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SILOS DE LEIXÕES: ECONOMIC AND FINANCIAL VIABILITY ANALYSIS FOR AN INVESTMENT PROJECT

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Abstract

Silos de Leixões, which belongs to GeStmin group, is a logistic operator, located at Leixões port – Matosinhos. It is the second largest national player in agro-food handling and storage, and in 2017 Silos de Leixões operated 763,000 tons.

Up to 2017, the port was explored only by one logistic operator, and so Silos de Leixões was limited to a single supplier, and also subject to higher prices. When the hypothesis of the port being explored by private entities emerged, the GeStmin group decided to plan the creation of a new company able to serve Silos de Leixões as a ship unloader supplier.

The main purpose of this master thesis is to study the economic and financial viability of this project, based on the valuation model free cash flow to the firm. It was concluded that the creation of the new company is viable.

Keywords: Cereals, valuation models, free cash flow to the firm (FCFF), cash flows.

JEL Classification: M13; G32.

Sumário

A Silos de Leixões, empresa do Grupo GeStmin, é um operador logístico, localizado no porto de Leixões – Matosinhos. É o segundo maior *player* nacional em movimentação e armazenamento de produtos agro-alimentares, tendo em 2017 movimentado 763,000 toneladas.

Até 2017, o porto era explorado apenas por um operador portuário, ficando a Silos de Leixões tanto limitada a um só fornecedor de descarga de cereais, como também sujeita a preços mais elevados. Com surgimento da possibilidade do porto ser explorado por entidades privadas, o Grupo GeStmin decidiu planear a criação de uma nova empresa, que servisse como um operador portuário da Silos de Leixões.

O objetivo principal desta tese é avaliar a viabilidade económica e financeira deste projeto, tendo por base o modelo de avaliação *Free Cash Flow to the Firm*. Concluiu-se que a criação da nova empresa é viável.

Palavras chave: Cereais, modelo de avaliação, free cash flow to the firm (FCFF), cash flows.

Classificação JEL: M13; G32.

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Abbreviations

APV	Adjusted Present Value
AMT	Autoridade da Mobilidade e dos Transportes
CAPEX	Capital Expenditure
CCP	Climate Change Package
CRP	Country Risk Premium
DCF	Discounted Cash Flow
DOL	Degree of Operating Leverage
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EU	European Union
EV	Enterprise Value
EVA	Economic Value Added
FCF	Free Cash Flow
FCFE	Free Cash Flow to the Equity
FCFF	Free Cash Flow to the Firm
GDP	Gross Domestic Product
GMO	Genetically Modified Organisms
IGC	International Grains Council
IMF	International Monetary Fund
IMF	International Monetary Fund
INE	Instituto Nacional de Estatística
IRR	Internal Rate of Return
IRS	Imposto Sobre Rendimento Singular
NOPLAT	Net Operating Profit Less Ajusted Taxes
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
RED	Renewable Energy Directive
ROA	Return on Assests
ROE	Return on Equity
ROIC	Return on Invested Capital
SS	Segurança Social
TCGL	Terminal de Carga Geral e Granéis de Leixões
TSU	Taxa Social Única
TV	Terminal Value
WACC	Weighted Average Cost of Capital
WC	Working Capital

1. Introduction

Silos de Leixões, is dedicated to agro-food logistic, and its infrastructure is located in the perimeter of Porto de Leixões, Leça da Palmeira – Matosinhos - Portugal. Its main services include transport and storage of bulk agro-food (grains and flours). Its customers are national and international traders related with food and feed industries. The company's social capital is wholly owned by GeStmin group, a 100% Portuguese company that aggregates interest in several business areas: energy sector, food logistics, plastics industry, tourism and agro-industry.

The place where Silos de Leixões operates is under the private domain of Administração dos Portos do Douro, Viana do Castelo e Leixões (APDL). In turn, the Terminal de Carga Geral e Granéis de Leixões, S.A (TCGL) is the unique port operator, which holds the concession attributed by APDL in July 2001, for commercial exploitation of the conventional of Leixões port, that is, ships unloading. TCGL having the monopoly of grains' unloading from the ships, the firm is totally depending on this service. Consequently, with the monopoly taken by TCGL, that in theory is controlled by APDL, in practice led to a 20% increase in the price of supply unloading service, between the previous situation (before the concession) and the situation resulting from the concession to TCGL, increasing the costs for importers.

Last year, APDL opened the hypothesis that a part of the port can be exploited by private companies. The notice pleased GeStmin group and so, they want to go ahead with the investment project that intends a creation of a new company able to do the ships unloading. With the hypothesis announced by APDL, Silos de Leixões saw an opportunity to start guarantying its service through two unloading ways: one of them by the public port, through TCGL services and another through a new company that will be created, being 100% of GeStmin.

According to Buzzell (1983:3-5), vertical integration is *"the combination, under a single ownership, of two or more stages of production or distribution (or both) that are usually separate"*. Integrate vertically presupposes changes in the chain value, such as, reduction costs, investment in equipment and employees now-how. Following the same author, there are some advantages in taking into a vertical integration: reduction costs, supply assurance, improved coordination and technological capabilities. Taking into account the current situation of Silos de Leixões, with the creation of a new company, it

may reduce costs, once TCGL held until now the unloading monopoly. On the other hand, cereals unloading will be assured in two ways, minimizing the risk of failure.

This project aims to study the economic and financial viability of the creation of this new company, able to do what actually is done only by APDL, and analyses if the company should or should not go forward and implement it.

To answer the main goal of this thesis, it was developed a literature review, where some topics about value and types of valuations models were explored, in order to choose the best model to use. It was also made a study about the cereals market and the port industry in Portugal, to understand the current market situation where the company operates. After these researches, it was possible to choose the best model to value the company – free cash flow to the firm, and the author concludes that the project is economic and financially viable, since it presents a positive NPV €1,322,686, and an IRR (16.02%) higher than the WACC. The sensitivity analysis made confirms that this project is still viable in the worst scenario. Analyzing the behavior of the main indicators, it can be seen the positive performance all over the project lifetime.

2. Literature Review

2.1 Value

There is a big difference between the price and the value of something that in some cases could be coincidence. Price is on everyone's eyes, defined and established by someone or a company. The value has to be backed up by reality, which implies that the price paid for any asset should reflect the cash flow it is expected to generate (Damodaran, 2012). Fernandez (2015) agrees with Damodaran saying that the price is the quantity agreed in the sale of a company and the value is the price we are willing to pay.

Value is created when companies invest cash today to generate more cash in the future, growing and earning a return on capital that exceeds their cost of capital (Koller *et al,* 2015). Increasingly, companies are concerned and focused in the creation of value for both shareholders and stakeholders, such as costumer, suppliers, employees and communities, instead of focusing only on shareholders. There are many ways to create value and the strategy will depend on the company's environment and actual situation. For Koller *et al* (2015) high-ROIC companies usually create more value by focusing on growth, while lower-ROIC companies create more value by increasing ROIC.

Value is driven by the expected cash flows discounted at a cost of capital and cash flows are driven by expected returns on invested capital and revenue growth (Koller *et al,* 2015). According to Koller et al, (2015:36), *"anything that doesn't increase cash flows doesn't create value"*. Investors should focus on increasing cash flows of their business rather than finding tricks to make results look better or distribute value among investors. In a company, the debt and equity structure should not be affected by value's creation, unless the general cash flows of the company also change (Modigliani and Miller, 1958).

As estimating future cash flows implies a certain uncertainty, risk is another important factor in value creation. It impacts valuation through two ways: company's cost of capital, risk's price, once is the price charged by investors, and the uncertainty of the future (Koller *et al,* 2015).

Valuation helps to better understand how to create and measure value. Also helps to identify sources of economic value creation or destruction inside the company and help investors to make decisions. It is not an easy task once the environment and markets are always changing, which makes it difficult to valuate. It is very dependent on the accuracy of data inputs that should be taken with impartiality and many times it is not.

2.2 Valuation Methods

For Damodaran (2012), there are four possible ways of valuation methods: (i) asset-based valuation (liquidation value and replacement cost); (ii) relative valuation, that take into account some variables (book value, earning, revenue and others); (iii) contingent claim valuation, use option pricing models to value assets and opportunities and (iv) discounted cash flow: dividend model, cash flows (free cash flow to the firm, free cash flow to the equity), adjusted present value, cost of capital and excess return.

According to Fernandez (2015), the valuation methods can be divided in six groups: (i) balance sheet method (book value, adjusted book value, liquidation value and substantial value); (ii) income statement (multiples); (iii) mixed method; (iv) cash flow discounting (equity cash flow, free cash flow, capital cash flow and debt tax shield); (v) value creation (EVA, economic profit, cash value added and cash flow return on investment) and (vi) options methods. The first four are the methods more used to value companies.

The choice of the valuation methods may be a difficult task, because there are a lot of models. The values obtained from the methods can be very different and there is no best and exclusive model. The challenge is to understand the one that is more appropriate for the company, project, asset, etc. The decision may depend on the nature of the company, asset or business characteristics, analyst's characteristics and belief, the reason for doing the valuation, and market beliefs (Damodaran, 2012). Also, the same author says that, the methods more used by analysts for valuation are the discounted cash flow and multiples approaches. Once the prospects for the new company will have a long time horizon and it is a unique preoptic, according to Damodaran (2012), the valuation method that is more adequate to analyze the viability of the project is the discounted cash flow. Also, Koller *et all* (2010) says that the discounted cash flow (DCF) approach is still the favorite one for many academics and professional because it trusts only on the flow of cash in and out of the firm rather than accounting earnings, that can conduct to mistakes. So, through the DCF method, is taken into account the money that, effectively, comes into the company, described on working capital, and not only the accounting values. Fernandez (2015:2) agrees with the others authors saying that "*The methods that are becoming increasingly popular (and are conceptually "correct") are those based on cash flow discounting. These methods view the company as a cash flow generator and, therefore, assessable as a financial asset*".

2.3 Discounted Cash Flow Method

An accurate valuation done by discounted cash flows, should follow the following steps (Fernandez, 2007): (i) historic and strategic analysis of the company and the industry where it operates; (ii) project the future cash flows and some financial forecasts, such as the income statement and the balance sheet, the investments needed and how they will be financed; (iii) determine the discount rate; (iv) calculate the net present value of the cash flows and the terminal value; (v) understand and make a critic analysis of the results.

For valuing a company, the most appropriate model is the discounted future cash flows, as the value comes from the company's capacity to generate cash flows to equity holders and debt holders, if there is debt (Fernandez, 2007).

All discounted cash flows methods analyse the same reality and the same hypotheses, and so those should give the same value for a company. Although this situation does not always happen, Fernandez (2008) defends that it this arises from the calculation of the discounted tax shield.

The free cash flow (FCF) is the cash amount that the company can pay out to investors after paying for all investments necessary for growth (Brealey *et all*, 2017). In other words, it is the cash that the company is able to create after spending the money required to maintain or expand the business.

According to Damodaran (2012:15), through discounted cash flow valuation, it is possible to estimate the intrinsic value of an asset, defining intrinsic value as *"the value that would be attached to the firm by an unbiased analyst, who not only estimates the expected cash flows for the firm correctly, given the information available at the time, but also attaches the right discount rate to value these cash flows"*.

DCF Model relates the value of an asset to the net present value (NPV) of expected future cash flows of that asset (Damodaran, 2012).

$$\text{NPV} = \sum_{t=1}^{t=n} \frac{CFt}{(1+r)^t} \quad (1)$$

where,

- **n** is the life of the asset;
- **CFt** is the cash flow in period t;
- **r** is the discounted rate reflecting the riskiness of the estimated cash flows.

Projects with a positive NPV are accepted because they generate value and add it to the company, while if the NPV is negative, the projects are rejected since destroy value (Saims *et al*, 2003).

There are many DCF methods, but the classic cash flow model is considered the most popular (Damodaran, 2012). Inside the cash flows models there are two approaches: equity valuation and firm valuation. Each approach has its own models, represented in the Exhibit 1.

Exhibit 1: Cash Flows Models

Equity Valuation	Dividends
	Free Cash Flow to Equity
Firm Valuation	Free Cash Flow to the Firm
	Adjusted Present Value
	Excess Return Model

Source: Adapted from Damodaran (2012).

2.3.1 Free Cash Flow to Equity (FCFE)

This method reflects how much cash is available to be paid out as dividends or stock expenditures to company' equity holders after financial obligations and reinvestments needs (Damodaran, 2012).

To compute FCFE we should start from the net income and ignore cash outflows (capital expenditures), and the depreciations should be added back, since they are non-cash charges. Variations in non-cash working capital and the issue of new debt should be considered on the cash flow because they are cash inflows. On the other hand, debt repayment, as a cash outflows, it must be discounted. It can be reached through the following formula:

$$FCFE = \text{Net income} - (\text{capital expenditures} - \text{depreciation}) - (\text{changes in non} - \text{cash working capital}) + (\text{new debt issued} - \text{debt repayments}) \quad (2)$$

To reach the equity value of the company, the FCFE should be discounted at the cost of equity rate (rE), the rate of return required by equity investors in the company (Damodaran, 2012).

$$\text{Value of equity} = \sum_{t=1}^{t=n} \frac{FCFE\ t}{(1+rE)^t} \tag{3}$$

where,

— **n** is asset life;

— **FCFEt** is the expected cash flow to equity in period t;

— $\boldsymbol{rE}$ is the cost of equity.

If the company shows indicators of constant growth to perpetuity we can use the Constant Growth FCFE Model represented by the following:

$$\text{Stock Value} = \frac{FCFE_1}{rE - gn} \tag{4}$$

where:

— **$FCFE_1$** is the expected FCFE in the next year**;**

— $\boldsymbol{rE}$ is the equity cost of the firm;

— **gn** is the growth rate for perpetuity in FCFE.

If the company shows in the first year an inconstant growth and after that it starts to grow at a constant rate, and it is expected to be a perpetuate growth, we can use the Two-stage FCFE model, represented by the following:

$$\text{Stock Value} = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+rE(hg))^t} + \frac{\frac{FCFE_{n+1}}{rE(st)-g}}{(1+rE(hg))^n} \tag{5}$$

where,

— **$FCFE_t$** is the expected FCFE in year t;

— $\boldsymbol{rE(hg)}$ is the equity cost in high growth periods;

— $\boldsymbol{rE(st)}$ is the equity cost in stable growth periods;

— **g** is the growth rate for perpetuity in FCFE.

Apart from these two stages of growth models, there is also a Three Stage FCFE model, which starts with a high growth rate, followed by a transitory period where growth declines, and after that comes a steady period at a stable growth rate (Damodaran, 2012).

The cash available to stockholders does not have to be all paid out. The reasons vary from firm to firm and can be related with the future investment needs; higher taxes paid over dividends rather than capital gains; and other reasons. This portion can be seen by the following ratio:

$$\text{Cash to Stockholders to FCFE Ratio } = \frac{Dividens + Equity\ Repurchases}{FCFE} \qquad (6)$$

2.3.1.1. Cost of Equity

It is called cost of equity to the return expected by equity investors that make their equity investments in a company**.** The cost of equity depends on the financing structure of the company. It can be unlevered cost of equity if equity represents 100% or weighted average cost of capital (WACC) if the company is both financed by debt and equity.

