



The Impact of the COVID-19 Pandemic Crisis and the Going Concern Assessment

The case of the audiovisual production sector in Portugal and Spain

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Thesis to obtain the Master of Science Degree in
Industrial Engineering and Management

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December 2022

Declaration

I declare that this document is an original work of my own authorship and that it fulfills all the requirements of the Code of Conduct and Good Practices of the Universidade de Lisboa.

Acknowledgements

When I joined the Instituto Superior Técnico in 2017, I was told that a degree at this institution "could not be done alone". Five years later, I cannot only prove this statement but also highlight it in this dissertation that marks the end of my university journey. Thus, I could not miss the chance to thank all those involved who, more or less actively, helped me conclude this journey.

First of all, I want to thank Professor Cândido Peres for all the expertise, guidance and, above all, availability during this year dedicated to this dissertation's conclusion. Also, to Professor Pedro Pinheiro, I would like to thank for all the feedback, advice, and availability.

Secondly, I would like to thank my family and friends for all their patience, help and support, not only this past year but throughout my academic path.

To my colleagues at IST, especially those whom I have the privilege to call friends, I express my gratitude for all the motivation and reciprocal help that, undoubtedly, were essential in the conclusion of this dissertation.

At last, I must thank Catarina for her presence and unconditional support.

Abstract

In 2020, the emergence of the COVID-19 pandemic changed the world as people knew it. Its impact was felt globally in numerous spheres of society due to compulsory confinements, social distancing and, most importantly, the associated health repercussions.

In this sense, this dissertation aims to assess the pandemic crisis's impact in the economic-financial sphere in a particular sector of the economy – the audiovisual production sector — in Portugal and Spain.

For this purpose, 40 companies in both countries' sectors were selected, subject to Legal Certification of Accounts. From the data gathered from their financial reports, one calculated economic-financial indicators to evaluate the pandemic's impact in categories considered relevant: profitability, liquidity, leverage, and efficiency. It is also proposed to evaluate the crisis's impact in verifying the going concern assumption in the sector's companies, which was achieved with the analysis of statistical models of bankruptcy prediction.

The study concludes that the impact was felt mainly at the revenue level, with a considerable decrease in 2020. Regarding the going concern assumption, it can be said that, in 2020, the Portuguese and Spanish samples presented similar results to the previous year, with the same proportion of companies verifying the assumption.

Although this dissertation's goal is to assess the pandemic crisis's effects in a section of the audiovisual industry, it is supported by indicators and models that can be used in any other context. This way, these tools will enable the analysis, forecasting and mitigation of future crises that will again affect the economy and society.

Keywords: Audiovisual production; Economic-financial analysis; Going concern assumption; COVID-19 pandemic; Portugal; Spain

Resumo

Em 2020, a emergência da pandemia COVID-19 alterou o mundo como o conhecíamos. O seu impacto fez-se sentir de forma global em inúmeras esferas da sociedade, com confinamentos obrigatórios, políticas de distanciamento social e, fundamentalmente, com as repercussões sanitárias associadas.

Nesse sentido, esta dissertação tem como propósito avaliar o impacto da crise pandémica na esfera económico-financeira, num setor particular da economia — setor da produção de conteúdos audiovisuais — em Portugal e Espanha.

Para o efeito, foram selecionadas 40 empresas do setor entre os dois países, sujeitas a Certificação Legal de Contas. Aos dados dispostos nos seus relatórios financeiros, foram aplicados indicadores económico-financeiros que permitiram avaliar categorias consideradas relevantes: rentabilidade, liquidez, estrutura de capital e eficiência. Também é proposto, com este estudo, avaliar a verificação do pressuposto da continuidade das empresas do setor, o que foi alcançado com a análise de modelos estatísticos de previsão de falência.

