.9% the position of middle manager and 4.7% the position of manager
- 5) 42.9% earn 1 minimum wage (2,550,307 Gs), 41.4% earn between 1 and 2 minimum wages (between 2,550,308 Gs and 5,100,614 Gs), 12% earn between 2 and 3 minimum wages (between 5,100,615 Gs and 7,650,921 Gs), 3.7% earn between 3 and 4 minimum wages (between 7,650,922 Gs and 10,201,228 Gs).
- 6) 39.8% consume 100% of their income, 17.8% consume between 91% and 100% of their income, 25.1% consume between 81% and 90%, 7.9% consume between 71% and 80% of their income and 9.4% consume less than 70% of their income. In order to make a more concise approximation of the data collected, a statistical average was applied to these data to be able to describe more precisely the consumption according to their respective categories.
- 7) According to the results obtained based on the survey conducted, an average consumption in transportation of 21.43%, an average consumption in food of 23.51%, an average consumption in health and personal care of 4.64%, an average consumption in entertainment of 8.73%, an average consumption in education of 13.22%, an average consumption in rent of 2.36%, an average consumption in communication of 2.82%, an average consumption in clothing or clothes of 3.32%, an unspecified consumption (other) of 8.17%, the average percentage allocated to savings of 5.85%, and the average percentage allocated to debts of 8.17%.
- 8) Of those surveyed, 56% said that they do save, while 44% said that they do not save.
- 9) 52.1% allocate between 0 and 10% of their income to savings, 31.1% allocate between 11% and 20% of their income to savings, 12.6% allocate between 21% and 30% of their income to savings, 3.4% allocate between 31% and 40% of their income to savings, and 0.8% allocate more than 40% of their income to savings.
- 10) 65.4% expressed that they do depend on financial credit to support their expenses, 40.8% are between 24 and 29 years old.
- 11) It is recorded that 29.1% depend on credits between 0 and 10% of their income, 50% depend on credits between 11% and 20% of their income, 15.1% depend on credits between 21% and 30% of their income, 3.5% depend on credits between 31% and 40% of their income and 2.3% depend on credits between 41% or more of their income.<sup>6</sup>

#### Analysis of wages through average

The statistical average formula is:  $w = \Sigma X / n$ , where: w is the population average,  $\Sigma X$  is the sum of variables, n is the total number

of variables. Applying the formula using the income data obtained through the questionnaire we were able to obtain that the average income of the employees of the company under study is equivalent to approximately 3.772.052 Gs.

#### Analysis of savings through scatter plot

In order to make the scatter diagram (Figure 1), the data collected by means of the instrument used were used, with the savings variable (dependent) on the ordinate axis as opposed to the independent variable called income. It was possible to establish the direct positive relationship between the variables analyzed (savings - income), which shows us that the increasing values of Y are associated with increasing values of X.<sup>7</sup>

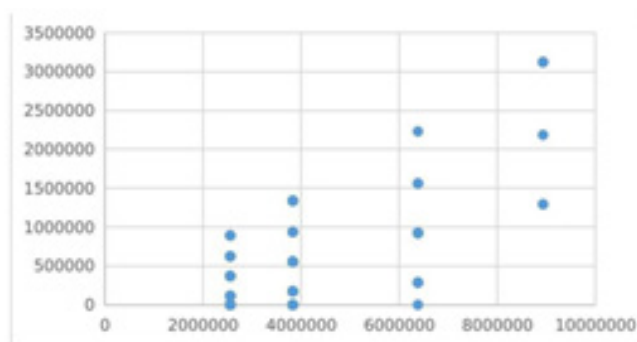


Figure 1 Analysis of savings through scatter plot.

#### Analysis of consume through scatter plot

We have taken into account the dependent variable consumption in relation to the independent variable income (Figure 2), which allows us to discover the direct, inverse or null dependence between the data. This allows us to discover the direct, inverse or null dependence between the data, as it shows the direct positive relationship between consumption and income in advance.<sup>8</sup>

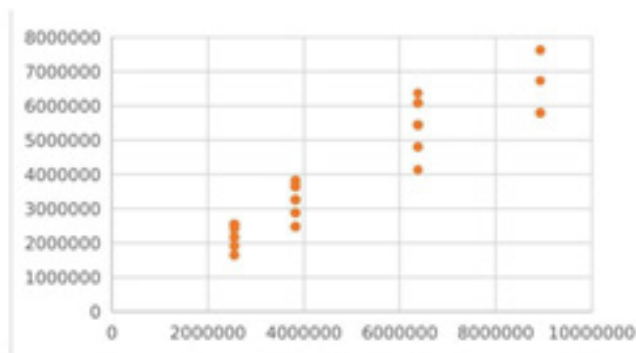


Figure 2 Analysis of consume through scatter plot.

#### Analysis of the linear regression

Considering the hypothesis that there is a direct relationship between the income variable and the consumption and savings variables, we can argue that as income increases, it is very likely that both consumption and savings will increase. We can define the regression equation as follows:  $\beta_0 =$  initial savings,  $\beta_1 =$  Marginal Propensity to Save,  $Y =$  Savings,  $X_1 =$  Income,  $u_i =$  Error. Using the data collected through the instrument used (which are detailed in the appendix) and with the help of the GRETL software, we obtained the following results:

## Results

### Simple linear regression for the savings function (Table 1)

**Table 1** Model: OLS, analyzing observations 1-191 dependent variable: savings

Variable	COEF	Stand. error	T
Const	-603962	82040,8	-7,362
Wages	0,274469	0,0200997	13,66
r2 = 0,496631			

Sources: Own sources.

From the model summary the regression equation is: “ $Y' = -603962 + 0,274469X$ ”.

