COLEGIO UNIVERSITARIO DE ESTUDIOS FINANCIEROS

FINAL DEGREE PROJECT



ANALYSIS OF FINANCIAL DATA



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1. INTRODUCTION

1.1 What this work aims to explain

This work has as its main objective the detailed analysis of one of the most important companies of Portugal, Jeronimo Martins, and the behavior of its asset in the PSI20, the stock market index in which it is quoted. To make a significant and coherent analysis, methods and knowledge acquired throughout my university studies will be used.

First of all, I will explain the beginnings of Jeronimo Martins and how it has been developed over the last years. In addition, regarding the financial study on the entity, the balance sheet, the annual accounts and the internal structure of it will be explained detailly. In addition, a statistical-descriptive analysis of the evolution of its share price in the PSI20 will be presented, and several hypothesis contrasts will respond to questions related to the asset behavior and its market index.

Since Jeronimo Martins is a company that not only operates in Portugal, but has also achieved a significant global expansion, is influenced by several relevant factors that at first sight are not so easy to see. Therefore, the main objective of this work is to make a deep analysis of the company Jeronimo Martins and its share progress in the market.

Finally, the resolution of questions about the possible events and factors that have influenced the performance of the company over the years will be answered through different hypothesis.



1.2 History of the company

In the year 1792, a young Galician named Jeronimo Martins came to Portugal looking to open his small business and start a new life in this country, especially in Chiado, Lisbon. But what he did not know was that after a few years, it would become one of Portugal's leading companies. His business was simple and concrete. It consisted basically on importing food products into the country and selling them in his small shop. This small business was mainly characterized by its great variety of products, where there could be found from sacks of corn and sausages to candles and brooms.

Very little time since he opened his shop, it became the focus of many Portuguese customers when buying food. The high reputation this small store gained only five years later since it opened, it became the official supplier of the Royal family of Portugal.

Its great business opportunity landed in the young businessman's shop in 1851, when the writer and politician Alexandre Herculaneum offered him the opportunity to sell his prime quality olive oil in his shop. This product was very well known and offered a very competitive quality. With this fact, Herculaneum and Martins became associated. However, even though this great prestige that the store had managed to acquire in the city, it did not manage to overcome the crisis that brought with it the First World War. Several factors such as unemployment, the high cost of living and the declining food supply caused the company to be on the verge of bankruptcy. Fortunately, two newcomers to Lisbon called Manuel dos Santos and Elysio Pereira, made an incredible offer to Jeronimo for one million Portuguese escudos for his company, which he did not reject.

Despite a difficult economic period, they managed to refloat the company by modernizing it with a wide variety of products. When the store began to belong Manuel dos Santos, he decided to keep his initial name and continued to be called Jeronimo Martins. When World War II arrived, margarine had become a



star product on the market. In search of opportunities, Elisio Alexandres dos Santos, nephew of Manuel dos Santos, began to produce margarine in his own factory called the Imperial Fabrica of margarine, with which he later formed a joint venture with the multinational Unilever.

Over the years, Alexanders Soare dos Santos took the leadership of the company. Thanks to his vision for the future and his business leadership, he led the company towards the production business, for which he managed to acquire an important presence in the distribution sector. In 1978, after a long and exhaustive study of the supermarket business, Jeronimo Martins developed a very extensive chain of supermarkets.

The company's mission was clear; succeed in the distribution business. After a strategic alliance with Dekhaize Group, to which subsequently would have ended up acquiring, it managed to introduce in the Portuguese market very well-known firms like Heinz or Calvin Klein.

The development and growth strategies followed by Alexandre brought very positive results for the company. The key for this was the networking and the partnerships of Jeronimo Martins with other companies. To know how to conquer the Portuguese market and to be one of the most volume employers in Portugal, they went towards an international expansion.

After succeeding in his first target, Poland, they looked for new opportunities in other continent and opened stores in Colombia and Brazil. In addition, certain total acquisitions of other companies, such as Eurocash in Poland, must be added. Their business model was simple concrete; small and numerous shops that were primarily food retailers of excellent quality products that could be affordable for a common citizen.



1.3 Relevant events

Over the years, Jeronimo Martins has not only grown as a company, but also in terms of volume. In Addition, it has been able to cope up with a winning attitude some negative events that have taken place through its history.

Its first financial crisis took place in 1918, when the end of World War I came. This made citizens not have much money and not buy as many products as before. For that reason, the supply sector in Portugal was at the limit of bankruptcy. When Jerome Martins already had an important turnover, he developed his business mission towards distribution.

However, despite having a significant market share in Portugal, it searched for new opportunities to expand its business worldwide. In order to do so, Biedronka, a Polish company which worked in the same sector, was acquired in 1995. Jeronimo Martins opened its stores through Biedronka stores in Poland. After two years, the firm was already one of the leading Portuguese companies, principally because of the good results obtained in Poland.

In order to continue its global expansion, in 2001 it set its goal in Colombia, and began to operate there after its alliance with the company Hebe Store. However, it did not have such positive results, and it was in 2002 when it sold the Sugar Loaf group it had acquired a few years ago.