Da análise feita, foi concluído que o impacto da pandemia se fez sentir, sobretudo, ao nível do rendimento, com uma descida considerável em 2020. Em relação à verificação do pressuposto da continuidade, pode dizer-se que as empresas apresentaram resultados semelhantes aos do ano anterior, com uma mesma proporção de empresas a verificar o pressuposto.

Apesar desta dissertação se apresentar com o objetivo de avaliar o impacto sentido pela crise pandémica num setor da indústria audiovisual, esta sustenta-se em indicadores que podem ser utilizados noutros contextos. Dessa forma, estas ferramentas permitirão analisar e prever futuras crises que voltarão a afetar, certamente, a economia e a sociedade.

Palavras-chave: Produção audiovisual; Análise económico-financeira; Princípio da continuidade; Pandemia COVID-19; Portugal; Espanha

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List of Acronyms and Abbreviations

APIT - Television Independent Producers Association

BdE - Bank of Spain

BdP - Bank of Portugal

B2B - Business to Business

CAE - Classification of Economic Activities

CNAE - National Classification of Economic Activities

CCC - Cash Conversion Cycle

CCI - Industrial Contribution Code

CCL - Capital Companies Law

CNC - Accounting Standards Commission

COGS - Cost of Goods Sold

CP - Cash Position

CR - Current Ratio

CSC - Commercial Companies Code

CSR - Corporate Social Responsibility

DGCI - Tax General Directorate

EBIT - Earnings Before Interest and Taxes

EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortization

EBT - Earnings Before Taxes

ECB - European Central Bank

EC-SNC - Conceptual Structure of the Accounting Standardization System

EEU - European Economic Community

EU - European Union

FASB - Financial Accounting Standards Board

GDP - Gross Domestic Product

GRI - Global Reporting Initiative

GVA - Gross Value-Added

IAPMEI - Institute of Support to Small and Medium Enterprises and Innovation

IASB - International Accounting Standards Board

ICAC - Accounting Audit Institute

IFRS - International Financial Reporting Standards

IMF - International Monetary Fund

INE - National Statistics Institute

IRN - Institute of Registries and Notaries

ISO - International Organisation for Standardization

LSC - Capital Companies Law

PGC - General Chart of Accounts

POC - Professional Organisation Committee

OECD - Organisation for Economic Cooperation and Development

QR - Quick Ratio

ROA - Return on Assets

ROC - Certified Public Accountant

ROE - Return on Equity

ROIC - Return on Invested Capital

SDGs - Sustainable Development Goals

SMEs - Small and Medium-Sized Enterprises

SNC - Portuguese Accounting Standards

TBL - Tripple Bottom Line

VAT - Value Added Tax

VOD - Video on Demand

WACC - Weighted Average Cost of Capital

WC - Working Capital

WCR - Working Capital Requirements

1. Introduction

The effectiveness of a business activity might come down to success or failure. Changes in both micro and macroeconomic levels may affect a company financially, shaping its possibility of success or the eventuality of failure (Pilch, 2021). Some of those macroeconomic events — crises — can have a profound economic and social effect on the economy, as stated in the European 2020 Strategy (European Commission, 2014), and, consequently, on companies.

Crises, whichever their origin, are a recurrent phenomenon in the world's economy (Lustig et al., 2000). One of the latest to strike the world was the coronavirus pandemic crisis at the beginning of 2020, which threatened the activities of several businesses and established an environment of uncertainty in the markets (Tashanova et al., 2020).

The coronavirus crisis also had social consequences on the economy and the world. Besides the evident fact that it is a disease that caused, until today, about six million deaths (Worldometer, 2022), it has also socially affected the economy in other ways: as some industries completely stopped labouring, several workers had to be let go, increasing the world's unemployment rate by one percentual point in 2020 (World Bank, 2022).