There are several ways to calculate the cost of equity: (i) Capital Asset Pricing Theory (CAPM); (ii) Arbitrage Pricing Model; (iii) Multifactor Model and (iv) Proxy Models. Although, CAPM, developed by William Sharpe (1964) and John Lintner (1965), based on earlier work done by Harry Markowitz (1959) about Portfolio Theory, is the simplest of the models, because it just requires a specific company information (beta) that can be estimated from public information. According to Damodaran (2012), it is the most used model to calculate the cost of equity. Also, Fama and French (2004) agree with Damodaran saying that CAPM approach is still extensively used to estimate company's equity costs and also to evaluate portfolios, due to its good prediction on the relation between expected return and risk. Borchert *et al* (2003) say that the purpose of CAPM model is to quantify the relationship between the beta of an asset and its corresponding expected return.

The expected return of an asset *p* is given by adding to the risk free rate, the market risk premium times the market beta of the asset *p.* It can be computed by the Sharpe-Lintner equation and adding a country risk premium when needed:

$$E(Rp) = Rf + \beta p * (E(RM) - Rf) + CRP \qquad (7)$$

where:

- **E(Rp)** is the expected return of an asset p;
- **Rf** is the risk-free interest rate;
- $\boldsymbol{\beta p}$ is the market beta of asset p;
- **E(RM)** is the expected market return.
- **CRP** is the country risk premium.

Koller *et al* (2015) suggest to add a country risk premium (CRP) to the cost of capital in order to give a more accurate valuation when using a different risk free rate from the country concerned.

The beta measures the sensitivity (correlation) of the asset's return to a variation in the market return. The market beta of an asset *p* can be calculated dividing the covariance between the asset's return and the market's return and the variance of the market return, demonstrate by the following equation:

$$\beta pM = \frac{cov\ (Rp; RM)}{\sigma^2(RM)} \tag{8}$$

where:

- $\boldsymbol{\beta pM}$ is the market beta of an asset p;
- $\boldsymbol{cov}\ (\boldsymbol{Rp}; \boldsymbol{RM})$ is the covariance between the asset's return and the market's return;
- $\boldsymbol{\sigma^2}(\boldsymbol{RM})$ is the variance of the market return.

To estimate a levered beta for a firm, it is possible in three ways (Damodaran, 2012):

1) Use the historical market beta, which is a common method for publicly firms;
2) Bottom-up Beta, where it is not required to use historical data, and should be done in three steps:
    a) Identify the industry where the company operates;
    b) Access public information about regression betas of some comparable companies which operates within that industry and generates income from

similar operations, in order to compute the average beta and the debt-to-equity ratio;

c) The unlevered beta for the sector is obtained by unlevering the average beta, estimated in the point above, by the average debt-to-equity ratio for these comparable companies;

$$Unlevered\ Beta\ (Industry) = \frac{Avarege\ Beta}{1 + (1 - t)(avarege\ \frac{D}{E})} \quad (9)$$

d) Finally, the beta found is re-levered, through the formula below, using the debt-to-equity ratio of the firm in study.

$$\beta L = \beta U * [1 + (1 - T) * \frac{D}{E})] \quad (10)$$

where:

— $\boldsymbol{\beta L}$ is the leverage beta of the firm;

— $\boldsymbol{\beta U}$ is the unlevered beta of the industry where the firm operates;

— $\boldsymbol{T}$ is the corporate tax;

— $\boldsymbol{\frac{D}{E}}$ is the debt-to-equity ratio of the firm.

3) From accounting earnings rather than from traded prices. The author does not recommend due to the ease of data manipulation and because it does not consider non-operating factors (depreciations, for example).

   On the other side, Koller *et all* (2010) propose to lever the industry's beta, where a company operates, to the company's debt-to-equity ratio.

Damodaran (2008) says that, to be considered risk free rate, there are two conditions that have to be met: (i) no default risk, associated with the securities issued by the governments, since they control the monetary policy and (ii) no uncertainty about the reinvestments rates, implying that the actual returns equals the expected returns. In this context, the risk free rate is the expected return on a long term government bonds: zero coupon bonds.

Also, Koller *et al* (2010) suggest that an investor should use a long term government bond as a risk free rate, and it should be in the same currency as the free cash flows. Also, the same authors say that, when valuing European companies, it is preferential to use 10-year German bonds.

2.3.2 Free Cash Flow to the Firm (FCFF)

In this model, all stakeholders of the firm are taken in consideration, and not only shareholders. It is the cash flow available for the claim holders after taxes and reinvestment needs, but before interests and principal payments on debt. According with Damodaran (2012), there are two ways to calculate FCFF:

1) Starting from Free Cash Flow to Equity (FCFE), it should be considered all debt expenses.

$$\begin{aligned} \text{FCFF} = \text{FCFE} &+ \text{interest expense} * (1 - \text{tax rate}) \\ &+ \text{principal repayments} - \text{new debt issues} \\ &+ \text{preferred dividends} \end{aligned} \quad (11)$$

2) Calculate the operating cash flow generated by the company net of investments in capital and net working capital.

$$\begin{aligned} &\text{FCFF} \\ &= \text{EBIT} * (1 - \text{tax rate}) + \text{depreciations} - \text{capital expenditure} \\ &- \Delta\text{working capital} \end{aligned} \quad (12)$$

$$\begin{aligned} &\text{FCFF} \\ &= \text{NOPLAT} + \text{depreciations} - \text{capital expenditure} \\ &- \Delta\text{working capital} \end{aligned} \quad (13)$$

Since investors are both stock and debt holders, to compute the enterprise value (EV), cash flows should be discounted at the WACC rate, which includes the cost of equity and the after tax cost of debt.

$$\mathrm{EV} = \sum_{t=1}^{t=\infty} \frac{FCFFt}{(1+WACC)^t} \tag{14}$$

where:

— **FCFFt** is the free cash flow to the firm in year t;

— **WACC** is the weighted average cost of capital.

After n years, if the company starts to grow at a stable rate, EV can be defined as:

$$\mathrm{EV} = \sum_{t=1}^{t=n} \frac{FCFF_1}{(1+WACC)^1} + \cdots + \frac{\frac{FCFF_n * (1+g)}{WACC - g}}{(1+WACC)^n} \tag{15}$$

where:

— **$FCFF_1$** is the free cash flow to the firm in year 1;

— **$FCFF_n$** is the free cash flow to the firm in year n;

— **g** is the growth rate for perpetuity;

— **WACC** is the weighted average cost of capital.

2.3.2.1. Weighted Average Cost of Capital

The WACC is the required return rate of debt and equity holders, when a company is using different components of financing. According with Sabal (2007), is the most widely rate used discount a company's cash flows in order to value it.

WACC has three components: the cost of equity; the after-tax cost of debt and the company's debt-to-equity ratio (Koller *et al* 2015). Equity and debt returns should be weighted by their market value proportions, as the following formula:

$$WACC = \frac{\mathrm{E}}{\mathrm{E+D}} * \mathrm{rE} + \frac{\mathrm{D}}{\mathrm{E+D}} * \mathrm{rD} * (1 - \mathrm{T}) \tag{16}$$

where,

— **E** is the market equity value of a company;

— **D** is the market debt value of a company;

— **rE** is the company's equity cost;

— **rD** is the company's debt cost;

— ***T*** is the corporate tax.

2.3.2.2. Cost of Debt

The cost of debt is the rate at which a company is borrowing money. Within private companies, since they are not rated and do not have bond outstanding, according with Damodaran (2012), the cost of debt can be represented by the following approaches:

1) If a company borrowed money recently, it can be used the borrowing interest rate;
2) Assume the average debt cost for an industry where a firm operates, if it is being valued for an initial public offer, since it is assumed that its debt structure will be similar to comparable firms;
3) Use the interest coverage ratio for a sub-set of smaller and publicly traded companies and the default spreads on these ratings.

2.3.3 Adjusted Present Value (APV)

The APV model was originally presented by Stewart Myers (1974). It is an alternative to the free cash flow to the firm model and assumes that, a company's value is not affected by the choice of the financial structure, in a market without taxes, since those are the ones which affects the enterprise value (Koller *et al*, 2010). All over the years, this method is even more accepted within growing companies, which predict to adjust their capital structure, in leverage buyouts and in cases of venture capital (Allen, 2008).

The value of a company is given by (i) the enterprise value if a company is 100% equity financed, plus (ii) the present value of tax shields and (iii) expected bankruptcy costs. Damodaran (2012) presents an analysis divided in three steps:

1) Discount the expected free cash flows to the firm at the unlevered cost of equity, in order to achieve the unlevered value of the firm. To calculate the unlevered equity cost, it should be computed through the unlevered beta thought the formula 17. If a company has debt in its capital structure, the unlevered equity cost is smaller than the equity cost, since the shareholders would bear the financial risk associated to debt, and will impose a higher equity risk premium (Fernandez, 2007);

$$\beta U = \frac{\beta L}{1+(1-t)\frac{D}{E}} \quad (17)$$

where

— $\boldsymbol{\beta L}$ is the leverage beta of the firm;

— $\boldsymbol{\beta U}$ is the unlevered beta of the firm;

— $\boldsymbol{t}$ is the corporate tax;

— $\frac{\boldsymbol{D}}{\boldsymbol{E}}$ is the debt-to-equity ratio of the firm.

2) Calculate the expected tax savings, which are the interest payables multiplied by the tax rate, and discount them at the cost of debt, in order to get the present value of the tax shields;
3) Estimate the default probability, after the additional debt, and apply it to the present value of the bankruptcy costs.

The choice of the discount rate used to achieve the present value of the tax shield is uncertain among the authors. Allen (2008), Damodaran (2012), Koller *et all* (2010) and Luehrman (1997) propose to use the cost of debt, since the risk of the tax saving is the same as the debt risk. On the other hand, Brealey *et all* (2017) proposes to use the unlevered cost of equity.

According to Luehrman (1997:134), this model *"can help managers analyze not only how much as asset is worth but also where the value comes from"*. Allen (2008) agrees with Luehrman saying that APV is useful to look separately for the operating part of any investment, and then worry about the financing.

WACC approach is more practical if the firm does not expect extraordinary future changes in its debt-to-equity ratio. APV model is useful if the company wants to significantly change its leverage ratio according with a pre-determinate schedule (Inselbag and Kaufold, 1997).

2.3.4 Growth Rate

Nowadays, a company should grow to survive and prosper, and managers must understand where it comes from and plan how to grow in the future, through a sustaining growth. It is a hard job, especially in product markets since they have a natural life cycle (Koller *et al*, 2010). Within a private company, the growth rate can be estimated by looking at the historical company's growth or from reinvestment rate and return on capital Damodaran (2012). The author also defends that the expected growth rate should be

reasonable within the economy environment (GDP growth, interest rates and inflation) where the company operates and should not exceed the economy growth rate more than two percent. Koller *et al* (2010:81) says that *"(…) growth creates value only when a company's new customers, projects, or acquisitions generates returns on invested capital (ROIC)"*.

3. Sector Analysis

In this chapter, it is presented a summary of cereals and oilseeds commodities, essentially the market situation (supply, demand and prices) and some perspectives for the upcoming years. This sector analysis focus on the main cereals and oilseeds operated by Silos de Leixões, which are wheat, maize and soy. Also, it is presented the impact of the incentives to use biofuels in transport sector and an analysis of the port sector in Portugal, highlighting the ports with more influence in the movement of agro-food products. The market analysis and the data used was based on OECD reports (2017, 2018) and International Grains Council website. For port industry analysis it was used information from Autoridade da Mobilidade e dos Transportes reports (2017) and INE statistical report (2017).

3.1 Commodity Markets

Recent years have seen a significant accumulation of global stock, once grains production has increased and demand does not keep pace with this growth, resulting in the biggest stock accumulation in 2016, with the ratio stocks-to-use in the end of period around 24%. Through Exhibit 2, it is possible to see that, for grains, which include wheat and other coarse grains, and for soybeans, production has been increasing since 2015/2016 against a lower growth in the consumption side.

Exhibit 2: Medium Term Supply and Demand Summary (World)

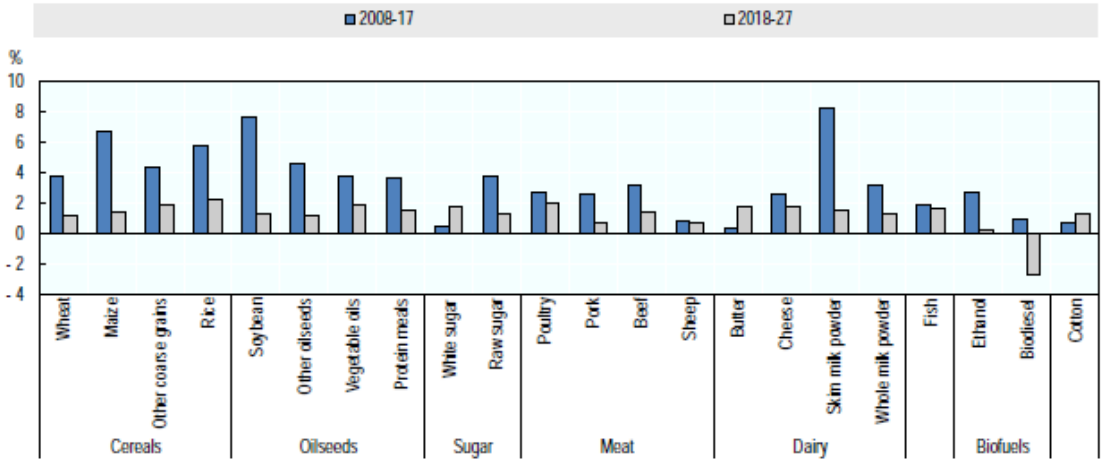
TOTAL GRAINS**	**Unit**	**2015/2016**	**2016/2017**	**2017/2018**	**2018/2019 proj.**	**2019/2020 proj.**	**2020/2021 proj.**	**2022/2021 proj.**
Production		2,003	2,077	2,041	2,054	2,082	2,109	2,137
y/y change	*%*		*3.6%*	*-1.8%*	*0.6%*	*1.3%*	*1.3%*	*1.3%*
Comsumption	M Tons	2,054	2,054	2,048	2,066	2,093	2,116	2,142
y/y change	*%*		*0.0%*	*-0.3%*	*0.9%*	*1.3%*	*1.1%*	*1.2%*
Stocks	M Tons	480	498	492	480	469	461	456
y/y change	%		*3.6%*	*-1.2%*	*-2.5%*	*-2.3%*	*-1.7%*	*-1.1%*
Stock-to use	*%*	23.0%	24.0%	24.0%	23.0%	22.0%	22.0%	21.0%
SOYABEANS								
Production	M Tons	315	332	334	342	350	359	368
y/y change	%		*5.1%*	*0.6%*	*2.3%*	*2.3%*	*2.5%*	*2.4%*
Comsumption	M Tons	320	332	337	345	352	360	368
y/y change	%		*3.6%*	*1.5%*	*2.3%*	*2.0%*	*2.2%*	*2.2%*
Stocks	M Tons	33	33	30	28	26	26	26
y/y change	%		*0.0%*	*-10.0%*	*-7.1%*	*-7.7%*	*0.0%*	*0.0%*
Stock-to use	%		10.0%	9.0%	8.0%	7.0%	7.0%	7.0%

** Wheat and coarse grains.

Source: Adapted from International Grains Council website

Last decade was characterized by a strong demand and production growth, and consequently high agriculture prices. For some commodities, such as soybeans and cereals, trade volumes grew strongly in the past years with growth rates between 4% and 8% per year. Nowadays and in a near future, trade volume will grow at a slower speed, as shown in Exhibit 3, consistent with the slower growth of demand. The highest expect rate will be for rice, around only 2.2% per year and, for some commodities, like biofuels, is not expected any trade growth. Although, despite a global economic recovery and higher oil prices, prices for most agriculture commodities did not change much in 2017 compared with 2016, apart from sugar and dairy.