Finally, in November 2013, Alexandre Soares dos Santos announced that he was leaving the presidency of the company after being in charge for 45 years.



1.4 Financial Statements analysis

In order to be able to do a good analysis of the performance of Jeronimo Martins in the market, its balance and its income statement are going to be explained before. By this, an internal analysis of the economic and financial situation of the company will be projected.

BALANCE SHEET

ASSETS	2017	2016	Change	EQUITY AND LIABILITIES	2017	2016	Change
Non current Assets	4,45	4,008	11,0%	Equity	2,013	1,991	1,1%
Net Property, Plant & Equipment	3,475	3,023	15,0%	Common Equity	1,788	1,738	2,9%
Buildings	3,228	2,833	13,9%	Retained Earnings	1,193	1,189	0,3%
Land & Improvements	495	455	8,8%	Other Appropriated Reserves	0	0	0,0%
Machinery & Equipment	1,716	1,572	9,2%	Capital susplus	22	22	0,0%
Construction in Progress	410	289	41,9%	Accumulated Minority Interest	225	253	-11,1%
Other Property, Plant & Equipment	254	233	9,0%	Total Equity	2,013	1,991	1,1%
Accumulated Depreciation	2,628	2,358	11,5%	Non current Liabilities	406	295	37,6%
Total Investments and Advances	51	49	4,1%	Long-Term Debt	238	115	107,0%
Other Long-Term Investments	50	49	2,0%	Long-Term Debt excl. Capitalized Leases	232	112	107,1%
Intangible Assets	768	739	3,9%	Non-Convertible Debt	232	112	107,1%
Net Goodwill	647	630	2,7%	Capitalized Lease Obligations	6	3	100,0%
Net Other Intangibles	121	109	11,0%	Provision for Risks & Charges	96	83	15,7%
Current Assets	1,992	1,678	18,7%	Current Liabilities	4,023	3,436	17,1%
Other Receivables	326	255	27,8%	Short Term Debt	298	224	33,0%
Inventories	847	720	17,6%	Current Portion of Long Term Debt	2	1	100,0%
Raw Materials	6	4	50,0%	Accounts Payable	2,913	2,561	13,7%
Total Accounts Receivable	382	301	26,9%	Income Tax Payable	58	45	28,9%
Cash & Short Term Investments	682	645	5,7%	Other Current Liabilities	752	606	24,1%
Cash Only	681	644	5,7%	Miscellaneous Current Liabilities	595	606	-1,8%
TOTAL ASSETS	6,442	5,686	13,3%	Total Equity and Liabilities	6,443	5,686	13,3%

FIGURE 1. Balance Sheet of Jeronimo Martins for 2017 and 2016.

<u>Source</u>: Financial Quotes, The Wall Street Journal(Own elaboration in Excel)

Regarding its economic side, the majority its non-current assets are focused on buildings and infrastructures, which the company owns as it is largely dedicated to retailing and needs a large infrastructure to be able to store all the goods. It also has a large number of machinery and equipment, so it can be said that it has a large amount of fixed assets. On the part of the most liquid asset, it is composed mostly of inventory, which is not excessively high, and by cash.



On the other hand, there is its financial part, both internal and external. Its equity accounts for 31.24% of its financing, so it is internally self-financed with a third part of its totality. However, as far as its external financing is concerned, it is mostly financed in the short term. This is very common in companies whose main activity is retailing, as they continually buy from suppliers to satisfy the demands of their customers, and the majority of its goods is financed in the short term. A positive aspect of its financing is its capacity for self-financing, as it accounts for one-third of the total and does not depend entirely on external financing. However, one aspect to improve is its capacity of liquidity, since the liquidity ratio, composed of its current assets between its current liabilities, is 0.5. This means that the company would be able to face only half of its short-term debts with the sum of its liquid assets.



NCOME STATEMENT

Fiscal year (Millions)	2017	2016	Change(%)
Sales/Revenue	16,276	14,622	11,31%
Cost of Goods Sold (COGS) incl. D&A	12,818	11,509	11,37%
Depreciation&Amortization Expense	331	294	12,58%
Gross Income	3,458	3,113	11,08%
SG&A Expense	2,857	2,53	12,92%
EBIT	601	583	3,08%
Unusual Expense	8	6	33,33%
Non Operating Income/Expense	-13	171	-107,6%
Non-Operating Interest	4	2	100%
Interest Expense	19	16	18,75%
Gross Interest Expense	19	16	18,75%
Pretax Income	565	734	-23,02%
Income Tax - Total	-152	-130	16,92%
Income Tax – Current Domestic	-177	-139	27,33%
Income Tax - Deferred Domestic	-24	-9	166,67%
Net Income	385	593	-35,07%

FIGURE 2. Income Statement of Jeronimo Martins for 2017 and 2016.

<u>Source</u>: Financial Quotes, The Wall Street Journal(Own elaboration in Excel)

In the income Statement of the company, it can be clearly observed that the result of its net income has decreased in an important proportion from the year 2016 to the year 2017. However, despite having a lower result, the sales level has increased by 11.31%.