Among the many areas impacted by the pandemic crisis, the audiovisuals production sector — production of movies, television programs and commercials not made in television studios — was one of the most affected due to the governmental restrictions imposed at the time (Blázquez et al., 2020). These restrictions had a direct impact on the productions at that time, which had to be postponed and also on the destination of the content to be produced, adding significant market risk to the movies' primary distribution channel (Gaustad et al., 2021). Therefore, according to a study by Copenhagen Economics (2020), the Arts, Entertainment and Recreation sector in Europe, which includes the production of audiovisuals, saw an 84% reduction in its activity in 2020 as a share of the total Gross Value-Added (GVA).

This dissertation will solely focus on the audiovisual production sector in Portugal and Spain. Not being a primary sector in the economy of each of the countries — a GVA of 0.60% in Portugal (PORDATA, 2021) and 0.49% in Spain (INE, 2021) compared to the countries' total GVA — it is a sector with particular importance for its cultural and artistic contribution, gaining increasing relevance in political and academic agendas in the past years (Apóstolo, 2016).

The pandemic effects on the sector were also felt in both Portugal and Spain, as it is corroborated in some studies (Burnay et al., 2021; Macarro, 2021). Moreover, while the current productions were stalled with no timeline to resume, the demand for streaming services increased, especially during the period of mandatory confinement (Burnay et al., 2021). In conjunction with the increasing demand for these alternate services, the pandemic and the observed changes it brought about have driven some structural changes in the sector, as will be discussed. Hence, it is understandable why it is crucial to analyse a company's performance and financial continuity.

Due to the growth in the number of company collapses and the difficulties experienced when facing periods of crisis, the bankruptcy prediction topic is particularly emphasised, and it is increasingly arousing the interest of researchers (Peres, 2014), which came up with models to determine an

enterprise's proximity to default (Vasconcelos, 2017). If aligned with the analysis of indicators that monitor a company's financial dimensions, these models can provide an adequate report of how the institution is labouring (Brealey et al., 2020).

That said, this dissertation aims to address two essential dimensions of a crisis: (i) prevention and preparation — pre-crisis; and (ii) learning and review — post-crisis. The first dimension relates to the theoretical review of some methods and tools that allow companies to study and mitigate the effects of a potential financial crisis. The second dimension refers to the direct analysis of the impact of a crisis on a specific sector. From this assessment, it is possible to draw conclusions that can translate into beneficial tools for overcoming a possible future crisis.

1.1. Contextualisation

1.1.1. Economy and the audiovisual production sector overview

Before the pandemic, there was one major crisis in 2008: the subprime crisis. This crisis, as Ryan (2008) refers to, arose in the United States of America due to poor risk assessment and subsequent credit loans, and unprecedented global market liquidity over a long period of time. In the following years, its effects rapidly expanded to other countries. Eventually reached a worldwide scale, spreading to both Portugal and Spain, with some financial institutions reporting significant losses and even bankruptcy (Mohti et al., 2019). In 2011, Portugal was obliged to resort to the IMF, European Central Bank (ECB), and European Commission for a financial bailout (Barros, 2014) and in 2012 was Spain's turn to ask for financial aid (Royo, 2020).

According to Eurostat (2020), the years that followed were of a slow recovery, with all economies showing deceleration except for China. This fact links with a more recent past, before the pandemic, when the world economy was on a subdued growth.

In 2019, growth in the world's Gross Domestic Product (GDP) downgraded to 2.87% compared to 2017's 3.75% and 2018's 3.61% (World Bank, 2022). As claimed by Gita Gopinath (2019), chief economist of the International Monetary Fund (IMF), there were a variety of factors that contributed to the slowing of GDP's growth: (i) rising trade barriers; (ii) high uncertainty surrounding trade and geopolitics; (iii) factors causing macroeconomic strain in several emerging market economies; and (iv) low productivity and ageing demographics in advanced economies.

At that time, the trade issues that dominated the international scene were due to heavy tariffs between China and the USA, the worry of a disorderly Brexit and a negative global output outlook (UNCTAD, 2015). Alongside it, factors such as conflict and geopolitical instability are accounted for the decline in growth of some emerging market economies (IMF, 2019).