Taking into account the results obtained and exposed, considering the critical levels (degree of significance), the hypothesis of this research is accepted, which establishes that there is a direct relationship between the consumption and income variable. Recall that the regression equation is:  $Y = \beta_0 + \beta_1X_1 + \beta_iX_i + \dots + u_i$ , and using the data obtained, we have:  $Y' = -603.962 + 0.274469X$ . Which establishes that an increase of one thousand guaraníes in a person’s income would increase his savings by approximately 274 guaraníes. This constitutes the Marginal Propensity to Save. Assuming an income of Gs. 3.000.000.-, and considering the data obtained in the regression line, we find a saving of Gs. 219.445.9

Taking into account the negative value of the intercept, it establishes that it is a value of savings. Therefore, assuming that we do not have any income, we would be saving Gs. 603.962.-

The r2 value in this equation was 0.496631, which indicates that the variation in savings is 50% explained by the income obtained. In the same way we have performed the regression for the saving function in the households of Ciudad del Este, for which we considered the following:  $\beta_0$  equals initial consumption,  $\beta_1$  equals marginal propensity to consume, Y equals consumption,  $X_1$  equals Income,  $u_i$  equals error.

### Simple linear regression for the consume function

Taking into account the results obtained and exposed (Table 2), considering the critical levels (degree of significance), the hypothesis of this research is accepted, which establishes that there is a direct relationship between the consumption and income variable. Recall that the regression equation is:  $Y = \beta_0 + \beta_1X_1 + \beta_iX_i + \dots + u_i$ , and by using the data obtained, we have:  $Y' = 603962 + 0.725531X$ .

**Table 2** Model: OLS, analyzing observations 1-191 dependent variable: consume

Variable	COEF	Stand. error	T
Const	603962	82040,8	7,362
Wages	0,725531	0,0200997	36,10
r2 = 0,873322			

It can be seen that if income increases by one thousand guaraníes, consumption will increase on average Gs, 726, this represents the Marginal Propensity to Consume.

The estimation of the parameter  $\beta_0 = 603.962$  expresses the value of autonomous consumption or also the cut-off point with the Y-axis of the estimated consumption function.<sup>10</sup>

We can say that if income is zero guaraníes, the value of autonomous consumption is Gs. 603,962. 603,962. If we were to

establish a value (Gs. 3,000,000) for the independent variable income, it would have a directly proportional influence on the dependent variable consumption (Gs. 2,780,555).

Assuming the goodness of fit, which is measured by the coefficient of determination identified with the acronym r2, it obtains a value of approximately 0.87, which means that the variations that occur in the dependent variable consumption are explained by 87% by the independent variable income. It is a measure of the degree of fit, the closer it is to 1, the better the fit of the regression line.<sup>11</sup>

## Conclusion

Through the statistical analysis of Simple Linear Regression with the Ordinary Least Squares Method, with the help of the GRETLL software and through digital format surveys, the results have been obtained. The hypothesis of this research has been accepted because the workers of a company that distributes mass consumption products are expected to allocate approximately 27% of their income to savings; likewise, more than one third of the workers stated that they depend on credit to pay for their consumption.

It was possible to answer the general question and the specific questions posed. In relation to the general question, it was possible to measure the Marginal Propensity to Save of the workers of a company that distributes mass consumption products, with the result  $Y' = -603962 + 0.274469X$ , which establishes that the explanatory variable has a positive effect on savings. For every thousand guaraníes of income, savings will increase by 274 guaraníes on average. If she does not receive any income, she will have an indebtedness of Gs. 603.962.<sup>12</sup>

In relation to the specific questions, it was possible to estimate the average salary at approximately Gs. 3,772,052 of the workers of the company under study, their income is mainly spent on food and transportation, to a lesser extent on education and entertainment, and to a lesser extent on the rest of the consumption categories; the average amount at which people resort to financial credit for their expenses was determined, and it was observed that more than a third of the total population depended on credit, that is, 1 out of every 3 workers were recurrent consumers of credit, and a direct positive relationship was found between the variables analyzed (savings - income).<sup>13</sup>

In relation to the determination of the Marginal Propensity to Consume, we have found the regression line  $Y' = 603962 + 0.725531X$ , indicating that for every thousand guaraníes of income, a person will be consuming on average 725 guaraníes. If the person has no income, he/she will have an autonomous consumption of Gs. 603.962.

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## Conflicts of interest

The authors declare that they have no conflicts of interest related to the present work.

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## References

1. Paredes de Vallejos CE. Comparison of the function of consumption and savings in the homes of Ciudad del Este, research work. Universidad Nacional del Este; 2019.

2. Roberto Vázquez Burguillo. Saving. *Economipedia*. 2016.
3. Javier Montes de Oca. Consumption. *Economipedia*. 2015.
4. Susana Gil. John Maynard Keynes. *Economipedia*. 2015.
5. Anónimo. What is the Keynes or Keynesian model?. *BBVA*. 2022.
6. Andrés Sevilla Arias. Keynesianism. *Economipedia*. 2015.
7. Fernández, Tomás, Tamaro Elena. Biography of John Maynard Keynes. In: *Biographies and Life*. Spain; 2004.
8. Steven Jorge Pedrosa. Marginal propensity to save. *Economipedia*. 2016.
9. Steven Jorge Pedrosa. Marginal propensity to consume. *Economipedia*. 2016.
10. Paula Nicole Roldán. Expense multiplier. *Economipedia*. 2018.
11. Danelly Salas Ocampo. The mixed approach to research: some characteristics. *Investigation*. 2019.
12. Estudio Descriptivo. Descriptive study. 2020.
13. Enrique Rus Arias. Descriptive research. *Economipedia*. 2021.