In order to define the leverage effect of Jeronimo Martins, it is necessary to make a comparison between its ROA and ROE. In other words, this the difference between the profitability of its assets, and the profitability obtained by its invested capital. In addition, both of them are used in order to provide



additional information about the most appropriate financing structure for the company.

The ROA of Jeronimo Martins is 5.97%, while its ROE is 19.12%. This would mean for the company that it is in a state of positive leverage. Therefore, its average cost of the debt is lower than the profitability obtained through all its assets. For this reason, the debt carried out with its external agents has facilitated its growth for its financial profitability.



FIGURE 3. Graph of the total sales percentage of the Jeronimo Martins group.

Source: Own elaboration in Excel.

As it can be observed in Figure 3, almost 70% of the total sales volume of the Jeronimo Martins group comes from Biedronka, the chain of supermarkets that it acquired so as to achieve its international expansion in Poland. This high percentage that represents Biedronka on its sales, refers to the important decision the Jeronimo Martins group made when it came to expand, that not only has reached a geographical expansion, but also a high volume of sales.



However, local businesses in Portugal constitute almost a quarter of their total sales volume. The group of Jeronimo Martins continues to have an important focus in Portugal, its country of origin.

2. ANALYSIS OF THE SECTOR

Within the food distribution sector, Jeronimo Martins is the main distributor in Portugal because of the volume of its business. Not only the capacity of expansion it has, but also its view of the future, make the company the leading brand in the market.

As it is not the only company listed in the PSI20 focused on food distribution, the other possible competitors should be mentioned. Firstly, the main competition comes from Sonae, leaded by Paulo de Azevedo. However, the company itself is not fully concentrated on the food distribution sector. This Company is divided into several sub-holdings, such as telecommunications, shopping malls and supermarkets. For this reason, Jeronimo Martins presents a more competitive advantage over Sonae, since it is focused exclusively on food distribution.

Finally, another possible future competitor would be the Spanish company Mercadona, as its expansion to Portugal is will be taken place in 2019. This company could be an important competitor because of its high reputation in supermarkets, and the different high quality products it offers to its customers.



3. STATISTICAL-DESCRIPTIVE ANALYSIS

3.1 Data collection and description

For the elaboration of this work, the data of the monthly stock price of Jeronimo Martins (JMT) has been obtained from January 2000 until December 2018, and of the index of reference where the action quotes in, the PSI20.

The adjusted closing prices of the stock have been used in order to study the returns of the stock from one month to another. Also, this return are useful to

So as to develop an econometric model of the CAPM, the Portuguese bond free of risk to 10 years has been studied. Finally, some financial information from the annual accounts and analytical reports has been obtained to make a more detailed analysis of the company, and to explain some reasons for the stock price of Jeronimo Martins in the stock market.



3.2 Descriptive Statistics

In order to make a better exposure of the share price of Jeronimo Martins over the past eighteen years, the returns and the volatility of the price will be analyzed. Also, the data collected will be useful for comparing the behavior of the share with respect to the index of the market, the PSI20. Finally,



FIGURE 4. Evolution of prices of JMT.

<u>Source</u>: Market Data from Bloomberg (Own elaboration in EViews)

In Figure 4, it is shown the evolution of Jeronimo Martins stock price from the beginning of the year 2000 until the end of the year 2018. As is observed, the price of the share has been growing exponentially since the beginning of 2008. However, some important descents are also present from the year 2013.

The maximum historical value of the action, which is \in 18.08, takes place in April 2013, while the minimum value of \in 1.03 occurs rather earlier, in September 2001.

An upward trend of prices can be seen in the graph a trend of growing prices, as the historical minimum prices recorded in the last years are higher than



those recorded in the previous years. So it suggests that the company is being more profitable and has been in a process of growing expansion.

With the aim to explain in detail the rise and fall in value of the share, Figure 4 is divided into four parts which represent some relevant events which have taken place;

- <u>1º Stage (01/2000 09/2008)</u>→the share value started decreasing from the year 2000. However, the company reached an increasing tendency until September 2008.
- <u>2º Stage (03/2009 04/2013)</u>→over these four years, the historical Price of the share has been growing up much more than the eight years before. This could have happened as in 2009, Jeronimo Martins announced its massive expansion in Poland, where it opened 120 stores through the company Jeronimo Martins had acquired 15 years before, Biedronka. Two years later, in 2011, the expansion in that country recorded very positive operating results in terms of sales.
- <u>3º Stage (05/2013 10/2014)</u> →the significant fall of the share value in such a short period of time may be due to the resignation of the presidency of Alexandre Dos Santos after been in the presidency of the company for 45 years. In Addition, , it must be added that a very quick drop in food prices took place in some countries in which Jeronimo Martins operates, such as Colombia or Portugal.
- <u>4º Stage (11/2014 05/2017)</u> →The value of the share started to recover after the excellent operating results obtained due to its global expansion by opening stores in Poland through Biedronka, the food distribution company acquired in 1997. The performance Jeronimo Martins in Poland was so outstanding that it amounted to 66.3% of total global sales of the company.