At the beginning of 2020, in Portugal, even though there were still some structural problems and a heavy heritage from the previous crisis — such as high levels of public, private and external debt, low wages, high-income inequalities, and the degree of segmentation in the labour market — there was a great economic situation compared to the most recent past (Mamede et al., 2020).

As listed by Mamede et al. (2020), some factors illustrated this favourable economic scenario: (i) Portugal's GDP had recorded its 25th quarter of expansion; (ii) total employment had increased in

every quarter since the end of 2013; (iii) the unemployment rate was at its lowest since 2002; (iv) real wages had increased by about 2.7% in 2018 and 2% in 2019, after nearly a decade of stagnation; (v) for the first time in fifty years, the budget balance was positive while public debt followed a downward tendency; and (vi) there was a significant improvement in the balance sheet of financial institutions. In other words, there was a positive outlook for the economy and employment.

In Spain, although there has been a decrease in the GDP since 2017 due to the lessening of the boost from the foreign sector and the reduction in household spending, the country's economic situation was also favourable (Baquer & Jimeno, 2019). Spain enjoyed a robust and job-rich recovery, improving its economic resilience after the 2008 financial crisis with a more balanced growth pattern and a healthier financial sector (OECD, 2021).

In this plainly favourable period for both Portugal and Spain, the pandemic crisis escalated, profoundly affecting numerous sectors and industries. One of the most affected by the restrictive isolation and social distancing measures was the cultural sector, which comprises the audiovisual industry and its production sector (Ibrus & Teinmaa, 2020).

The audiovisual industry does not correspond to a set of isolated activities with separate chains of conception, production and sales. It is instead a set of intertwined and interrelated activities in which economic and business interests sometimes evolve into business partnerships and, in addition to having internal production capacity, distribute and transmit the content to the final consumer (AM&A, 2016). However, it is more common to find the various links in the audiovisual product value chain dispersed among several independent agents specialising in specific core businesses rather than fully integrated business clusters (AM&A, 2016).

As stated by Blásquez et al. (2020), this sector's resources come from (i) public funding, (ii) revenues from TV advertising, (iii) consumers' subscriptions to paid services (linear pay television and subscription video on demand), (iv) cinema box-office revenues and even physical and (v) digital sales of audiovisual works. Therefore, in 2019, prior to the pandemic, the European audiovisual sector was in a fragile equilibrium. There was a stagnation of resources as television advertising was losing its prominence to internet advertising, and subscription video on demand (VOD) was challenging linear pay television (Blásquez et al., 2020).

In Portugal, companies in the audiovisual industry are covered by the Classification of Economic Activities (CAE) 591 — motion picture, video and television programme production activities. Before the pandemic, this sector had about 1609 companies, of which 61 were small, and 1537 were micro-enterprises (Banco de Portugal, 2021). In 2019, the sector recorded declines in some profitability ratios. The Return on Assets (ROA) stood at -2.80% compared to 4.47% in the previous year. The Return on Equity (ROE) also suffered a drop: in 2018, the ROE was 14.45%, contrasting with -11.17% in 2019. Both drops are due to higher operational expenses from 2018 to 2019.

From the analysis of the micro-companies and small companies in the sector separately, it is noticed that the average Net Income of micro-companies in the sector is negative, whereas the small companies present positive values. Also, the capital structure differs when small and micro-companies are analysed separately. Small companies have twice as high percentages of equity and about three times as low percentages of financial funding compared to micro-companies. Finally, the sector has a

Current Ratio (CR) of 1.09, meaning that the companies can only cover their short-term liabilities with their current assets.