Exhibit 3: Growth in trade volumes, by commodity



Source: OECD-FAO Agriculture Outlook 2018-2027 (2018)

3.1.1 Production

From a few years ago, world cereals production has gradually grown to levels never attained and reached a new record in 2017. According to OECD (2017), in agriculture, the main factors that influence production growth are (i) weather conditions; (ii) technologies and more efficient techniques used in production; (iii) dimensions of available cropland and (iv) the increase the output per unit of land. Analyzing individually the main cereal commodities: maize, soybeans and wheat, through Exhibit 3, it is possible to verify that maize and wheat production has been increasing over the years and reached

the pick in 2017, around 1.093 M tons and 758 M tons, respectively. It represents an increase of 1% for both commodities compared to the previous year.

It is expected that global cereal and oilseeds production grows 1.5% per year over the coming decade. This increase results from different growth perspective across several regions in the world. On the one hand, production growth in the developed countries, especially in Western Europe, will be lower due to the reduction of agricultural land, once a significant part of it is already cultivated and also due to techniques and machines used that make the agricultural process much more efficient. On the other hand, particularly in Sub-Saharan, Middle East and North Africa, and South and East Asia, is expected a strong growth as a result of an enlargement of production area through the conversion of pasture in cropland and the use of fertilizers, pesticides, improved seed and other technologies, like mechanization and irrigation, that have the potential to introduce efficient in agriculture process and to win substantial productivity gains OECD (2017).

In Western Europe region, it is expected a slower growth comparing with recent years, as a consequence of the reasons mentioned above. Although Europe will continue to be one of the major suppliers of numerous agriculture commodities, and its crop production growth will come mainly through yields improvements. Actually, Western Europe countries, which includes the European Union, hold a significant portion in world production of coarse grains (31%), such as rye, barley and oats, followed by wheat (29%), oilseeds (20%) and other, like milk and meat (20%) (OECD, 2017). Global cereal production is actually, and will continue to be, mainly for consumption rather for feed.

3.1.2 Demand

Over the past decades, world demand has grown considerably mostly due to two facts: (i) world's population growth that has grown in the last decade around 11% (The World Bank website); (ii) income increase in emerging economies, most notably in China, boosting the *per capita* demand for several commodities, such as cereals, meat and dairy products. Nowadays, this source of demand growth started decelerate and the new sources of global demand are not sufficient to maintain this growth. For most commodities, demand growth will only be a little more than world's population growth in future years.

The continuous weakening of demand growth is predicted for the next years once *per capita* consumption of staple foods, including cereals, is expected to be flat as a

consequence of consumption level being almost close to saturation in many countries. Focusing on cereals and oilseeds, the main source of demand growth will be feed (animal feed), strictly followed by food industry. Although China had decreased its demand for food source, will continue to positively influence the demand growth at feed industry. Nevertheless, feed demand growth is projected to slow at a global level. OECD (2017) expects that trade in agriculture and fish products are probably to grow at about half the rate of the previous decade.

Summarizing, global supplies of major cereals continued to exceed overall demand, leading to significant stock accumulation and much lower prices on international markets when compared with the previous decade.

3.1.3 Prices: General Cereals Analysis and by Commodity

Behind demand and production, agriculture commodities real prices are influenced by macroeconomic, demographic and policy environment. In the midst of many others, we have some macroeconomic factors such as: (i) economic growth; (ii) oil prices; (iii) GDP and (iv) income per capita. The main demographic influencer is the population change (OECD, 2017). As an example of policy environment, we have the encouraging policies to use biofuels.

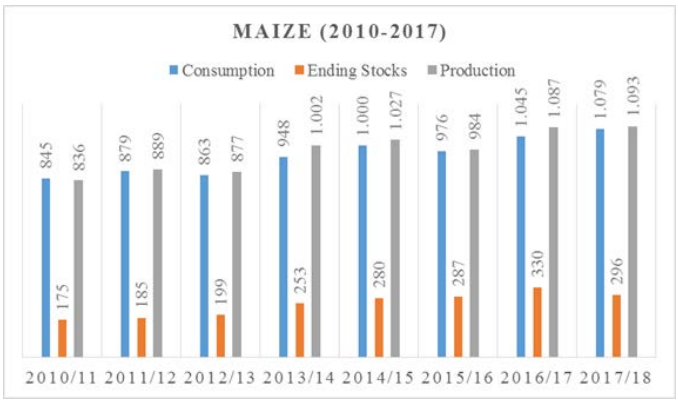
Similarly to 2016, 2017 was characterized by the maintenance of low cereals prices. Although, during the first and fourth quarter of 2017, it was verified higher cereals prices than those observed in 2016, for the same period. Yet, in 2017, the peak cereals prices occurred in July, around 204, lower than the peak observed in June 2016, around 218 (OECD, 2017).

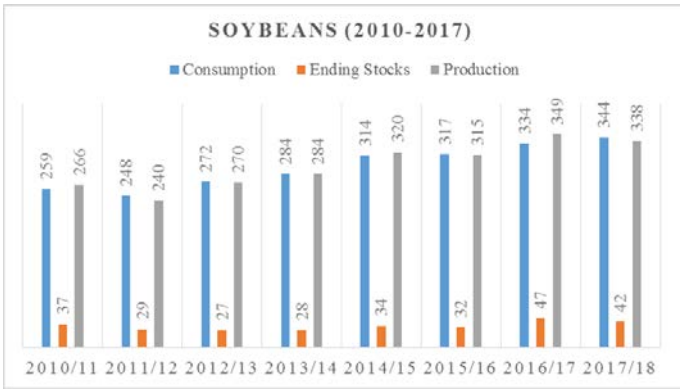
For most commodities, including cereals, production levels started to reach record levels in 2016 and a new one in 2017. These exceptional production levels along with stagnant demand, generate high levels of existing stock, which led to the decline in prices for most commodities, in 2016. As we can observe through Exhibit 4, wheat reached a new production record in 2017 about 758 M ton, representing an increase of 1% relative to previous year, followed by an 2% increase verified in 2016. Although, demand remains constant and prices slightly decreased compared to 2016, changing between 166 and 155, as it is possible to observe in Exhibit 5. Can also be observed that wheat prices did not reach these minimum levels since 2010.

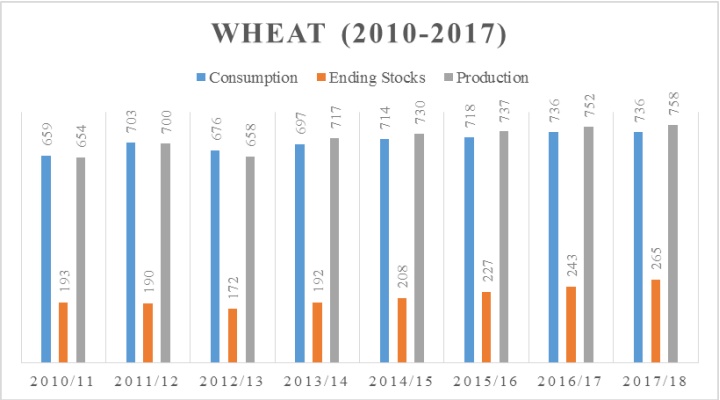
Relative to maize, production and consumption in 2017 varied in very close values relative to 2016, around 1% and 3%, respectively. An approximation between production levels and consumption allowed a little increase in prices, once demand growth was slightly bigger than production. Prices varied from 168 in December 2016 to 183 in December 2017 (+8%). This allowed, in 2017, a fall around 10% in the stocks accumulation level (Exhibit 4).

Soybean production increased intensely in 2016 due to record crops in Brazil and United States. Global soybean production will continue to be dominated by those two countries. In 2017, was registered a slight fall in production and a little increase in consumption. Even prices resisted an increase of 9% in 2017, relative to 2016, it is not so relevant since prices have never been so low since 2010 (Exhibit 5).

Exhibit 4: Consumption, Ending Stock and Production Evolution of Maize, Soybeans and Wheat (2010-2017), M tons







Source: Adapted from International Grains Council website

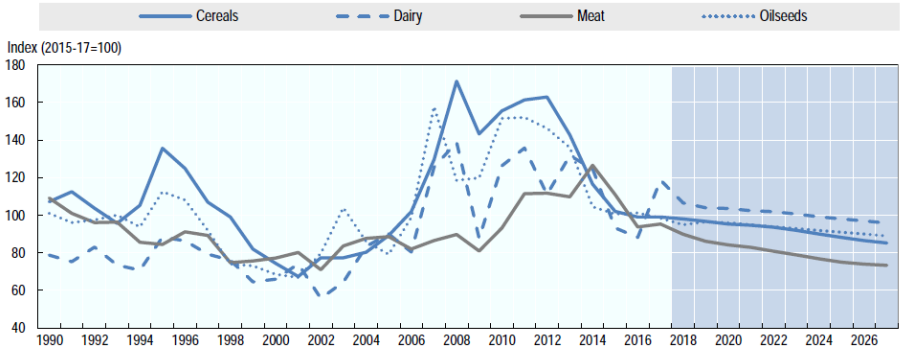
Exhibit 5: Wheat, Maize and Soybeans Index Evolution (2010-2017)

Note: basis January 2000=100

Source: International Grains Council website

In the coming decade, real prices in agriculture commodities are expected to remain low, once demand is decelerating allied to productivity improvements, which allow greater outputs without using additional inputs, resulting in efficient gains. Although on the demand side, global population is expected to increase, but at a lower growth rate (Our World in Data website), it is not enough to compensate the production side. In Exhibit 6, can be seen that forecasts for cereals and oilseeds real prices are below the prices registered since 2006.

Exhibit 6: Medium-term Evolution of Commodity Prices, in Real Terms



Source: International Grains Council website

3.2 Biofuel Impact

In the European Union, environmental and ecological concerns have had an impact on European agriculture, especially on the use of contaminants and their limits on products and the use of Genetically Modified Organisms (GMOs). Furthermore, agriculture commodities are not only used for food and feed, they are also used as biofuels. One of the main elements used to produce biodiesel and bioethanol are soy oil and wheat and corn, respectively.

The behavior of biofuels is very sensitive to changes in policies. The European Union (EU) has been progressively focusing on the incorporation of biofuels, as an ecological and sustainable alternative to oil. For this, EU Energy and Climate Change Package (CCP) implemented a directive[1] in EU in 2009 - Renewable Energy Directive (RED) - and has been transposed to the national legislation of each Members State by December 2010. The main objectives of this directive are:

- All fuel suppliers must reduce greenhouse gas emissions by 6% until 2020, and;
- In transportation sector, reach 10% of renewable energy, which 7% has to be via biofuels.

[1] Renewable Energy Directive (2009/28EC) - https://ec.europa.eu/energy/en/topics/renewable-energy/renewable-energy-directive - acceded on 10/06/2018.

Most demand for biofuels is sustained by policy decisions which have been imposed around the world, in order to combat environmental concerns. Over the past decade, with the introduction of these mandatory policies, demand for some agriculture products, like wheat, maize, soy and sugarcane, increased, to serve as an input for ethanol and biodiesel production. This had as a consequence the increase in the production of these agriculture products in order to serve demand needs. Other factors that stimulated the use of biofuels are the creation of different taxation and subsidies enacted in some countries. As already mentioned, in the European Union, until 2020, 7% of the energy used in transportation sector must come from biofuels and remains stable thereafter.

Although, in 2017, the European Commission changed the target, mentioned above in the second point, from 7% to 3.8% after 2020. This decision had impact on biofuels demand. The demand for cereals and oilseeds as an input for the production of biofuels slowdown in 2017 and prices stabilized.

In the next years, the demand for cereals and vegetable oils, as an input for biofuel industry, is expected to stabilize, once the pace to reach the mandatory requirements will be much lower than in the past years. Expectation for demand growth will be more modest than last year. For instance, in the next decade, the demand for wheat, for the biofuel industry, is expected to represent only 1.2% of its global use. Consequently, production of ethanol and biodiesel will also calm down.

3.3 Port Sector Analysis

Agriculture products market has been developed in an irregular way. Between 2008 and 2013, negative variations were registered and in 2014 started the recovery period, although with a trivial decrease in 2016.

In 2017, trade in Continental Portugal ports registered the highest volume of goods traded, reaching 95.9 million tons, 2% more than recorded in 2016, and the Lisbon port contributed more significantly for this increase. Leixões port also showed a positive behavior related to 2016, since goods movements grew about 6.5%, reaching a market share of 20.3%.

Related to goods trade, the performance of Continental Portugal ports result from a combination of a 1.5% exports decrease and an increase of 4.8% in imports. Global imports registered in 2017 56,8 million ton of good landed in ports, which 90% are goods. This increase is the highest registered to date. The biggest influencer were oil products

that grow 25.2%, with a market share of 14.3%, followed by coal, which also increased and with a market share of 10.9% and agriculture products with imports increase of 7.3% over 2016, and represents 8.8% of total goods traded.

In Exhibit 7 are represented the values of cargo movements, occurred during 2017, per type of good: general cargo, solid grains, with agriculture products detail and liquid grains. Are also denoted the percentage change compared with the previous year, as well as the share of each port with respect to the total movements occurred in 2017. It is possible to observe that the 95 million ton moved in 2017 were distributed asymmetrically by the several ports, drawing attention the weight that Sines port represents especially in cargo container (general cargo), coal (solid grains) and oil and derivatives (liquid grains). Focus on Leixões Port, competes mainly with Lisboa and Sines ports in general cargos and liquid grains, and also with Aveiro port in agriculture products (solid grains).