As it is showed in the graph of Figure 5, the movements of the stock JMT follow the same trend as those taking place in the PSI20 market. For that reason, it is graphically presented how the profitability of the stock and the index in the same direction evolve.

However, the deviations from the returns of the PSI20 vary in greater proportion than the market ones, so it has a greater deviation from the average. Which means that they disperse more from the mean, with a greater volatility. From an investment point of view, in would be more risky to invest in the JMT stock than in the PSI20 market.





FIGURE 6. Graph of the price frequency of JMT stock

Source: Market Data from Bloomberg (Own elaboration in Eviews)

In Figure 6, the histogram shows the frequency of the stock price of Jeronimo Martins over the last twenty years. The vast majority of the values it has taken is between the range from 1 to 2 euros per share. Also, there is not any price below one euro, but not above nineteen euros.

3.3 Hypothesis Contrast

In this section of the work, some key aspects about the returns and volatility of the share are going to be tested so as to see if they present any similarity with the market or not. In order to be able to answer this type of questions, some hypothesis contrasts are going to be developed to bring out the most accurate results as possible.

Not only questions about volatility or returns will be answered, but also some important events which have taken place over the last 20 years will be subject of study.



QUESTION	H _o	DECISION	FIGURE
Is the mean of the JMT share the same as the market?	Equal return	Not reject	Figure 13(Annex)
Is the JMT share price as volatile as the market?	Equal variance	Reject	Figure 14(Annex)

The first matter refers to the returns of the Jeronimo Martins: **¿Is the share of JMT as profitable as the PSI20 market?** In This case the average returns of Jeronimo Martins are compared with the market PSI20 one. In order to do so, a hypothesis test has to be made. Using the data of returns of the company and the market since the year 2000, a contrast is used to see the difference between the JMT and the market. In this case, the null hypothesis (H₀) states that the JMT share and the market have the same returns. For that reason, the difference between the returns should equal to D (D=0). However, the alternative hypothesis (H₁) states that the difference between them is not D. It would mean that their returns are not be equal. The hypothesis contrast is the following:

$$H_0: \quad \underline{X}_{JMT} - \underline{X}_{PSI20} = D$$
$$H_1: \quad \underline{X}_{JMT} - \underline{X}_{PSI20} \neq D$$

So as to see the optimal decision to make, it is chosen $\alpha = 0.05$ and it is obtained that $z_{\alpha/2} = 1,9599$. As the D obtained is equal to 1.27, the null hypothesis cannot be rejected given that d<- $z_{\alpha/2}$. By this, the fact that their return is the same one cannot be denied.



According to the question; **¿Is the JMT share price more volatile than the market?**, it is intended to observe if the share of Jeronimo Martins has a greater volatility with respect to the one of the Market, this is, if it follows a lower price stability.

$$\begin{array}{ll} H_0: \ \sigma_{JMT}^2 = \ \sigma_{PSI20}^2 \\ H_1: \ \ \sigma_{JMT}^2 \neq \ \sigma_{PSI2}^2 \end{array}$$

In this case, it is also used $\alpha = 0.05$ and is obtain $z_{\alpha/2} = 1,9599$. However, when comparing the volatility of the stock of JMT and the one from the market PSI20, it is obtained a F-test equal to 2.45 and a probability of 0.0%. Therefore, the null hypothesis is rejected, and it is said that the volatility of the stock JMT is different from the one in the market.

In addition, as it can be observed in the CAPM table (Figure 7) in the CAPM section, the beta of the JMT stock is lower than the market one.



4. CAMP MODEL

The Model of Valuation of the Price of the Financial Assets or Capital Asset Pricing Model (CAPM) will serve as a tool in order to estimate the variation of the stock JMT according to the returns of PSI20 market.

$$R_{A} = R_{F} + \beta(R_{M} - R_{F})$$

- R_{A:} rate of return of the JMT stock
- **R**_{F:} rate of return of the JMT stock without risk
- R_{M:} rate of return of the PSI20 market
- (R_M R_F): risk-premium
- β : coefficient that measures the variation of the return of the JM stock facing any possible variation in the PSI20.
- α : coefficient which measures the returns of the JMT stock

The econometric model would be:

$$(R_A - R_F) = \alpha + \beta (R_M - R_F) t + \varepsilon_t$$
 t=1,2,...n

Dependent Variable: PJMT Method: Least Squares Date: 03/31/19 Time: 19:01 Sample (adjusted): 2000M02 2018M12 Included observations: 227 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20	0.658126 0.764980	0.501599 0.090682	1.312056 8.435872	0.1908 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.240286 0.236909 7.472865 12564.83 -777.6548 71.16393 0.000000	Mean depende S.D. depender Akaike info crit Schwarz criter Hannan-Quinn Durbin-Watsor	ent var nt var eerion oriter. n stat	0.027191 8.554586 6.869205 6.899381 6.881382 2.036548

FIGURE 7. CAPM Econometric Model.

Source: Price data from Bloomberg. (Own elaboration in EViews)



In the CAPM model, it is presented a lot of information about the stock without carrying out the treatment of atypical values. The coefficient of determination of the model is 24%.