In Spain, the audiovisual industry companies are included in the same code of economic activities as in Portugal: National Classification of Economic Activities (CNAE) 591. As reported by the Bank of Spain (BdE), before the pandemic crisis, this CNAE included 3146 companies, of which 2846 were micro-firms, 147 small firms, 61 medium firms, and 92 large firms. In 2019, the sector recorded a ROA value of 4.37% and 3.10% in the previous year. In terms of ROE, meanwhile, 2019 recorded a value of 11.81%, surpassing 2018's 9.39%. The CR of the sector presents relatively healthy values, settling at 1.40. To conclude, companies' capital structure in the sector mainly comprises 36.99% of equity and 7.17% of long-term liabilities, with micro-companies being more dependent on external financing than small and medium-sized companies.

According to the study promoted by the Television Independent Producers Association (APIT) in 2016, the audiovisual product value chain can be divided into four different categories of activity: the first includes the authors of the idea or work behind the audiovisual production; the second relates to the production phase, which encompasses the product development activities and the production itself; the third has to do with the distribution of the content to other business agents, usually on a Business to Business (B2B) basis; at last, there is the category that includes the types of entities closest to the end consumer and whose activity is the broadcasting of television content or the projection of movies in movie theatres. The focus of this thesis will be on the second category, production.

The production sector of the film and television industry is predominantly organised around projects (Gaustad et al., 2021). In Portugal, these audiovisual production companies are covered by the CAE 5911, which encompasses the activities of film production intended to be projected in movie theatres or to be broadcast on television, on film, videocassette or DVD, including also the production of television programs and commercials not made in television studios (INE, 2007).

On the other hand, in Spain, there are two CNAEs related to audiovisual production: 5915 and 5916. The first includes cinematographic and video production companies, and the second relates to television show production.

1.1.2. Impact of COVID-19 on the audiovisual industry

According to the Oxford Business English Dictionary definition, *impact* is "the powerful effect that something has on someone or something" (Parkinson & Noble, 2021, p. 272). Impact, as perceived by its definition, can occur in different dimensions in a noticeable and significant way. In this case, it is intended to analyse the impact of a crisis, which, in different ways — economic, social, among others — usually reaches global proportions. The purpose of this study, however, is not to assess the impact of the pandemic crisis as a whole but rather what economic effect it had on a particular sector in a specific geography.

With the pandemic crisis came a series of measures that changed life as we knew it. Lockdown, social distancing measures, and mandatory mask-wearing were some of the measures adopted on a global scale to try to mitigate the segregation of the virus (Suppawittaya et al., 2020). The pandemic's

consequences were felt in almost all sectors of activity, including the audiovisual sector, which was affected for different reasons.

First, one should recall the primary resources in this sector: (i) public funding; (ii) revenues from advertising; (iii) consumers' subscriptions to paid services; (iv) cinema box-office revenues; and (v) physical and digital sales of audiovisual works (Blásquez et al. in 2020).

That said, it is easy to conceive that the pandemic greatly impacted the audiovisual industry. Television advertising revenues decreased since it does not correlate with audiences but with general economic welfare. Also, the cinema box-office revenues were affected by the closure of the cinemas and the restrictive measures of their reopening (Blásquez et al., 2020).

Another direct impact of the pandemic on the industry was the lockdown that was implemented on a practically global scale. Many productions at the time had to cease activity, and some projects planned to be launched during the lockdown had to be postponed. In addition, according to Blásquez et al. (2020), resuming some of these projects even a while later would trigger additional expenses that would not necessarily be compatible with the financing work plan. Among these are technical and production expenses but also marketing costs, which may not be covered by the revenues of a future at that time still uncertain.

This crisis has certainly triggered paradigm shifts in the industry. When audiovisual productions resumed, the various health and social distancing measures caused several changes, and new forms of production and transmission were to be implemented (Vieira & Costa, 2021).

For example, a study performed by Gaustad et al. (2021) showed that in Nordic productions, the number of shooting days increased by 7% and the production time increased by 21%. Also, at the level of content distribution, some changes were made. As Blásquez et al. (2020) state, distributors who owned the production rights opted for a direct release of films on VOD platforms, benefiting from a temporary slowdown in exploitation.