Exhibit 7: Goods Movements per Port in 2017 (Tons)

	Viana do Castelo		Douro e Leixões		Aveiro		Figueira da Foz		Lisboa		Setúbal		Sines		Faro		Total	
	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%	Ton	Δ%
General Cargo	273,504	9.7%	8,361,920	-1.4%	1,286,706	-11.7%	1,179,004	0.3%	5,196,735	22.1%	3,653,106	-7.4%	21,025,489	1.5%	2,952	-97.7%	40,979,416	1.4%
Solid Grains	94,718	-4.8%	2,353,226	-1.2%	2,593,856	40.8%	883,090	1.4%	5,354,393	17.8%	2,666,464	-3.7%	6,360,998	8.5%	81,851	161.7%	20,388,596	10.8%
Agricultural Products	0	-	617,669	-11.8%	1,110,374	66.0%	7,441	-86.3%	3,330,412	1.8%	34,123	-5.4%	0	-100.0%	0	-	5,100,019	7.6%
Liquid Grains	42,954	1.1%	8,795,842	18.1%	1,272,236	2.5%	9,983	-66.0%	1,634,873	15.0%	274,745	1.7%	22,497,987	-8.6%	0	-	34,528,620	-1.5%
Total	**411,176**	**5.1%**	**19,510,988**	**6.5%**	**5,152,798**	**13.5%**	**2,072,077**	**-0.2%**	**12,186,001**	**19.2%**	**6,594,315**	**-5.6%**	**49,884,474**	**-2.5%**	**84,803**	**-46.5%**	**95,896,632**	**2.2%**
% Total Ports	**0.4%**		**20.3%**		**5.4%**		**2.2%**		**12.7%**		**6.9%**		**52.0%**		**0.1%**		**100.0%**	

Source: Adapted from Autoridade da Mobilidade e dos Transportes (2017)

Also, in the same Exhibit, it is possible to see that, during 2017, were moved a total amount of 5,1 million tons, both to export and import, of agriculture products, and mostly traded in Lisboa (65.3%), followed by Aveiro (21.8%) and then Leixões (12.1%), as it is possible to observe in Exhibit 8. Lisbon port has an advantage position once it supplies cereal silos located in Trafaria, Beato, Palença and Alhandra, which represent 42.4% cereals and oilseed total imports of agro-food and feed industry. Another advantage is that Lisbon port is the only in Portugal where *Panamax* ships (ships with huge dimensions) can dock to unload cereals. Also, the same table shows that Leixões port is one of the ports that, besides Lisbon in agriculture products, holds majority shares namely in ores and roll-on/roll-off or ro-ro (ship designed to carry wheeled cargo, such as cars and trucks).

Exhibit 8: Share of Cargo Volume per Port (%)

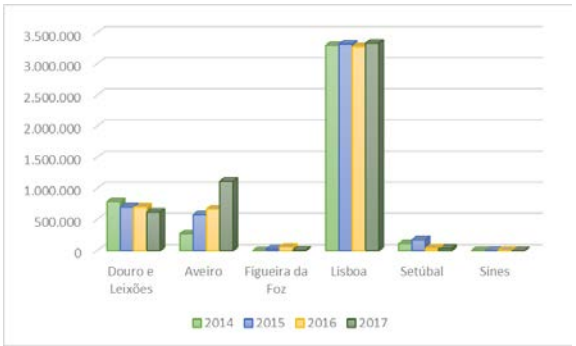
	Viana do Castelo	Douro e Leixões	Aveiro	Figueira da Foz	Lisboa	Setúbal	Sines	Faro
General Cargo	**0,7%**	**20,4%**	**3,1%**	**2,9%**	**12,7%**	**8,9%**	**51,3%**	**0,0%**
Containerized		18,2%		0,6%	14,8%	4,8%	61,7%	
Fractional	4,8%	19,8%	22,8%	17,5%	3,1%	29,9%	1,9%	
Ro-Ro		74,3%			0,7%	24,6%	0,4%	
Solid Grains	**0,5%**	**11,5%**	**12,7%**	**4,3%**	**26,3%**	**13,1%**	**31,2%**	**0,4%**
Coal						4,1%	95,9%	
Ores		58,5%		0,4%	1,5%	33,2%	6,5%	
Agricultural Products		12,1%	21,8%	0,1%	65,3%	0,7%		
Others	1,2%	14,0%	19,0%	11,2%	25,7%	25,7%	2,1%	1,0%
Liquid Grains	**0,1%**	**25,5%**	**3,7%**	**0,0%**	**4,7%**	**0,8%**	**65,2%**	
Crude Oil		33,7%					66,3%	
Oil Products	0,2%	19,4%	3,1%		6,3%	0,2%	70,7%	
Others		21,1%	32,2%	0,5%	23,0%	10,6%	12,6%	
Total	**0,4%**	**20,3%**	**5,4%**	**2,2%**	**12,7%**	**6,9%**	**52,0%**	**0,1%**

Source: Adapted from Autoridade da Mobilidade e dos Transportes (2017)

In 2017, the movement of agriculture products has improved positively when compared to the last year, after a slightly decrease in 2016/2015. Aveiro port, port with high significance in supply feed-industry (animal food), had been growing over the years. Observing Exhibit 9, in 2017, Aveiro port moved more 441,605 tons (+66%) and reached a total of 1,110,374 tons. Conversely, Leixões Port presented a decrease of 82,890 tons (-1.8%), being surpass by Aveiro port in the number of tons moved.

Of the total amount of 5,1 million of agriculture cargo moved, 4,97 million tons (97.5%) are landings. The remaining 2.5% are only shipments exported through Lisbon port, around 125 thousand tons, equivalent to 3.8% of total cargo handled in that port.

Exhibit 9: Agriculture Products Movements by Port and variations (2014-2017)



	Weight (%) 2017	Δ% 2017/16	Δ% 2016/15	Δ% 2015/14
Douro e Leixões	12,1%	-11,8%	-0,1%	-11%
Aveiro	21,8%	66,0%	16,9%	114%
Figueira da Foz	0,1%	-86,3%	121,5%	100%
Lisboa	65,3%	1,8%	-1,3%	1%
Setúbal	0,7%	-5,4%	-78,9%	57%
Sines	0,0%	-100,0%	149,9%	-5%
	100,0%	**7,6%**	**-1,0%**	**7,3%**

Source: Adapted from Autoridade da Mobilidade e dos Transportes (2017)

3.4 Portugal: Agro-food Imports

According with Estatísticas Agrícolas Report (INE, 2017), in Portugal, agriculture and agro-food imports, except beverages, increased 9.6% related to 2016, achieving 7,999 million euros. This growth happened in almost all agro-food subdivisions, excluding the segments of vegetables, roots and tubers and plaiting materials, where was verified a decrease of 0.1% and 15.7%, respectively.

The agro-food segments which have a greater portion for Portuguese imports are meat (12.9%), cereals (9.7%) and fruits, animals and vegetables oils (9.4%). Focusing on cereals, imports increased 4.9% compared with the previous year, due to import of wheat and maize, which contributed with a gain of 47.5% and 35.9%, respectively, in the cereals total growth. Despite this growth, cereals group decreased its weight in the total imports of agro-food, 10.1% in 2016 to 9.7% in 2017. As main suppliers we have France, Ukraine, Spain and Brazil. All of them increased or maintained the exports level to Portugal compared to 2016 (INE, 2017).

Portugal is still heavily dependent on agriculture and agro-food imports, mostly from European Union (80%). Even though it was observed an increase in exports, this was not enough to cover the effect of imports increase, aggravating the trade balance of agriculture and agro-foods products. Cereals sector remains one of the largest negative balance, in Portuguese trade balance.

4 Company

4.1 Overview

Silos de Leixões is dedicated to agro-food logistic, and its infrastructure is located in the perimeter of Porto de Leixões, Leça da Palmeira – Matosinhos. SdL's main services include transport and storage of bulk agro-food (grains and flours). Its customers are national and international traders, and also food and feed industries.

SdL's social capital is wholly owned by GeStmin SGPS, S.A. group, a 100% Portuguese company that aggregates interest in several business areas: energy sector, food logistics, plastics industry, tourism and agro-industry.

In 1976, silos of Leixões started to be built two years before and was located on port land under the private domain of APDL. Two years later, silos are inaugurated and became part of the EPAC – Empresa Pública de Abastecimento de Cereais, a company that had a function to manage all public organizations in the production sector and national cereal industries. Silos had a storage capacity of 70,000 tons. In 1980 the capacity was already of 105,000 tons. In 1987, silos of Leixões together with silos of Beato and Trafaria, located in Lisbon port, integrated into Silopor – Empresa de Silos Portuários. There was a need to create horizontal silos for storage of flours. In 1992, horizontal silos had a storage capacity of 15,000 tons.

Following the liquidation of Silopor, a process for holding concession was started, which was won by a company named Silos de Leixões, owned by GeStmin group. Silos de Leixões was certified according to the HACCP Codex Alimentarius.

4.2 Activity

In Exhibit 10 are described the total cereal movement and operated by Silos de Leixões, in k tons, from 2012 until 2017. In 2017, it was registered a global increase of 3%, a slightly decline compared to 2016. In a more delated analysis, by product, wheat has been maintaining its movements, which supplies mainly the food industry, with growth rates around 4% and 2% in the last two years. Maize mainly supplies animal food (feed-industry), and unlike the increase verified in wheat, maize has registered a significant decrease, since 2015, with a rate around -23% in 2015 and -12% in 2016. This decline is mostly due to two reasons: (i) a wheat type, forage wheat, also used for feed industry, has been listing low prices, and become more attractive for consumers than

maize, for feed industry purposes; (ii) in recent years, Aveiro port, where it is centralized the feed industry market, has greatly invested in the development of its port, weakening the Silos de Leixões's competitiveness.

To reply to this situation, Silos de Leixões has focused on doing new business with new customers and attracting new products, called no-grains (flours), with an increase of 95% in 2016. A new segment, biomass, will began to move at the port in 2018, and it is expected to consolidate in the upcoming years.

Exhibit 10: Cereals Movement and Operated by Silos de Leixões (2012-2017)

	Unit	2012	2013	2014	2015	2016	2017
Maize	*k tons*	263	199	297	227	200	210
	Δ%		*-24.5%*	*49.3%*	*-23.4%*	*-12.0%*	*5.0%*
Wheat	*k tons*	429	390	444	442	460	469
	Δ%		*-9.3%*	*14.0%*	*-0.4%*	*4.0%*	*2.0%*
Others	*k tons*	12	13	15	14	12	12
	Δ%		*6.9%*	*23.3%*	*-7.2%*	*-15.8%*	*0.4%*
Total Grains	***k tons***	**704**	**601**	**756**	**684**	**672**	**691**
	Δ%		***-14.7%***	***25.9%***	***-9.5%***	***-1.8%***	***2.8%***
Soybeans	*k tons*	17	14	3	0	0	2
	Δ%		*-15.8%*	*-78.8%*	*-100.0%*	*0.0%*	*100.0%*
Others	*k tons*	69	57	39	35	69	70
	Δ%		*-17.1%*	*-32.3%*	*-8.8%*	*95.1%*	*1.3%*
Total Flours	***k tons***	**86**	**72**	**42**	**35**	**69**	**72**
	Δ%		***-16.9%***	***-41.6%***	***-15.4%***	***95.1%***	***4.2%***
Total Cereal Movements	**k tons**	**791**	**673**	**798**	**720**	**741**	**763**
	Δ%		*-14.9%*	*18.7%*	*-9.9%*	*3.0%*	*3.0%*

Source: Adapted from Silos de Leixões Annual Report (2017)

5 Assumptions

5.1 Macroeconomic Assumptions

Silos de Leixões is a player in the port industry. Hence, this industry is influenced by macroeconomic indicators and it is important to take them into account before making any prediction.

Port industry is influenced by agriculture markets, which in turn are substantially influenced by macroeconomic factors, such as (i) gross domestic product (GDP), which influences the demand for agriculture products; (ii) oil price, which determines the price of several inputs into agriculture and effect the demand for vegetable oils, through the biofuels market and (iii) inflation.

Estimators based on future macroeconomics indicators were taken to develop the company's financial statement and to estimate the company's value.

5.1.1 Inflation

In order to consider the inflation impact in this valuation, it was extracted from International Monetary Fund (IMF) website the estimated year-on-year annual changes of average consumer prices in Portugal, expressed in percentage, from 2018 until 2022 (Exhibit 11). According with Silos de Leixões, inflation affects clients and suppliers in 40%, that it is why was considered 40% of inflation changes registered by IMF. This rate is associated with company's historical information.

Exhibit 11: Estimated Inflation rates for Portugal and Inflation rates reflected in the Company

Inflation	Unit	2017	2018E	2019E	2020E	2021E	2022E
Portugal	%	1.21	1.40	1.48	1.61	1.79	1.81
Inflation rate reflected in clients and suppliers **(40%)**	%	0.48	0.56	0.59	0.64	0.71	0.73

Source: Adapted from IMF website

5.1.2 Gross Domestic Product (GDP)

Portuguese GDP grew 2.7% in 2017 and, for the upcoming 5 years, it is expected a slower GDP growth (Exhibit 12). However, according with Banco de Portugal (2017) Portuguese economy should continue to benefit from a favorable economic and financial environment.

Exhibit 12: Portuguese Real GDP Growth

Real GDP growth	Unit	2017	2018E	2019E	2020E	2021E	2022E
Portugal	%	2.70	2.4	1.80	1.50	1.20	1.20
European Union	%	2.70	2.5	2.10	1.80	1.70	1.70

Source: Adapted from IMF website

5.2 Income Statement Assumptions

5.2.1 Revenues

As previously stated, the new company is an autonomous company able to unload merchandise from the ships, which later will be stored in the silos, at the service of Silos de Leixões. The new company is a service provider of Silos de Leixões, similar service provided so far by TCGL. The company will not be able to unload all ships operated by Silos de Leixões, due to the size of some ships that arrive at the port. An advantage of this, for Silos de Leixões, is the possibility to operate cereals simultaneously from two ships, via the new company and also via TCGL. The management predicts that the new company will be able to unload from 75% to 90% of the total cereals operated by Silos de Leixões, being the remaining done by TCGL.

To project the volume of cereals moved in Leixões port, from 2018 to 2022, it was taken into account two important variables: (i) inflation, which was already analyzed in macroeconomic factors, and (ii) imports in OECD countries, which include European countries (See countries detail in Appendix 1).

The predicted volume of cereals and oilseeds, which will be operated by Silos de Leixões, from 2018 to 2022, was obtained through the following steps:

1) Cereals movements in Leixões port are directly influenced by imports, so it is the revenue's basis of both Silos de Leixões and the new company. Through Exhibit 13, extracted from OECD databases[2], we can observe historical data, from 2012 to 2017, about wheat, maize and oilseeds imports within OECD countries. Also in the same Exhibit, it can be noticed the expected values from 2018 until 2022, which have taken into account several variables, such as GDP and oil price;

[2] https://stats.oecd.org/ - accessed on 15/07/2018.

Exhibit 13: Cereal and Oilseeds Imports in OECD Countries (2012-2022E)

Commodity	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cereals												
Wheat	k tons	32,437	30,471	33,901	31,921	33,418	32,873	33,047	32,943	32,919	32,934	32,948
Maize	k tons	47,946	57,052	53,604	60,117	59,635	59,618	59,785	59,047	59,660	60,359	60,903
	k tons	**80,383**	**87,523**	**87,505**	**92,038**	**93,052**	**92,491**	**92,832**	**91,990**	**92,580**	**93,293**	**93,851**
Oilseeds	k tons											
Soybean	k tons	23,443	26,275	25,873	28,009	27,428	27,085	27,272	27,255	27,711	27,919	28,323
Other oilseeds	k tons	10,115	10,927	9,823	10,350	10,459	10,892	10,969	11,271	11,405	11,499	11,544
	k tons	**33,557**	**37,202**	**35,696**	**38,360**	**37,887**	**37,977**	**38,241**	**38,525**	**39,116**	**39,419**	**39,867**
Total Imports	**k tons**	**113,941**	**124,724**	**123,202**	**130,398**	**130,939**	**130,467**	**131,073**	**130,515**	**131,695**	**132,712**	**133,718**

Source: Adapted from OECD database

2) Historical data, about cereals movements in each Portuguese port, was provided by Silos de Leixões (Exhibit 14). It was not considered Figueira da Foz port because it receives quantities that are not significant for this analysis. Also, Sines and Viana do Castelo ports were ignored since, nowadays, these ports are not receiving agro-food products anymore. The market shares, presented in Exhibit 14, were computed by dividing the cereals moved in each port by the total movement.