First of all, the Market premium of PSI20, β = 0,7649, has a P-value equal to 0.0000. This indicates that it is a significant variable in the model. If the PSI20 prime increases or decreases, the JMT's prime will suffer a change but to a lower extent than the market, since its beta is less than 1. Therefore, the variation of the returns of the JMT stock is lower than the variation of the PSI20 market one.

In order to be easier to understand, the following example is presented. If the market risk premium increases by 100 basic market points, the JMT risk premium would increase by 67 basic market points. Therefore, this indicates that the JMT stock is less risky than the market index.

At the time of investing, the real estimator is very significant in this case, as it advises the investor about investing in the market or the asset. If the investor's profile is a very risky one, he would go to invest in the market. However, from the point of view of a more conservative profile, this one would choose to invest in JMT.

As far as the constant of the model, it is not significant because it has a P-value of 0.1560, which is higher than the level of significance used (α =0.05). Therefore, no exogenous factor will affect the return of the JMT stock.



4.1 Analysis of the residues MCO

The residues are the estimation of the disturbances, which take place in the model which can affect the JMT stock. In order for the estimated model in this work to be valid, it is necessary to perform an analysis of the residues and these must be white blond to give the model estimated by valid.

In order to do, the residues must meet the following four hypotheses:

- <u>Hypothesis 1</u> \rightarrow the perturbations have a mean equal to zero.
- <u>Hypothesis2</u> \rightarrow the perturbations have the same variance.
- <u>Hypothesis 3</u> \rightarrow the perturbations are independent.
- <u>Hypothesis 4</u> \rightarrow the perturbances follow a normal distribution.

4.2 Normality Analysis

In order to carry out the analysis of normality of stock, the Statistic Jarque-Bera is used. To do so, a contrast of hypothesis is carried out. The null hypothesis (H_0) means that there is normality, and the alternative hypothesis (H_1) , that there is no normality.

- H₀: there is normality among the residues
- H₁: the is absence of normality among the residues

The expression of the hypothesis contrast is the following one:

$$JB = N[\frac{CA^2}{6} + \frac{(CK-3)^2}{24}] \sim X^2 2$$





FIGURE 8. Normality Analysis.

Source: Own elaboration in EViews

As can be seen in Figure 8, the statistical value of Jarque-Bera is 19.80 and the P-value has a value of 0.00005. Therefore, the null hypothesis which states that there is normality among the residues is rejected as the p-value is less than 0.05. Consequently, the alternative hypothesis is accepted, which determines that the residues do not follow a normal distribution.

In addition, in Figure 6, there are negative residues higher than others. This can be due to some atypical values which might distort the population values, which at first sight, seems to follow a normal distribution. But after the hypothesis test, it does not.



4.3 Heteroskedasticity Analysis

To start with the analysis of heteroskedasticity, the Contrast of White is going to be carried out. The heteroskedasticity problem takes place when the disturbances of the model do not present the same variance.

In order to see if they have the same variance, a contrast of hypotheses is made, in which the null hypothesis states that all the disturbances have the same variance and the alternative hypothesis states that the variances are different, so there would be a problem of heteroskedasticity.

H₀: Homoscedasticity among the residues

H1: Heteroscedasticity among the residues

To calculate the statistic, it is necessary to estimate an auxiliary model in which the dependent variable, that is, the MCO, residues of the original model (CAMP1), are squared. On the other hand, the explanatory variables are the regressors of the model, its squares and its crossed products.

$$\hat{c}_t^2 = \alpha_1 + \alpha_2 PSI20_t + \alpha_3 PSI20_t^2 + \alpha_t$$
 $t = 1, 2, ..., n$

Where the test statistic is:

$$nR^2 \rightarrow x_{p-1}^2$$

- n : number of the sample
- R²: coefficient of determination of the regression
- p: is the number of coefficients estimated in the regression



Dependent Variable: PJMT Method: Least Squares Date: 03/21/19 Time: 20:29 Sample (adjusted): 2000M02 2018M12 Included observations: 227 after adjustments

Heteroskedasticity Test: White

F-statistic	1.271089	Prob. F(3,223)	0.2851
Obs*R-squared	3.816407	Prob. Chi-Square(3)	0.2820
Scaled explained SS	5.258930	Prob. Chi-Square(3)	0.1538

Test Equation: Dependent Variable: RESID^2 Method: Least Squares Date: 03/31/19 Time: 18:44 Sample: 2000M02 2018M12 Included observations: 227 Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20^2 PPSI20*D0810 PPSI20	47.50447 0.171318 6.993950 -0.925048	6.861656 0.131156 4.658358 1.201698	6.923179 1.306217 1.501377 -0.769784	0.0000 0.1928 0.1347 0.4422
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.016812 0.003586 88.82626 1759493. -1338.558 1.271089 0.285112	Mean dependen S.D. dependent Akaike info crite Schwarz criterio Hannan-Quinn Durbin-Watson	nt var t var erion on criter. stat	52.77746 88.98594 11.82871 11.88906 11.85306 1.894235

FIGURE 9. Test White. Heteroskedasticity Table.

Source: Own elaboration in EViews

As it can be observed in the Figure 9, the value of the statistic is 3.816, whose p-value is 0.2820, which is higher than the level of significance used for the hypothesis ($\alpha = 0,05$). Then, the null hypothesis (H₀) cannot be rejected with a level of significance of 5%. Therefore, the variance of the residues is constant for each residue value. Consequently, there problem of heteroskedasticity is not present in our model.



4.4 Autocorrelation Analysis

The analysis of autocorrelation aims to analyze whether there is independence between the residues of the model or not. To do so, the following contrast of hypothesis is made using the statistic Durbin-Watson.

The analysis of Autocorrelation aims to analyze whether there is independence between the residues of the model or not. To do this, the following contrast of hypothesis is made using the statistic Durbin-Watson:

H₀: No autocorrelation

H₁: Autocorrelation AR (1)

In The estimation MCD, to carry out the study of the self-correlation of the residues, it is observed that the value the statistic Durbin-Watson is of 2.03, which is very close to 2 (Figure 7). Therefore, the null hypothesis of no autocorrelation against the alternative hypothesis, which indicates autocorrelation type AR (1), cannot be rejected.

This statistic indicates the dependence which the disturbances of the model have with respect to their values from the past. However, both the data collected from the JMT stock and the PSI20 market, are monthly periodicity, so the disturbances can follow a higher-order regressive model.

To solve this issue in more detail, the contrast of Breusch-Godfrey will be carried out, since it allows taking into account the data of the perturbations from the previous month.

However, the residues can be autocorrelated by autoregressive models of higher order, and in this section, the contrast for an AR (2) by means of the statistician of Breush-Godfrey is carried out. To this end, the following contrast of hypotheses presents a null hypothesis (H_0) of non-autocorrelation, and an alternative hypothesis of autocorrelation type AR (2):



H₀: Non autocorrelation

H₁: Autocorrelation AR (2)

In the Figure 15 (Annex), it can be observed that the value of the contrast statistic is 0.2687 with a P-value of 0.8743, which is greater than the level of significance used (α = 0.05), so the null hypothesis of absence of autocorrelation of order 2 cannot be rejected.

Once it has been proved through the contrast of hypothesis AR (2) that there is not any autocorrelation between the residues over a period of two months, a contrast of hypotheses is going to be made through an AR (12) model. This model is used to observe the possible existence of autocorrelation over a longer period of time than before; this is, a 12 months period.

In hypothesis contrast, the null hypothesis still stands ups for the absence of autocorrelation between residues, while the alternative hypothesis defends the autocorrelation of AR (12) type.

As can be seen in the Figure 16 (Annex), it is calculated a P-value of 0.1412, which is greater than the level of significance used. Therefore, the alternative hypothesis cannot be rejected.

As a result, there is no problem of autocorrelation among the residues of the model.



4.5 Conclusions of the residues

In order to demonstrate if the disturbances that exist in the model are white noise, the necessary hypothesis contrasts have been previously made. The following conclusions can be released from those contrasts,

With regard to the normality of the residues, by using the Statistician Jarque-Bera, it is observed that they do not follow a normal distribution since there are atypical values that are distorted with respect to the average.

Moreover, it is observed through the Contrast of White that there is the problem heteroskedasticity. Therefore, the distribution of the residues does not present a similar variance.

Finally, not only the use of both Durbin-Watson, but also the Breush-Godfrey statisticians has been used so as to carry out the study of the autocorrelation of disturbances. It has come to the conclusion that the residues are not auto correlated among them. Therefore, the problem of autocorrelation or medium term (AR2), or long-term (AR12) is not present in the model.



5. ESTIMATION OF THE MODEL WITH DUMMIES

The dummies that are given in the model, are those atypical values that exceed the typical deviation of ± 3 . These are atypical variables that are introduced in the model in order to collect qualitative information.



FIGURE 10. Dummy's chart.

Source: Own elaboration in Eviews

As can be seen in Figure 10, there is only one situation in which the atypical value exceeds -3, which is in December of the year 2000. At that date, the company Jeronimo Martins presented its financial results obtained throughout the year.

In 1997, Jeronimo Martins acquired the Brazilian supermarket company called Supermarkets I Know with the aim of having presence in the Brazilian market. However, their results were not expected, so at the beginning of the year 2001 it was decided to sell it to the Pan de Azucar group.



Due to the negative financial results obtained at the end of the year 2000, it is intended to study if this fact had an effect on the profitability of the JMT stock.

For this, the dummy has been introduced corresponding to the negative results obtained in December 2000 in the econometric model. As shown in Figure 11, the variable introduced (SeSupermarkets12_00) has a p-value of 0.0550. Using a α =0.1 in order to do an hypothesis, the conclusion reached is that the event taken place in December 2000 was relevant for the returns of the JMT stock.