Exhibit 14: Cereal Movements in Portuguese Ports and Market Share (2012-2022E)

	Unit	2012	2013	2014	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Cereals Movement (Portugal)												
Aveiro	*k tons*	217	250	260	537	562	754	777	759	752	759	765
Leixões	*k tons*	790	673	798	720	741	763	853	919	996	1,003	1,009
Lisboa	*k tons*	3,036	3,108	3,087	3,090	3,034	2,790	2,789	2,721	2,690	2,712	2,734
Setúbal	*k tons*	130	0	4	13	0	0	0	0	0	0	0
Total	***k tons***	**4,173**	**4,031**	**4,150**	**4,359**	**4,337**	**4,308**	**4,417**	**4,398**	**4,438**	**4,472**	**4,506**
% YoY (PT)	*%*		*-3.41%*	*2.96%*	*5.04%*	*-0.50%*	*-0.68%*	*2.54%*	*-0.43%*	*0.90%*	*0.77%*	*0.76%*
Portugal Market Share												
Aveiro	%	5.20%	6.20%	6.27%	12.32%	12.96%	17.30%	17.58%	17.26%	16.95%	16.96%	16.97%
Leixões	%	18.94%	16.69%	19.24%	16.51%	17.09%	17.72%	19.31%	20.90%	22.45%	22.42%	22.38%
Lisboa	%	72.75%	77.11%	74.39%	70.88%	69.95%	64.40%	63.13%	61.85%	60.61%	60.64%	60.67%
Setúbal	%	3.12%	0.00%	0.11%	0.29%	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%
						Earnings/losses in Leixões Market share		1.6%	1.6%	1.5%	0.0%	0.0%

Source: Author and Silos de Leixões

3) In order to achieve the value of cereal and oilseeds imports in Portugal, it was done a relation between the cereals moved in Portugal (Exhibit 14) over the total amount imported within the OECD countries. Exhibit 15 shows that relation, expressed in percentage, and can be observed that around 3% of OECD imports belong to Portugal. Between 2012 and 2017, this percentage did not change significantly and so, for this project, it was done an average of the last 6 years (3.37%) and used it to estimate the imports volume in Portugal from 2018 to 2022. For this, it was multiplied the imports forecasted in OECD countries, during those 4 years, by the rate estimated (3.37%) and it was

obtained the estimated value for cereals and oilseeds imports in Portugal during the period of the project (Exhibit 15).

Exhibit 15: OECD Imports vs. Cereal Movement in Portugal Ports (2012-2022E)

	Unit	2012	2013	2014	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Imports OCDE	***k tons***	**113,941**	**124,724**	**123,202**	**130,398**	**130,939**	**130,467**	**131,073**	**130,515**	**131,695**	**132,712**	**133,718**
Wheat	*k tons*	32,437	30,471	33,901	31,921	33,418	32,873	33,047	32,943	32,919	32,934	32,948
Maize	*k tons*	47,946	57,052	53,604	60,117	59,635	59,618	59,785	59,047	59,660	60,359	60,903
Oilseeds	*k tons*	33,557	37,202	35,696	38,360	37,887	37,977	38,241	38,525	39,116	39,419	39,867
% Imports OCDE vs. Cereal Movement (PT)	**%**	**3.66%**	**3.23%**	**3.37%**	**3.34%**	**3.31%**	**3.30%**	**3.37%**	**3.37%**	**3.37%**	**3.37%**	**3.37%**
Estimated Cereal Imports (Portugal)								**4,417**	**4,398**	**4,438**	**4,472**	**4,506**
%YoY Imports OCDE	*%*		*9.46%*	*-1.22%*	*5.84%*	*0.42%*	*-0.36%*	*0.46%*	*-0.43%*	*0.90%*	*0.77%*	*0.76%*

Note: Portugal is one of OECD Countries. Check Appendix 1**.**

Source: Author and OECD (2017)

4) The goal is to get an estimated value of what will be the cereals imports in Leixões port between 2018 and 2022. Historical information categorized by cereal type, which has been operated over the past years by Silos de Leixões, is presented in its Annual Report 2017 (Exhibit 16). Thereafter, it was applied the yearly variation, designated in Exhibit 14 by "%YoY (PT). The projected values of maize, wheat and oilseeds are designated in Exhibit 16 by "Projected". For other grains and other flours it was equally applied that rate. For maize and soybeans, the company negotiated new contracts and predicted additional ships of 35,000 tons each year until 2020, for both products. From 2020 until 2022, three more ships are expected than in 2017, as it is demonstrated in Exhibit 16 as "New business". The expected values operated by Silos de Leixões are displayed in Exhibit 16 as "Total Cereal movements".

Exhibit 16: Movements in Leixões Port, by type of cereals (2012-2022E)

Cereals Movement (Leixões)	Unit	2012	2013	2014	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Total Cereal Movements	*k tons*	**790**	**673**	**798**	**720**	**741**	**763**	**853**	**919**	**996**	**1,003**	**1,009**
Δ%		*#REF!*	*-14.91%*	*18.69%*	*-9.86%*	*3.00%*	*2.99%*	*11.71%*	*7.82%*	*8.38%*	*0.61%*	*0.60%*
Total Grains	***k tons***	**704**	**601**	**756**	**684**	**672**	**691**	**744**	**776**	**817**	**823**	**828**
Δ%	*%*		*-14.70%*	*25.88%*	*-9.55%*	*-1.76%*	*2.86%*	*7.60%*	*4.30%*	*5.33%*	*0.67%*	*0.66%*
Total Maize	*k tons*	**263**	**199**	**297**	**227**	**200**	**210**	**250**	**284**	**321**	**323**	**325**
Projected	*k tons*							215	214	216	218	220
New business	*k tons*							35	70	105	105	105
Total Wheat	*k tons*	**429**	**390**	**444**	**442**	**460**	**469**	**481**	**479**	**483**	**487**	**491**
Others	*k tons*	**12**	**13**	**15**	**14**	**12**	**12**	**12**	**12**	**13**	**13**	**13**
Total Flours	***k tons***	**86**	**72**	**42**	**35**	**69**	**72**	**109**	**144**	**179**	**180**	**180**
Δ%	*%*		*-16.62%*	*-41.56%*	*-15.41%*	*95.08%*	*4.20%*	*51.15%*	*31.87%*	*24.85%*	*0.32%*	*0.32%*
Total Soybeans	*k tons*	**17**	**14**	**3**	**0**	**0**	**2**	**37**	**72**	**107**	**107**	**107**
Projected								2	2	2	2	2
New business	*k tons*							35	70	105	105	105
Others	*k tons*	**69**	**57**	**39**	**35**	**69**	**70**	**72**	**71**	**72**	**73**	**73**

Source: Author and adapted from Silos de Leixões Annual Report 2017.

To calculate the revenue for the five years of the project, it was considered gradually 75%, 80%, 85% and 90% of Silos de Leixões cereals movements, which were predicted in the last point. The price per ton is 2.70€ and 3.75€, for grains and flours, respectively. It was also considered the inflation factor, already expected by year in the chapter 5.1.1 – Inflation.

It is expected a revenue growth around 16% in the first two years, due to the capture of new clients and business opportunities done by Silos de Leixões, and almost stagnant after that, at a growth rate of almost of 0.6%.

Exhibit 17: New Company's Revenue for 2018E-2022E

1. REVENUE	Unit	2017	2018E	2019E	2020E	2021E	2022E
			75%	80%	85%	90%	90%
1.1 Grains (wheat, maize, others)							
Cereals Operated	k tons		558	621	695	741	745
Value per ton operated	2.70 €						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Grains Subtotal	**k€**	**0**	**1,515**	**1,686**	**1,888**	**2,014**	**2,027**
1.2 Flour (soy, others)							
Cereals Operated	k tons		82	115	152	162	162
Value per ton operated	3.75 €						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Flour Subtotal	**k€**	**0**	**308**	**433**	**575**	**611**	**613**
Total Cereals Operated	**k tons**	**0**	**640**	**736**	**847**	**902**	**908**
Total Revenue	**k €**	**0**	**1,823**	**2,119**	**2,463**	**2,625**	**2,640**
Δ%				*16.3%*	*16.2%*	*6.6%*	*0.6%*

Source: Author

5.2.2 Operating Expenses

In this financial caption it is included all the expenditures, incurred by the company, as a result of performing its operational activity. Operating expenses are directly connected with sales volume.

These captions include: subcontracted labour force, transportation, APDL taxes and fuel for equipment. In the first year of the project (2018), operating expenses represents 70% of the revenue. Over the following years, it is expected a decrease in this weight, reaching 65.9% in 2022.

The impact of inflation changes was considered in all these captions.

5.2.2.1. Labour Force

Employees who operate in the port are responsible for all operating tasks, such as unloading cereals from the ships and ships' hold cleaning. The new company opted for outsourcing, which costs 165€ per period. The number of workers required to operate in each period will depend on (i) the ship size; (ii) the product being transported and (iii) whether it is discharging or cleaning time.

To estimate the expenses with labour force, it was necessary to find the number of worked periods, cleaning and discharging periods, per ships type and both for flours and grains (Exhibit 18). Silos de Leixões provided the information for 2017: the number of ships operated, by size, and some indicators. In the column "Ships Dimension (Average) is indicated the average weight per type of ship. As "Work Periods (No Cleaning)" are designed as the "discharging periods" and cleaning periods are designed by "Work Periods (Cleaning)".

The estimation of ships operated by the company, from 2018 to 2022, was based on the information for 2017 and adjusted in accordance with the movements predicted in the chapter 5.2.1 - Revenues. It has been taken into account which type of grains and flours is transported in each ship type. For example, maize can only be transported on ships longer than 10,000 tons. For further detail see Appendix 2: Type of Grains and Flours by Ship Type.

Also the forecasts about the number of ships operated and the total cereals movements per ships type, from 2017 until 2022, are shown Exhibit 19.

Exhibit 18: Number of Ships operated by Silos de Leixões and Work Periods Indicators (2017)

			Indicators per Ship				Per Year	
	2017	Ships Dimension (Average)	Work Periods **(No Cleaning)**	Work Periods **(Cleaning)**	Tons operated per period	Tons operated per hour	Work Periods **(No Cleaning)**	Work Periods **(Cleaning)**
Flours								
< 3.000 tons	2	2,900	2	1	967	138	4	2
≥ 3.000 tons < 5.000 tons	4	4,700	2	1	1,567	224	8	4
≥ 5.000 tons < 10.000 tons	5	6,500	2	1	2,167	310	10	5
≥ 10.000 tons	1	14,800	4	1	2,960	423	4	1
Total Flours	**12**	**71,900**	**10**	**4**	**7,660**	**1,094**	**26**	**12**
Grains								
< 3.000 tons	5	2,500	1	1	1,250	179	5	5
≥ 3.000 tons < 5.000 tons	70	4,750	2	1	1,583	226	140	70
≥ 5.000 tons < 10.000 tons	23	6,950	2	1	2,317	331	46	23
≥ 10.000 tons	7	26,500	9	1	2,650	379	63	7
Total Grains	**105**	**690,350**	**14**	**4**	**7,800**	**1,114**	**254**	**105**
Total	**117**	**762,250**					**280**	**117**

Note: Each period corresponds to 7 worked hours.

Source: Silos de Leixões and adapted by the Author

Exhibit 19: Number of Ship Operated and the Total Cereals Movements per Ships type (2017-2022E)

	2017		2018E		2019E		2020E		2021E		2022E	
Ship Type	Nº	Cereals Movements per Type of Ship(Average)	Nº	Cereals Movements per Type of Ship(Average)	Nº	Cereals Movements per Type of Ship(Average)	Nº	Cereals Movements per Type of Ship(Average)	Nº	Cereals Movements per Type of Ship(Average)	Nº	Cereals Movements per Type of Ship(Average)
Flours												
< 3.000 tons	2	2,900	2	2,936	2	2,985	2	2,990	2	3,001	2	3,010
≥ 3.000 tons < 5.000 tons	4	4,700	4	4,759	4	4,837	4	4,845	4	4,863	4	4,878
≥ 5.000 tons < 10.000 ton	5	6,500	5	6,581	5	6,690	5	6,701	5	6,725	5	6,746
≥ 10.000 tons	1	14,800	2	24,993	3	28,603	4	30,238	4	30,347	4	30,442
	12	**71,900**		**107,800**		**144,580**		**179,817**		**180,468**		**181,029**
Grains												
< 3.000 tons	5	2,500	5	2,605	5	2,619	5	2,656	5	2,688	5	2,719
≥ 3.000 tons < 5.000 tons	70	4,750	70	4832	70	4,843	70	4,870	70	4,892	70	4,914
≥ 5.000 tons < 10.000 ton	23	6,950	23	7,070	23	7,085	23	7,125	23	7,158	23	7,190
≥ 10.000 tons	7	26,500	8	28,076	9	29,016	10	29,837	10	30,143	10	30,446
	105	**690,350**		**738,487**		**776,173**		**816,414**		**821,952**		**827,435**
Total		**762,250**		**846,287**		**920,752**		**996,231**		**1,002,421**		**1,008,465**

Source: Silos de Leixões and adapted by the Author

Once finalized the estimation about the number and type of ships expected, it was possible to calculate the number of work periods, per year. Through Exhibit 20 it is possible to observe the estimated costs for 5 years. During the ships discharging it is only necessary 1 employee per period. The number of employees increases during the cleaning periods, from 1 to 3, because it is more manual work, with a machine (mini wheel loader) on the board of the ships.

In the first year, this expense caption is 5.92% of the revenue, gradually decreasing until 2022.

Exhibit 20: Operating Expenses: Labour Force (2018E-2022E)

2. OPERATING EXPENSES	**Unit**	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**
2.1 Labour Force - Port Employees							
2.1.1 Grains + Flour - **No Cleaning** Operations							
# Nº of Employees per Period	1						
# Nº of Periods (year)			**293**	**306**	**319**	**319**	**319**
Grains			263	272	281	281	281
Flour			30	34	38	38	38
Cost per Employee/Period	**165**						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
No Cleaning Operations Subtotal	**€**	**0**	**48,615**	**50,789**	**52,973**	**53,011**	**53,017**
2.1.2 Grains + Flour - **Cleaning** Operations							
# Nº of Employees per Period	3						
# Nº of Periods (year)			**119**	**121**	**123**	**123**	**123**
Grains			106	107	108	108	108
Flour			13	14	15	15	15
Cost per Employee/Period	**165**						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Cleaning Operations Subtotal	**€**	**0**	**59,234**	**60,250**	**61,276**	**61,320**	**61,327**
Total Labour Force	€	**0**	**107,849**	**111,039**	**114,250**	**114,331**	**114,344**
% Revenue			*5.9%*	*5.2%*	*4.6%*	*4.4%*	*4.3%*

Source: Author.