Dependent Variable: PJMT Method: Least Squares Date: 04/01/19 Time: 06:08 Sample (adjusted): 2000M02 2018M12 Included observations: 227 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20 SESUPERMARKETS12_00	0.719287 0.762418 -14.36311	0.499599 0.090148 7.445298	1.439727 8.457402 -1.929152	0.1513 0.0000 0.0550
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.252702 0.246029 7.428074 12359.49 -775.7846 37.87318 0.000000	Mean depend S.D. depende Akaike info cri Schwarz critel Hannan-Quini Durbin-Watso	ent var nt var iterion rion n criter. n stat	0.027191 8.554586 6.861538 6.906802 6.879803 2.014076

FIGURE 11. CAMP Model with the Dummies.

Source: Own elaboration in Eviews



6. ECONOMETRIC HYPOTHESIS CONTRASTS

In the following table, all the relevant issues which seem to be significant for the company's performance are listed, but with the help of a hypothesis contrast which has been carried out, their relevance for the performance of Jeronimo Martins will be proved or not.

QUESTION	H _o	DECISION	FIGURE
Did the retirement of the CEO of the company have an effect in the return of the share?	Not effect	Not reject	Figure 12
Did the sale of the financial crisis affect the returns?	Not effect	Not reject	Figure 12

As mentioned before in the history of the company, in September 2003, the CEO of Jeronimo Martins resigned after having presided over the company for 40 years. As he has been in the head of the company for many years, when leaving the company, some investors might have or have not changed its decision of investing in Jeronimo Martins, as a new president, Pedro Manuel de Castro Soared, has become in charge of the company. Therefore, it is intended to study whether the exit of the president had any effect in the return of the stock.

To do so, the following question is carried out; **¿Is the stock of JMT as profitable as before the retirement of its CEO?** To answer it, a contrast of hypothesis by comparing the profitability of the stock before and after the event is made. The hypothesis contrast is the following one;



$$\begin{array}{ll} H_0: & \underline{X}_{JMT(Before\ sept.213)} - \underline{X}_{JMT(After\ sept.2013)} = 0 \\ H_1: & \underline{X}_{JmT(Before\ sept.213)} - \underline{X}_{JMT(After\ sept.2013)} \neq 0 \end{array}$$

To choose the most accurate decision, it is used $\alpha = 0.05$ and is obtained that $z_{\alpha/2}=$. As the probability obtained is 0.9027 and is higher than the α used, the null hypothesis that there has not been any change in profitability with the departure of the CEO cannot be rejected. Therefore, it is proved that the change in the head management does not only not change return of the JMT stock, but neither the point of view from investors over the company.

The beginnings of the financial crisis took place in October 2008, where most companies suffered a bad economic environment in order to be able to carry out their bossiness. Also, this financial crisis had an important effect on the financial market.

However, it did not have the same effect on all companies. Therefore, to know if it had a significant effect on Jeronimo Martins, the profitability of the stock JMT before and after the crisis, that ended approximately in the year 2014, will be compared. To answer the question, ¿Did the financial crisis affect the return of Jeronimo Martins, the following hypothesis contrast is done;

 $\begin{array}{l} H_0: \quad \underline{X}_{JMT(Before\ Crisis)} - \underline{X}_{JMT(After\ Crisis)} = 0 \\ H_1: \quad \underline{X}_{JmT(Before\ Crisis)} - \underline{X}_{JMT(After\ Crisis)} \neq 0 \end{array}$

In the hypothesis contrast made, it is obtained a probability of 0.91. Since the value is higher than the α used ($\alpha = 0.05$), the null hypothesis that there has been no effect cannot be rejected. Consequently, it is proved that the financial crisis did not have such an important effect in Jeronimo Martins to change its financial return.

Dependent Variable: PJMT



Method: Least Squares Date: 04/01/19 Time: 06:10 Sample (adjusted): 2000M02 2018M12 Included observations: 227 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20 CRISIS08_10 CEOEXIT11_03	0.629112 0.765219 0.130306 -0.926658	0.580204 0.091295 1.151623 7.574642	1.084294 8.381790 0.113150 -0.122337	0.2794 0.0000 0.9100 0.9027
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.240371 0.230152 7.505880 12563.43 -777.6421 23.52142 0.000000	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		0.027191 8.554586 6.886715 6.947066 6.911067 2.036749

FIGURE 12. CAPM Econometric model.

Source: Own elaboration in Eviews.



7. CONCLUSIONS

Throughout the detailed analysis which has been carried out through the paper, the following conclusions are worth highlighting regarding the financial situation of Jeronimo Martins, the effect of relevant facts in the company, its behavior on the PSI20 market and its evolution over the last 18 years.

As far as the financial side is concerned, it has a very powerful storage structure, since its main activity consists of retail. Moreover, over the years it has been increasing its business level through different measures. The first one has been its internal growth level, since its infrastructure volume has been increasing over to the years. Also, another major reason for its exponential growth has been its global vision to make the company an international business. In order to carry out its expansion in different countries, it has supported acquisitions and mergers with other companies in those expansion countries who were dedicated to the same sector. As a result, Jeronimo Martins is one of the leading companies in the Portuguese market today.