5.2.2.2. Transportation

After ships unloading, cereals are transported from the port to the silos, to be stored. Transportation is subcontracted, with labour force and all costs with the trucks included. The transportation cost is 0.85€ per ton of cereals operated. It represents a huge portion of revenue, around 29%.

Exhibit 21: Operating Expenses: Transport (2018E-2022E)

2.2 Transportation	Unit	2017	2018E	2019E	2020E	2021E	2022E
Cereals Operated	tons		640	736	847	902	908
Transport Cost (€/ton)	**0.85**						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Total Transportation	**k€**	**0**	**547**	**629**	**725**	**772**	**777**
% Revenue			*30.0%*	*29.7%*	*29.4%*	*29.4%*	*29.4%*

Source: Author.

5.2.2.3. APDL Taxes

To operate in Leixões port, the company needs to pay a tax per each ton of cereals operated, which costs 0.8038€. The price is established in Circular E-006 - Normas Transitórias de Utilização do Terminal Multiusos, paragraph 3, item a), approved and published by ADPL in annex to Decreto-Lei nº335/98, November 2015[3].

Exhibit 22: Operating Expenses: APDL Taxes (2018E-2022E)

2.3 APDL Taxes	Unit	2017	2018E	2019E	2020E	2021E	2022E
2.3.1 Taxes APDL							
Cereals Operated	tons		640	736	847	902	908
Taxes Cost per ton (Circular E-006)	**0.8038**						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
APDL Taxes Total	**k€**	**0**	**517**	**595**	**685**	**730**	**735**
% Revenue			*28.4%*	*28.1%*	*27.8%*	*27.8%*	*27.8%*

Source: Author.

[3] In accordance with Circular E-006, paragraph 3, item a), " *As empresas de estiva licenciadas que vierem a operar no Terminal pagarão à administração portuária pelo uso das áreas portuárias uma taxa variável em função da quantidade e do tipo de carga embaraçada e desembarcada de navios, a saber:*
a) Carga geral fraccionada ou granel: 0,8038€ por tonelada […]"

5.2.2.4. Fuel for Equipment

Another operation expense that should be taken into account is the fuel for machines: the continuous discharges and the mini-wheel loader. To estimate the expenses incurred with fuel, it was considered several variables, represented in Exhibit 23. The continuous discharges are only used to cereals discharging, so it was just considered in "No cleaning operations". On the other hand, the mini wheel loader supports in cleaning operations. As it was mentioned before, 1 period has 7 hours. It was considered that continuous discharges and mini-wheel loader consume 36 and 6 liters per hour, respectively. Through Kuanto Kusta website[4], it is possible to access the diesel price on the 31st of December of 2017, 1.308€ per liter.

Exhibit 23: Operating Expenses: Fuel for Equipment (2018E-2022E)

2.4 Fuel for Equipments	Unit	2017	2018E	2019E	2020E	2021E	2022E
2.4.1 Continuous Dischargers							
Consumption (liters/hour)	36						
# Work Periods			**293**	**306**	**319**	**319**	**319**
Grains - **No Cleaning Operations**			263	272	281	281	281
Flours - **No Cleaning Operations**			30	34	38	38	38
Nº of Hours per Period	7						
Diesel Price (per liter)	**1.308 €**						
Inflation			*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Subtotal	**€**	**0**	**97,117**	**101,460**	**105,823**	**105,899**	**105,910**
2.4.2 Mini-Wheel Loader							
Consumption (liters/hour)	**6**						
# Work Periods			**121**	**123**	**123**	**123**	**123**
Grains - **Cleaning Operations**			107	108	108	108	108
Flours - **Cleaning Operations**			14	15	15	15	15
Nº of Hours per Period	**7**						
Diesel Price (per liter)	**1.308 €**						
Inflation			*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Subtotal	**€**	**0**	**6,684**	**6,797**	**6,801**	**6,805**	**6,806**
Total Fuel	**€**	**0**	**103,802**	**108,258**	**112,624**	**112,705**	**112,717**
% Revenue			*5.7%*	*5.1%*	*4.6%*	*4.3%*	*4.3%*

Source: Author.

[4] Website where it is possible to search for historical prices for several products. - https://www.kuantokusta.pt/auto-moto/Historico - accessed in 26/07/2018.

5.2.3 Structure Expenses

Structure expenses are expenditures incurred which are not directly connected with the volume of cereals operated. In 2018, it is estimated that structure expenses represent 27.2% of the revenue, yearly decreasing until represents 19.4% in 2022. Here there are included personnel expenses (current employees) and external supplies and services.

5.2.3.1 Personnel Expenses

Here are included personal expenses with (i) current employees working at the port, 1 superintendent and 4 crane men, (ii) 1 employee responsible for maintenance and (iii) 1 supervisor. By contrast to outsourcing workers, these employees have a fix salary, regardless of the quantities operated. Their annual salaries, represented in Exhibit 24, already include both holiday and Christmas periods, and therefore 14 months were considered.

Exhibit 24: Structure Expenses: Personnel Expenses (2018E-2022E)

3. SCRUTURE EXPENSES	Unit	2017	2018E	2019E	2020E	2021E	2022E
3.1 Personnel Expenses							
3.1.1 Port Operations							
Nº Employees - **Superintendent**	1						
Monthly Salary (per employee)	2,643 €						
Nº Employees **Crane Men**	4						
Monthly Salary (per employee)	2,018 €						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Port Operations Subtotal	**€**	**0**	**150,848**	**150,899**	**150,974**	**151,082**	**151,098**
3.1.2 Maintenance							
Nº Employees	1						
Monthly Salary (per employee)	2,389 €						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Maintenance Subtotal	**€**	**0**	**33,633**	**33,644**	**33,661**	**33,685**	**33,689**
3.1.3 Supervisor/Technical Manager							
Nº Employees	1						
Monthly Salary (per employee)	4,518 €						
Inflation	Δ%		*0.56*	*0.59*	*0.64*	*0.71*	*0.73*
Supervision Subtotal	**€**	**0**	**63,605**	**63,627**	**63,659**	**63,704**	**63,711**
Total Personnel Expenses	**€**	**0**	**248,087**	**248,170**	**248,294**	**248,471**	**248,498**
% Revenue			*13.6%*	*11.7%*	*10.1%*	*9.5%*	*9.4%*

Source: Author.

5.2.3.2 External Supplies and Services

In this caption are registered all expenditures that the company expects to incur per month, such as specialized jobs, lawyers, conservation and repair, marketing, electricity, water and gas, cleaning, and so on. The new company pays a monthly rent for a room in Silos de Leixões office. Inside this caption, it is also included 2 insurance types:

(i) civil insurance, accidents at work and workers' health insurance and (ii) insurance for merchandise, which costs €0.05325 per ton operated. Accounting, payroll, legal support and other services are provided by the owner company – GeStmin SGPS. As an estimate, it was considered 20% of the actually Silos de Leixões' s payment, € 191,287 per year.

In 2018 this caption totalizes €248,137, growing every year until reaches €262,930 in 2022, which represents 9.96% of the revenue. For further detail see Appendix 3: Structure Expenses: External Supplies and Services (2018E-2022E).

5.3 CAPEX

To start the business, the new company had to do a huge investment in machinery. So far, the unloading service, which from now on will be almost entirely provided by the new company to Silos de Leixões, it was provided by APDL, which hold all the equipment needed.

For port operation, the company bought 2 continuous discharges at a unit price of €1,250,000 and a mini-wheel loader for €40,000. Both machines were bought in 2017, before the company has started its activity. The continuous discharges are needed for cereals unloading and the mini-wheel is useful for cleaning periods and other tasks at the port. It was also necessary to invest in some administrative equipment, such as, computers, mobile phones, office materials, and others. As well as the machines, it was done a huge investment on these types of equipment, and reinvestments will be done, by a smaller amount, every year of the project.

Exhibit 25: CAPEX (2017-2022E)

1. CAPEX	UNIT	2017	2018E	2019E	2020E	2021E	2022E
1.1. Investment on Operations Equipment							
Continuous Dischargers							
Nº	2						
Purchase Price		2,500,000					
Mini-Wheel Loader							
Nº	1						
Purchase Price		40,000					
Subtotal	**€**	**2,540,000**	**0**	**0**	**0**	**0**	**0**
1.2 Infrastructure Investment							
Administrative Equipment		6,000	2,000	2,000	2,000	2,000	2,000
Others		50,000	1,000	1,000	1,000	1,000	1,000
Subtotal	**€**	**56,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
Total CAPEX	€	**2,596,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**

Source: Author.

5.4 Depreciations

Although the machines were bought in 2017, they only were ready for use when the business started, in January 2018, and consequently they only begin to depreciate from that moment on.

The company considers reasonable that operations and infrastructure equipment have an expected utility of 10 and 5 years, respectively. In Exhibit 26 is possible to observe the annual depreciation, the accumulated depreciations, and the gross and net assets value, for both equipment type.

Exhibit 26: Gross and Net Assets, Depreciations and Accumulated Depreciations (2018E-2022E)

2. DEPRECIATIONS	UNIT	2017	2018E	2019E	2020E	2021E	2022E
2.1. Operations Equipment							
Assets Life	10						
Capex - aquisitions		2,540,000	2,540,000				
Gross Asset			2,540,000	2,540,000	2,540,000	2,540,000	2,540,000
Year Depreciation			**254,000**	**254,000**	**254,000**	**254,000**	**254,000**
Accumulated Depreciations			254,000	508,000	762,000	1,016,000	1,270,000
Net Asset			2,286,000	2,032,000	1,778,000	1,524,000	1,270,000
2.2. Infrastructure Equipment							
Assets Life	5						
Capex - aquisitions		56,000	3,000	3,000	3,000	3,000	3,000
Gross Asset			59,000	62,000	65,000	68,000	71,000
Year Depreciation			**11,800**	**12,400**	**13,000**	**13,600**	**14,200**
Accumulated Depreciations			11,800	24,200	37,200	50,800	65,000
Net Asset			47,200	37,800	27,800	17,200	6,000
Total Depreciations	**€**		**265,800**	**266,400**	**267,000**	**267,600**	**268,200**
% Revenue			*14.6%*	*12.6%*	*10.8%*	*10.2%*	*10.2%*

Source: Author.

5.5 Working Capital

Working capital is a way to measure the operational efficiency of a company and also the short-term financial health. It is computed subtracting company' current liabilities (resources) from its current assets (requirements), those related with firm's operational activity. The non-operating items, which do not contribute to the day-to-day operations of the firm, must be ignored. Considering the average collection and payment periods mentioned below, working capital components were estimated and are presented in Exhibit 27.

- Average collection period from sales: 30 days;
- Average payment period for external supplies and services: 60 days;
- Average payment period for APDL taxes: 30 days;
- Average payment period for transportation services: 30 days;
- Average payment period for State regularization: 20 days.

Additionally, for safety, the company has a minimum treasury reserve of €1,000, to deal with unforeseen events. This value is the limit establish for Silos de Leixões Company and, as a prediction, it was considered the same for this project.

Looking at Exhibit 27, from 2018 to 2022, a positive and growing working capital is expected, meaning that company' requirements increase more than its resources. It can be explained by the fact that the biggest working capital parcel, clients, has 30 days average collection and the same happens in almost all liabilities items. The only liability parcel which is more advantageous in terms of payment period, is external supplies and services. Although it is not enough to cover the clients effect.

However, working capital growth will be closer over the 5 years, decreasing the working capital changes. These variations have a negative impact of the cash flow of the firm, since its operational requirements will increase more than its resources.

Exhibit 27: Working Capital (2018E-2022E)

WORKING CAPITAL	Days	2017	2018E	2019E	2020E	2021E	2022E
1. Current Assets							
1.1 Clients			1,822,666	2,119,004	2,462,554	2,624,674	2,640,202
Average Collection Period	30		**149,808**	**174,165**	**202,402**	**215,727**	**217,003**
1.2 Reservation Security Treasury			**1,000**	**1,000**	**1,000**	**1,000**	**1,000**
Total Current Assets	**€**	**0**	**150,808**	**175,165**	**203,402**	**216,727**	**218,003**
2. Current Liabilities							
2.1 External Supplies and Services			248,137	253,362	259,461	262,612	262,930
Average Payment Period	60		**40,790**	**41,649**	**42,651**	**43,169**	**43,221**
2.2 APDL Taxes			516,957	594,733	685,197	730,444	734,900
Average Payment Period	30		**42,490**	**48,882**	**56,318**	**60,036**	**60,403**
2.3 Transport			546,671	628,917	724,580	772,427	777,140
Average Payment Period	30		**44,932**	**51,692**	**59,555**	**63,487**	**63,875**
2.4 State and Other Public Entities							
Average Payment Period	20		123,091	123,133	123,194	123,282	123,295
			6,745	**6,747**	**6,750**	**6,755**	**6,756**
Total Current Liabilities	**€**	**0**	**134,956**	**148,970**	**165,274**	**173,448**	**174,255**
Working Capital	**€**	**0**	**15,852**	**26,195**	**38,128**	**43,279**	**43,748**
Working Capital Investment (ΔWC)	**€**	**0**	**15,852**	**10,343**	**11,933**	**5,151**	**470**

Note: For further details on State and Other Public Entities computations, see Appendix 4.

Source: Author.

5.6 Financing Plan and Cost of Debt

To start the business, it was required an initial amount of €2,716,000, which corresponds to the initial investment in CAPEX, €2,596,000, as it is possible to see in Exhibit 25, and €120,000 to address any cash needs.

The GeStmin SGPS management, the owners of the company, decided to finance this project with €1,500,000 and the remaining €1,216,000 through borrowed capital.

It was negotiated a long-term loan due in 10 years, with the starting date of 1st of November of 2017, with a rate of 3.5% a year added to a 3 month Euribor [5]. The applied stamp tax is of 4%, according with the tax code available on Autoridade Tributária website[6].

Applying the above values, we obtain a debt cost of 3.3%. Interests are postponed and due every year. Through the Exhibit 28 it is possible to observe the financing plan since the loan's beginning until 2022.

Exhibit 28: Financing Plan (2017-2022E)

	Unit	2017	2018E	2019E	2020E	2021E	2022E
Borrowed Capital (> 1year)		1,094,400	995,904	897,408	798,912	700,416	601,920
Borrowed Capital (< 1year)		121,600	110,656	99,712	88,768	77,824	66,880
	€	**1,216,000**	**1,106,560**	**997,120**	**887,680**	**778,240**	**668,800**
Interest Rate	**%**	3.30%	3.30%	3.30%	3.30%	3.30%	3.30%
Annual Interest	€	6,081	36,487	32,878	29,270	25,661	22,052
Annual Capital Repayment	€		109,440	109,440	109,440	109,440	109,440
ANNUAL OUTFLOW	**€**		**145,927**	**142,318**	**138,710**	**135,101**	**131,492**

Source: Author

[5] 3 month Euribor of 1st of November of 2017 - http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=143.FM.M.U2.EUR.RT.MM.EURIBOR3MD_.HSTA – accessed on 22/06/2018

[6] Stamp tax code, paragraph 17.3.1, available on Autoridade Tributária website - http://info.portaldasfinancas.gov.pt/pt/informacao_fiscal/codigos_tributarios/selo/Pages/ccod-selo-tabgiselo.aspx - accessed on 22/06/2018.

5.7 Cash Balance Map

Grouping up all cash inflows and outflows, we obtain the cash balance map (Exhibit 29). Cash balance results from subtracting the outflows from the inflows. Looking into the same Exhibit, we notice a negative cash balance in 2018, because it is the first year of the loan repayment and the cash flows generated are not enough to compensate it. To face this cash flow's need, it was included in the initial investment €120,000, as already mentioned in the chapter 5.6 - Financing Plan and Cost of Debt.

Cash is highly influenced for two factors: EBITDA growth and cash outflows mainly related with loan repayment. In addition, it should be noticed that the operation cash flow generated in the 5 years will be essentially to meet loan repayments and interest payments, rather than to invest in the operating cycle, which results in a rising accumulated cash balance. In 2028, the last year of loan repayment, it is expected a reinvestment in machinery only coming from operating cash flows.

Exhibit 29: Cash Balance Map (2017-2022E)

	Unit	2017	2018E	2019E	2020E	2021E	2022E
1. INFLOWS							
Gross Cash Flows			51,163	174,524	318,148	383,683	389,673
Capital		1,500,000					
Loan		1,216,000					
TOTAL	**€**	**2,716,000**	**51,163**	**174,524**	**318,148**	**383,683**	**389,673**
2. OUTFLOWS							
CAPEX		2,596,000	3,000	3,000	3,000	3,000	3,000
WC			15,852	10,343	11,933	5,151	470
Loan repayment			109,440	109,440	109,440	109,440	109,440
Interests			36,487	32,878	29,270	25,661	22,052
TOTAL	**€**	**2,596,000**	**164,779**	**155,661**	**153,643**	**143,252**	**134,962**
Cash balance	**€**	**120,000**	**-113,616**	**18,863**	**164,505**	**240,432**	**254,711**
Accumulated Cash Balance	**€**		6,384	25,247	189,753	430,184	684,895

Source: Author

5.8 Financial Statements

5.8.1 Income Statement

Based on the values obtained in the previous points, which resulted from the assumptions taken, an income statement was developed for each year (Exhibit 30). The net income follows a growing trend, and it will be positive after the year 2020. In 2022 it is expected that net income represents 2.7% of the revenue. The values are expressed in euros.

Exhibit 30: Income Statement (2017-2022E)

	Unit	2017	2018E	2019E	2020E	2021E	2022E
Sales			1,822,666	2,119,004	2,462,554	2,624,674	2,640,202
Operating Expenses			1,275,279	1,442,947	1,636,650	1,729,907	1,739,101
Gross Margin	**€**	**0**	**547,387**	**676,057**	**825,903**	**894,767**	**901,101**
Labor Costs			248,087	248,170	248,294	248,471	248,498
Other Operating Expenses			248,137	253,362	259,461	262,612	262,930
EBITDA	**€**	**0**	**51,163**	**174,524**	**318,148**	**383,683**	**389,673**
Depreciations			265,800	266,400	267,000	267,600	268,200
EBIT	**€**	**0**	**-214,637**	**-91,876**	**51,148**	**116,083**	**121,473**
Interests		6,081	36,487	32,878	29,270	25,661	22,052
Profit/Loss Before Taxes	**€**	**-6,081**	**-251,124**	**-124,754**	**21,878**	**90,422**	**99,420**
Income Tax		0	0	0	11,508	26,119	27,331
Net Income	**€**	**-6,081**	**-251,124**	**-124,754**	**10,370**	**64,304**	**72,089**
% Revenue			*-13.8%*	*-5.9%*	*0.4%*	*2.4%*	*2.7%*

Source: Author

5.8.2 Balance Sheet

In Exhibit 31 there is shown the balance sheet, where it is clearly noticeable the huge investment in plant, property and equipment in the first year. Cash and clients captions will increase as a consequence of revenue growth. Liabilities coming from the borrowed capital will progressively decrease due to loan's repayments.

Exhibit 31: Balance Sheet (2017-2022E)

	Unit	2017	2018E	2019E	2020E	2021E	2022E
Current Assets							
Cash		120,000	7,384	26,247	179,244	393,557	620,936
Trade Receivables		0	149,808	174,165	202,402	215,727	217,003
Total Current Assets	**€**	**120,000**	**157,192**	**200,412**	**381,646**	**609,284**	**837,939**
Non - Current Assets							
Plant, Property and Equipment		2,596,000	2,333,200	2,069,800	1,805,800	1,541,200	1,276,000
Total Non-Current Assets	**€**	**2,596,000**	**2,333,200**	**2,069,800**	**1,805,800**	**1,541,200**	**1,276,000**
TOTAL ASSET	**€**	**2,716,000**	**2,490,392**	**2,270,212**	**2,187,446**	**2,150,484**	**2,113,939**
Equity							
Capital		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Legal Reserve		0	0	0	519	3,215	3,604
Retained Earnings		0	0	-251,124	-376,396	-368,723	-304,809
Net Income		-6,081	-251,124	-124,754	10,370	64,304	72,089
TOTAL EQUITY	**€**	**1,493,919**	**1,248,876**	**1,124,122**	**1,134,492**	**1,198,796**	**1,270,885**
Current Liabilities							
Short-term Loan		121,600	110,656	99,712	88,768	77,824	66,880
Trade Payables		0	128,211	142,223	158,523	166,693	167,499
Tax Payables		0	6,745	6,747	6,750	6,755	6,756
Accrued Expenses		6,081	0	0	0	0	0
Total Current Liabilities	**€**	**127,681**	**245,612**	**248,682**	**254,042**	**251,272**	**241,135**
Non-Current Liabilities							
Long-term Loan		1,094,400	995,904	897,408	798,912	700,416	601,920
Total Non-Current Liabilities	**€**	**1,094,400**	**995,904**	**897,408**	**798,912**	**700,416**	**601,920**
TOTAL LIABILITIES	**€**	**1,222,081**	**1,241,516**	**1,146,090**	**1,052,954**	**951,688**	**843,055**
TOTAL EQUITY + LIABILITIES	**€**	**2,716,000**	**2,490,392**	**2,270,212**	**2,187,446**	**2,150,484**	**2,113,939**

D/E	0.82	0.99	1.02	0.93	0.79	0.66
D/(D+E)	0.45	0.50	0.50	0.48	0.44	0.40

Source: Author

6. Valuation

6.1 Discount Rate

The company is financed both by debt and equity, and so, the adequate discounted rate is the weighted average cost of capital (WACC). The formula used to compute the WACC rate, mentioned in the literature review by number 16.

The computation of the equity cost was based on the Capital Asset Pricing Model (CAPM), through the formula number 7, and the inputs used are expressed in Exhibit 32.

Exhibit 32: Equity Cost

	2018E	2019E	2020E	2021E	2022E
Risk-Free Rate	0,38%	0,38%	0,38%	0,38%	0,38%
Equity Risk Premium	7,96%	7,96%	7,96%	7,96%	7,96%
Levered Beta (Company)	1,75	1,77	1,70	1,60	1,50
Cost of Equity (rE)	17,21%	17,36%	16,81%	15,99%	15,19%

Source: Author

The assumptions taken to compute each input shown above were the following:

- **Risk-free rate:** it is a theoretical rate of return that an investor would expect from an investment with zero risk. It was decided to use 10-year German zero coupon[7] bond as a risk-free rate, since Portuguese bonds still have some risk and, nowadays, German bonds are the most truthful risk free rate. It was used a rate based on an average daily data, during 2017;
- **Equity risk premium:** it was used an equity risk premium for Portugal, at 31st of December of 2017, obtained from Professor Damodaran website. It includes the country risk premium for Portugal;

[7] Germany 10-year bond yield - https://www.investing.com/rates-bonds/germany-10-year-bond-yield-historical-data - accessed on 27/07/2018.

- **Levered Beta:** it was computed through the unlevered beta for shipbuilding and marine industry (0.99), defined by Damodaran on his website. The beta was levered using the yearly debt-to-equity ratio of the company, and it was assumed a zero beta of debt (Exhibit 33). The levered beta of the company results from the application of the formula number 10. Over those 5 years, the company's levered beta will probably decrease due to the declining of debt-to-equity ratio, and consequently, weakening the cost of equity.

Exhibit 33: Company's Levered Beta

	2018E	2019E	2020E	2021E	2022E
Levered Beta (Company)	1.75	1.77	1.70	1.60	1.50
D/E	99.41%	101.95%	92.81%	79.39%	66.34%

Source: Author

Bringing up all the inputs needed to apply the formula number 18, it was computed the appropriate discount rate for this valuation, and it is shown in Exhibit 34. WACC varies according with variation in company's financial leverage. The smaller the debt-to-equity ratio, the higher this discounted rate. The company's strategic from 2022 is to maintain a constant debt-to-equity ratio and so it was considered that the WACC rate remains stable after 2022.

Exhibit 34: WACC

	2018E	2019E	2020E	2021E	2022E
WACC	9.90%	9.90%	9.95%	10.04%	10.15%

Source: Author

6.2 Valuation: Free Cash Flow to the Firm

The appropriate valuation method to find out the new company's value is the free cash flow to the firm. The yearly cash flows were projected, taking into account all the assumption previously defined (Exhibit 35).

Exhibit 35: Calculation of the Free Cash Flows to the Firm

	Unit	2017	2018E	2019E	2020E	2021E	2022E
EBIT			**-214,637**	**-91,876**	**51,148**	**116,083**	**121,473**
(-) Tax Shield [8]			**-48,293**	**-20,672**	**11,508**	**26,119**	**27,331**
NOPLAT			-166,344	-71,204	39,640	89,965	94,141
(+) Depreciations			265,800	266,400	267,000	267,600	268,200
(+)(-) Inv. Working Capital			-15,852	-10,343	-11,933	-5,151	-470
(+)(-) CAPEX		-2,596,000	-3,000	-3,000	-3,000	-3,000	-3,000
Free Cash Flows	**€**	-2,596,000	80,604	181,853	291,707	349,414	358,872
Discounted Cash Flows	**€**	**-2,596,000**	**73,341**	**150,556**	**219,657**	**239,100**	**222,943**

Source: Author

After discounting all cash flows to the WACC rate (Exhibit 30), the net present value is shown in the Exhibit 36.

Exhibit 36: Net Present Value

Free Cash Flow to the Firm	
NPV (€)	**1,322,686**
Growth in Perpetuity	2%

Source: Author

[8] Corporate tax rate of 21%, in accordance with the current legislation (Orçamento de Estado 2017), it is increased by a municipal surcharge of 1.5%, since the company is located in Matosinhos. The company is not subject to a state surcharge because it does not have a taxable profit higher than €1,500,000.
Oficio Circular nº20198, 23-01-2018 - https://fiscalidade.pt/wp-content/uploads/2018/02/oc_20198_2018.pdf - accessed on 22/06/2018.

Although it is a new company in its initial growth state, its revenue is based on Silos de Leixões operations, which already exists and so, extraordinary growths are not expected. Then, from 2022 onwards, it was assumed a stable growth of 2% based on (i) the inflation rate of 0.73% for 2022, as previously mentioned in the subchapter 7.2.1 - Inflation and (ii) EBITDA growth in the last year of the project (1.56%).

The net present value of this project is positive, €1,322,686. The internal rate of return (IRR), which represents the maximum rate of return of the project, has a value of 16.02%, higher than the WACC.

Over the five years, the cash flows generated will not be enough to cover the initial investment, but in 2022, it is expected an investment return of 49%, and the remaining will be recovered after that.

Concluding, the project is economic and financially viable, since it presents a positive NPV and an IRR higher than the cost of capital, meaning that the investment made can be recovered, remunerating the shareholders and debt holders at least by the minimum rate required.

7. Sensitivity Analysis

This valuation was made under estimated values based on variables with some uncertainty degree. Aiming to a better understanding of how some of those variables influence the company's value, it was done a sensitive analysis, based on the variables with a higher degree of uncertainty and a higher impact on the project. The simplest way is to vary one variable in the model and examine the impact that the change has on the model's results (Hayward Group, 2009).

The variables considered were (i) the percentage of cereals unloaded, which has direct impact on the company's revenue and the (ii) constant growth for perpetuity. The results of this analysis are presented in Exhibit 37.

Exhibit 37: Sensitivity Analysis – Revenue

	Unit	2018E	2019E	2020E	2021E	2022E
CURRENT SCENARIO						
Cereals Unloaded	%	75%	80%	85%	90%	90%
Total Revenue	k€	1,823	2,119	2,463	2,625	2,640
NPV	€	**1,322,686**				
IRR	%	**16.0%**				
EBIT	€	-214,637	-91,876	51,148	116,083	121,473
Net Income	€	-251,124	-124,754	10,370	64,304	72,089
1st SCENARIO						
Cereals Unloaded	%	75%	80%	90%	90%	90%
Total Revenue	k€	1,823	2,119	2,607	2,625	2,640
NPV	€	**1,347,762**				
IRR	%	**16.2%**				
EBIT	€	-214,637	-91,876	110,406	116,083	121,473
Net Income	€	-251,124	-124,754	56,295	64,304	72,089
2nd SCENARIO						
Cereals Unloaded	%	75%	80%	80%	80%	90%
Total Revenue	k€	1,823	2,119	2,318	2,333	2,640
NPV	€	**1,175,091**				
IRR	%	**15.1%**				
EBIT	€	-214,637	-91,876	-8,110	-3,185	121,473
Net Income	€	-251,124	-124,754	-35,555	-28,129	72,089
3rd SCENARIO						
Cereals Unloaded	%	75%	80%	80%	80%	80%
Total Revenue	k€	1,823	2,119	2,318	2,333	2,347
NPV	€	**426,812**				
IRR	%	**10.5%**				
EBIT	€	-214,637	-91,876	-8,110	-3,185	1,531
Net Income	€	-251,124	-124,754	-35,555	-28,129	-20,866

Source: Author

Regarding the first variable, three possible scenarios were considered, one of them more favorable and the others two worst. In all of them, the company starts the first and the second year unloading 75% and 80% of cereals, respectively.

Starting by the better ones, the company will be operating 90% after 2020. The changes in the company's operational and financial performance are not that different from the project scenario. Although, the NPV is € 1,347,762, 19% higher than in the estimated scenario. The IRR improves 0.21% and within five years, the investment is recovered in 51%

In a worst case, the company controls 80% of cereals in 2020 and 2021, and 90% in 2022, and it will impair the company's value in 11%. However, the NPV of the project is still positive (€1,175,091). The maximum rate of the project drops 0.96% and at the end of the fifth year, the firm retrieves 43% of the initial investment. The EBIT and the net income are negative until 2021, € -3,185 and € -28.129, respectively, instantly recovered when the operation capacity reaches 90%.

The last scenario, the more conservative, the company unloads 80% of cereals during the last four years of the project. The enterprise value should drop 68%, meaning a positive NPV of €426.812. Even in the worst scenario, the viability of this project is not compromised. However, the economic performance is affected, since the net income is negative over the 5 years of the project, reaching €-20.866 in 2022. On the other hand, the EBIT presents a positive value of € 1,531 in 2022. As expected, the IRR decreases considerably, with a value of 10.52%, although it is still higher than the WACC, The investment will take longer to be totally recovered. In the fifty year the investment is 40% paid off.