At the time of having carried out a statistical study through different scenarios, the main conclusion that has been reached is that the profitability of the JMT asset is positive and greater than the one of the PSI20 market. However, taking into account the risk, the stock has a higher volatility than the market, so investing in Jeronimo Martins presents a greater risk to the investor, but offers greater profitability.

Regarding the econometric analysis elaborated through the model CAPM model, it has come to the conclusion that the disturbances present in the model are of white noise. Therefore, the disturbances given in the model are independent, homogeneous and follow a normal distribution.



To conclude, it is recommended to invest in the long term, doing it at Jeronimo Martins. The first reason is because their profitability is higher than the market one, but in turn has a higher risk to be more volatile action than the market. In addition, this is a company in search of internationalization and new markets. Therefore, their future growth forecasts are positive.



8. ANNEX

Test for Equality of Means Between Series Date: 03/18/19 Time: 17:58 Sample: 2000M01 2018M12 Included observations: 228

Method		df	Value	Probability
t-test Satterthwaite-V Anova F-test Welch F-test*	√elch t-test*	452 383.8631 (1, 452) (1, 383.863)	1.265422 1.265422 1.601292 1.601292	0.2064 0.2065 0.2064 0.2065
*Test allows fo	r unequal cell	variances		
Analysis of Var	iance			
Source of Varia	tion	df	Sum of Sq.	Mean Sq.
Between Within		1 452	82.38320 23254.47	82.38320 51.44794
Total		453	23336.85	51.51623
Category Statis	itics			
Variable	Count	Mean	Std Dev	Std. Err.
RJMT RPSI20	227	0.428046	8.551230 5.456405	0.567565 0.362154
All	454	0.002064	7.177481	0.336856

FIGURE 13. Equality of means of the JMT and PSI20.

Source: Own elaboration in EViews

Method	df	Value	Probability
F-test Siegel-Tukey Bartlett Levene Brown-Forsythe	(226, 226) 1 (1, 452) (1, 452)	2.456088 3.893298 44.06528 22.15666 20.83866	0.0000 0.0001 0.0000 0.0000 0.0000

Category Statistics

Variable	Count	Std. Dev.	Mean Abs. Mean Diff.	Mean Abs. Median Diff.	Mean Tukey- Siegel Rank
RJMT	227	8.551230	6.270811	6.232899	203.5242
RPSI20	227	5.456405	4.149467	4.147610	251.4758
All	454	7.177481	5.210139	5.190254	227.5000

Bartlett weighted standard deviation: 7.172722

FIGURE 14. Equality of the variance of the JMT and PSI20.

Source: Own elaboration in EViews

Test for Equality of Variances Between Series Date: 03/14/19 Time: 19:58 Sample: 2000M01 2018M12 Included observations: 228



Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.132140	Prob. F(2,223)	0.8763
Obs*R-squared	0.268702	Prob. Chi-Square(2)	0.8743

Test Equation: Dependent Variable: RESID Method: Least Squares Date: 03/27/19 Time: 17:07 Sample: 2000M02 2018M12 Included observations: 227 Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20 RESID(·1) RESID(·2)	-0.001115 -0.001206 -0.032162 0.011252	0.503559 0.091119 0.066965 0.067028	-0.002214 -0.013231 -0.480284 0.167876	0.9982 0.9895 0.6315 0.8668
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.001184 -0.012253 7.501857 12549.96 -777.5204 0.088093 0.966522	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		-3.21E-16 7.456314 6.885642 6.945994 6.909995 1.972432

FIGURE 15. Breusch-Godfrey test. Autocorrelation Analysis Type AR (2)

Source: Own elaboration in EViews

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.457839	Prob. F(12,213)	0.1421
Obs*R-squared	17.22887	Prob. Chi-Square(12)	0.1412

Test Equation: Dependent Variable: RESID Method: Least Squares Date: 03/27/19 Time: 17:07 Sample: 2000M02 2018M12 Included observations: 227 Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C PPSI20 RESID(-1) RESID(-2) RESID(-3) RESID(-4) RESID(-5) RESID(-5) RESID(-7) RESID(-7) RESID(-10) RESID(-11) RESID(-12)	-0.068488 -0.014039 -0.046653 -0.024814 -0.014393 -0.014393 -0.003981 -0.03981 -0.03987 -0.015895 -0.045526 -0.043342 -0.098705	0.496814 0.091194 0.068223 0.068547 0.068583 0.066590 0.067062 0.067932 0.067393 0.067394 0.069647 0.069647 0.069750	-0.137854 -0.153949 -0.683825 -0.363590 0.682151 -0.209834 0.003293 1.402860 1.198934 3.180626 -0.229483 0.653669 -0.621383 1.415394	0.8905 0.8778 0.4948 0.7165 0.8340 0.9974 0.1621 0.2319 0.0017 0.8187 0.5140 0.5350 0.1584
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.075898 0.019498 7.383266 11611.19 -768.6959 1.345697 0.188497	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		-3.21E-16 7.456314 6.895999 7.107230 6.981234 1.958336

FIGURE 16. Breusch-Godfrey test. Autocorrelation Analysis Type AR (2)

Source: Own elaboration in EViews



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