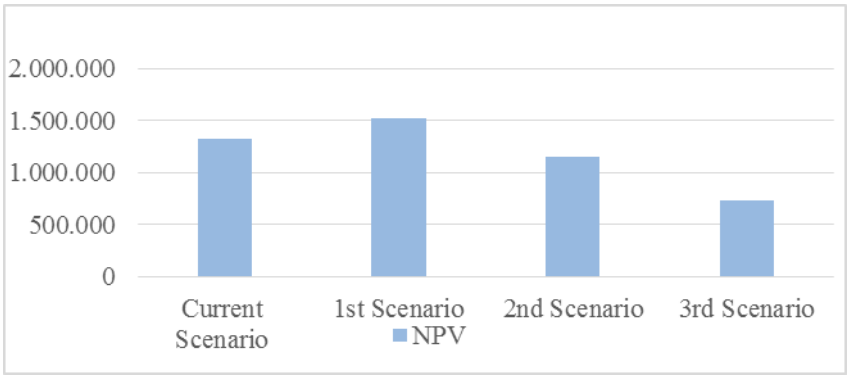
About the other variable - growth for perpetuity – the bigger it is, the higher the perpetuity value, and consequently the NPV. It was also considered three possible situations: a higher growth rate of 2.5%; a smaller growth rate of 1.5%; and the worst case, constant zero growth. In Exhibit 38, it is shown the impact of changing this growth rate.

Analyzing the first scenario, the NPV is improved by 15%, and the IRR reaches the best value so far, 17.9%, always being higher than the cost of capital. If we consider a 1.5 % growth for perpetuity, the company's value should fall 13%, and the IRR registers 15.02%. The less favorable scenario happens if we considered a growth of zero. Measuring this impact, the value of the company is also positive (€728.984) and the IRR is still 3% and 2% higher than the WACC, in the first and in the last year, respectively.

The recoverability of the investment does not have impact in these scenarios, since it will be recovered in the perpetuity.

Wind up, even in the worst scenarios, the project is still economic and financial viable.

Exhibit 38: Sensitivity Analysis – Growth for Perpetuity



Source: Author

8. Indicators

To complement this valuation, and in order to measure the economic and financial situation of the company over the five-year project, some indicators have been taken into account: economic, financial, liquidity and risk. These ratios were based on those used by IAPMEI in the project analysis (IAPMEI, 2016). The formulas used to compute each indicator are presented in Appendix 4.

8.1 Economic Indicators

The sales growth was previously analysed, in the chapter 7.3.1 - Revenue. It is expected a revenue growth around 16% in the first two years, and almost stagnant after that, at a growth rate of 0.6%. The net sales profitability is obtained dividing the net income by the sales presents, and presents a positive growth evaluation, reaching 3% in 2022, which means that the company will have a net income of € 0.03 per each euro of revenue earned.

Exhibit 39: Economic Indicators

	2018E	2019E	2020E	2021E	2022E
Sales Growth	-	16%	16%	7%	1%
Net Sales Profitability	-14%	-6%	0%	2%	3%

Source: Author

8.2 Economic - Financial Indicators

As well as economic ratios, these will also follow a growing trend. The ROIC, that measures the operating income (NOPLAT) to the capital invested in the company, the return on assets (ROA), which measures the operational efficiency of a firm to generate profits from its assets, and the return on equity (ROE), that examines profitability from the shareholders rate of return on their investment in the firm, will all report positive value as of 2020. In 2022, ROIC will represents 7% and ROA and ROE will both record a 6% ratio. ROIC surpasses the industry average in 2021, which according with Damodaran[11] is 4.88%. About the ROE of the company, from 2020, it is much higher than the industry average (-1.88%), defined by Damodaran[9].

[9] Damodaran Website - http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/mgnroc.html - accessed on 20-08-2018.

Exhibit 40: Economic - Financial Indicators

	2018E	2019E	2020E	2021E	2022E
Return on Investment Capital (ROIC)	-7%	-3%	2%	6%	7%
Return on Assets (Gross ROA)	-9%	-4%	2%	5%	6%
Return on Equity (ROE)	-20%	-11%	1%	5%	6%

Source: Author

8.3 Financial Indicators

The financial autonomy is bigger every year, starting in 2018 with 50% of assets being financed by equity, increasing to 60% five years later. The solvency ratio will continually grow, achieving the peak (251%) in 2022, meaning that the firm's total assets are able to meet its short and long-term liabilities. It is expected to grow after 2022, since the loan repayment will decrease the debt portion and the net income is expected to increase every year.

To complement this ratio, we have the interest cover ratio, which measures the capacity of the firm to meet interest payments from pre-debt and pre-tax earnings. The higher the ratio, the more secure is the firm's capacity to pay interest from earnings (Damodaran, 2012). In 2018 and 2019 is negative due to the negative EBIT. After 2020 it is expected a considerable recovery and the ratio will represent 5.51 in 2022.

Exhibit 41: Financial Indicators

	2018E	2019E	2020E	2021E	2022E
Financial Autonomy	50%	50%	52%	56%	60%
Solvency Ratio	201%	198%	208%	226%	251%
Interest Cover Ratio	-5.88	-2.79	1.75	4.52	5.51

Source: Author

8.4 Liquidity Indicators

The cash ratio presents positive and growing value, which indicates that the firm is able to pay off its current liabilities with cash. The best ratio, 2.58, is obtained in 2022.

The liquidity ratio measures the company's capacity to pay its liabilities on short term from the current assets, and it presents growing values between 0.64, in 2018, and 3.47 in 2022.

Exhibit 42: Liquidity Indicators

	2018E	2019E	2020E	2021E	2022E
Cash Ratio	0.03	0.11	0.71	1.57	2.58
Liquidity Ratio	0.64	0.81	1.50	2.42	3.47

Source: Author

8.5 Business Risk Indicators

As risk indicators were chosen two ratios: gross profit and the operational leverage ratio. The gross profit measures how much revenue a company does after paying all expenses necessary for the company operation. From 2018 to 2022, the firm presents positive, which grow year to year, due to the increase of sales. In the fifth year the firm has a gross profit of € 901,101.

Operating leverage measures the percentage change in profits for each 1% change in sales. When positive, the lower the value, the lower the risk of operating results being affected. According with Brealey *et al* (2017), companies with higher fixed costs rather than variables costs have higher operating leverage. Looking at Exhibit 43, the company starts with an unfavourable scenario of negative values until 2020, to a high risk state in 2021, where a 1% drop in sales would results in a fall of 19.28% in EBIT. This situation improves in 2022, where a sales fall of 1% provokes a decrease of 7.85 in EBIT.

Exhibit 43: Business Risk Indicators

	2018E	2019E	2020E	2021E	2022E
Gross Profit	547,387	676,057	825,903	894,767	901,101
Degree of Operating Leverage (DOL)	-	-	-	19.28	7.85

Source: Author

9. Conclusions

The main purpose of the master thesis is to evaluate whether the creation of the new company was economic and financially viable. To find an answer, some steps was followed.

The sector analysis allowed the author to understand the situation of cereals market and Portuguese port industry. On the market side, recent years have seen a significant accumulation of global stock, once grains production has increased and demand does not keep pace with this growth, resulting in the biggest stock accumulation in 2016. This situation led to the prices decline in most commodities, including wheat and soybeans. In the upcoming decade, real prices in agriculture commodities are expected to persist low, since demand will continue to decrease, allied to a higher production efficiency, which allow greater outputs without using additional inputs.

The year of 2017 was registered by the highest volume of goods traded, reaching 95.9 million tons. Leixões port revealed a positive performance, increasing its market share for 20.3%. This growth resulted mostly from the 4.8% increase in imports. Regarding agro-food imports, it increases 9.6% related to 2017, and cereals imports are the second higher segment (9.7%), which increased 4.9%, due to import of wheat and maize, that contributed with a gain of 47.5% and 35.9%, respectively, in the cereals total growth. Combining the market forecasts with the firm historical data, it enables the author to understand the trend and estimate the future sales of the company.

Regarding the choice of the best model for value a company, there are still different opinions among the authors. However, the author concludes that the free cash flow to the firm was the appropriate model to answer the aim of this project, since combines assets financed by equity and debt, and it is assumed that, from 2022, the company will maintain a constant debt-to-equity ratio, and so the same WACC.

It was concluded that the project is economic and financially viable, since it presents a positive NPV €1,322,686, and an IRR (16.02%) higher than the WACC, meaning that the investment made can be recovered, remunerating the shareholders and debt holders at least by the minimum rate required.

To reinforce this analysis, it was done a sensitive analysis using the variables with a higher degree of uncertainty and a higher impact on the project. The variables considered were (i) the percentage of cereals unloaded and the (ii) constant growth for perpetuity. Three possible scenarios were made, one of them more favorable and the

others two worst. In all of them, the project has a positive NPV and an IRR higher than the WACC. It was possible to conclude that even in the worst scenarios, the project is still economic and financial viable.

Analyzing the behavior of the main indicators, it could be seen the positive performance all over the project lifetime.

As a final note, it is important to denote that it was not possible to access some information, and meetings with Silos de Leixões management, in order to discuss about some points, like the assumptions taken, were limited. All valuation models have pros and cons. The choice of the most appropriate model is always subjective and involves many considerations. Nevertheless, all models are based on the analyst judgment, who assumes many assumptions which are not 100% reliable, since the future is not known.

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11. Appendices

Appendix 1: List of OECD countries

Country	Acession Date
AUSTRALIA	7 June 1971
AUSTRIA	29 September 1961
BELGIUM	13 September 1961
CANADA	10 April 1961
CHILE	7 May 2010
CZECH REPUBLIC	21 December 1995
DENMARK	30 May 1961
ESTONIA	9 December 2010
FINLAND	28 January 1969
FRANCE	7 August 1961
GERMANY	27 September 1961
GREECE	27 September 1961
HUNGARY	7 May 1996
ICELAND	5 June 1961
IRELAND	17 August 1961
ISRAEL	7 September 2010
ITALY	29 March 1962
JAPAN	28 April 1964
KOREA	12 December 1996
LATVIA	1 July 2016
LITHUANIA	5 July 2018
LUXEMBOURG	7 December 1961
MEXICO	18 May 1994
NETHERLANDS	13 November 1961
NEW ZEALAND	29 May 1973
NORWAY	4 July 1961
POLAND	22 November 1996
PORTUGAL	4 August 1961
SLOVAK REPUBLIC	14 December 2000
SLOVENIA	21 July 2010
SPAIN	3 August 1961
SWEDEN	28 September 1961
SWITZERLAND	28 September 1961
TURKEY	2 August 1961
UNITED KINGDOM	2 May 1961
UNITED STATES	12 April 1961

Source: OECD website

Appendix 2: Type of Grains and Flours by Ship Type

Ship Type	Grains	Flours
< 3.000 tons	Wheat, barley, rye	Colza, palmiste
≥ 3.000 tons < 5.000 tons	Wheat	Colza, sunflower
≥ 5.000 tons < 10.000 tons	Wheat	Dried distillers grains, corn gluten
≥ 10.000 tons	Wheat, maize	Dried distillers grains, corn gluten, soy

Note: Barley and rye are considered as "Other Grains" and all flours types except soy are considered as "Other Flours".

Source: Silos de Leixões.

Appendix 3: Structure Expenses: External Supplies and Services (2018E-2022E)

3.2 External Supplies and Services	€/month	2017	2018E	2019E	2020E	2021E	2022E
Specialized Jobs	1.000		12.000	12.000	12.000	12.000	12.000
Lawyers	500		6.000	6.000	6.000	6.000	6.000
Conservation and Repair	4.484		53.808	53.808	53.808	53.808	53.808
Marketing and advertising	250		3.000	3.000	3.000	3.000	3.000
Electricity, water and gas	350		4.200	4.200	4.200	4.200	4.200
Communication	250		3.000	3.000	3.000	3.000	3.000
Travel and Allowances	250		3.000	3.000	3.000	3.000	3.000
Office Rent	300		3.600	3.600	3.600	3.600	3.600
Car Rental	500		6.000	6.000	6.000	6.000	6.000
Fuel (car)	250		3.000	3.000	3.000	3.000	3.000
Insurances (civil, accidents and health)	6.003		72.036	72.036	72.036	72.036	72.036
Office Materials	150		1.800	1.800	1.800	1.800	1.800
Cleaning and Security	250		3.000	3.000	3.000	3.000	3.000
FSE Gestmin (SLAs)	3.188		38.257	38.257	38.257	38.257	38.257
Merchanside Insurance							
Cereals Operated	*ton*		*639.568*	*735.542*	*847.002*	*902.289*	*907.696*
Insurance Cost (€/ton)	**0,05325 €**		34.057	39.168	45.103	48.047	48.335
Inflation	Δ%		*0,56*	*0,59*	*0,64*	*0,71*	*0,73*
Total External Supplies and Services	**€**	**0**	**248.137**	**253.362**	**259.461**	**262.612**	**262.930**
% Revenue	*%*		*13,61%*	*11,96%*	*10,54%*	*10,01%*	*9,96%*

Source: Author.

Appendix 4: TSU, SS and IRS estimations (2018E-2022E)

Employees (Structure)	2018E	2019E	2020E	2021E	2022E
Annual (14 months)	248.087 €	248.170 €	248.294 €	248.471 €	248.498 €
Annual Base (without TSU)	200.474 €	200.542 €	200.641 €	200.785 €	200.807 €
TSU (23.75%)	47.613 €	47.629 €	47.652 €	47.686 €	47.692 €
SS (11%)	22.052 €	22.060 €	22.071 €	22.086 €	22.089 €
IRS (26.65%)	53.426 €	53.444 €	53.471 €	53.509 €	53.515 €
	123.091 €	**123.133 €**	**123.194 €**	**123.282 €**	**123.295 €**

Note: IRS of 26.65% is an average rate based on current employees wage and assumed that all are married, two holders, and one dependent.

Source: Author.

Appendix 5: Indicators formulas

$$\text{Net Sales Profitability} = \frac{\text{Net income}}{\text{Sales}} \tag{18}$$

$$\text{ROIC} = \frac{\text{NOPLAT}}{\text{Invested Capital}} \tag{19}$$

$$\begin{aligned}&\text{Invested Capital (Asset view)}\\&= \text{Business non} - \text{current asset}\\&+ \text{Working Capital}\end{aligned} \tag{20}$$

$$\text{Gross ROA} = \frac{\text{EBIT}}{\text{Assets}} \tag{21}$$

$$\text{ROE} = \frac{\text{Net income}}{\text{Equity}} \tag{22}$$

$$\text{Financial Autonomy} = \frac{\text{Equity}}{\text{Assets}} \tag{23}$$

$$\text{Solvency Ratio} = \frac{\text{Assets}}{\text{Liabilities}} \tag{24}$$

$$\text{Interest Cover Ratio} = \frac{\text{EBIT}}{\text{Interest}} \tag{25}$$

$$\text{Cash Ratio} = \frac{\text{Cash}}{\text{Current Liabilities}} \tag{26}$$

$$\text{Liquidity Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \tag{27}$$

$$\text{Gross Profit} = \text{Sales} - \text{Operating Expenses} \tag{28}$$

$$\text{Degree of Operating Leverage} = \frac{\Delta\ \text{EBIT}}{\Delta\ \text{Sales}} \tag{29}$$