As already mentioned, audiovisual companies were impacted, among others, by health measures that imposed production stoppages and postponements. These factors and changes had repercussions on the different dimensions of the companies, whether economic, social, or even structural. That is why this study is about the economic and financial impact on these companies, which is accomplished by comparing the situation in a time interval that includes the outbreak of the pandemic.

1.2. Purpose of the study and research questions

The research aims to carry out a theoretical and state-of-the-art review of a company's economic and financial analysis, as well as of its main techniques. These techniques will be applied to the audiovisual content production industry in Portugal and Spain to assess the state and performance of its companies between 2016 and 2020. This timeframe includes the outbreak of the pandemic, an episode that confers the study's relevance.

Since the pandemic and the consequent economic crisis had global consequences, evaluating its economic and financial repercussions in the audiovisual sector will be the primary purpose of this thesis. However, although it goes beyond the scope of this study, one thought it would also be important

to approach theoretically another area that was also significantly impacted by the pandemic in a corporate context: the social sphere. Even so, the practical consummation of this approach would be impossible to develop in this dissertation, given the time and scope constraints.

Thus, the main goal of this research will focus on the economic and financial sphere and implies answering the following three questions, the first being the initial contextualising question for the research and the derived questions that follow.

Research Question - What was the audiovisual production sector's financial situation in both countries prior to the pandemic?

This initial question intends to gauge, in a broader sense, what was the sector's situation before the pandemic outbreak in 2020. That will be done through a generalised analysis of profitability, liquidity, leverage, and efficiency in the years before the pandemic — from 2016 to 2019. Some important indicators for each category will be used to assess the general situation of the sector: profitability — Return on Assets and Return on Equity; liquidity — Cash Position (CP) and Current Ratio; leverage — Total Debt Ratio; activity — Asset Turnover.

That will be the starting point for a more in-depth analysis of the companies in the audiovisual production sector in Portugal and Spain and the pandemic's impact on them. That is an analysis in which great complexity is recognised and which would be impossible to execute in all its pertinent aspects. This analysis will focus on two points, which will be dealt with in the two derived questions.

Derived Question 1 - Regarding financial issues, how did the pandemic impact the companies in the sector?

Derived question 1 intends to assess the economic impact, mainly at the level of profitability, liquidity, capital structure, and efficiency, that the pandemic crisis had on companies in the sector. In order to ascertain this impact, it is necessary to compare two periods in time, a pre-pandemic period and the most recent period from which data can be obtained, using indicators that will be useful in the financial evaluation. Since business performance is a multivariable phenomenon, these financial indicators must be interpreted collectively and in a related way, drawing conclusions that would be imperfect if they were studied isolated.

The indicators to be used can be grouped according to their purpose. The first set of indicators is related to the profitability or performance of companies, inferring the degree of efficiency with which resources are applied. Those to be used are Return on Assets, Financial Return on Assets, Return on Equity, Return on Invested Capital (ROIC), Operating Profit Margin, and Net Profit Margin.

The second set, liquidity, aims to assess the ability to meet short-term obligations through the indicators Working Capital (WC), Working Capital Requirements (WCR), Cash Position, Current Ratio, Quick Ratio (QR) and Cash Ratio.

The third set of indicators intends to assess longer time horizons, analysing the capital structure and debt composition options. The indicators to be used for this purpose are Total Debt Ratio, Debt Structure Ratio, and Debt-to-Equity.

At last, activity indicators — Asset Turnover, Accounts Receivable Period, Accounts Payable Period, and Cash Conversion Cycle (CCC) — will evaluate the degree of resource utilisation and the efficiency of its management.

Derived Question 2 - Was there an impact of the crisis on the going concern assessment of this sector's companies?

The second derived question aims to evaluate the verification of the going concern principle and bankruptcy risk in the companies of the sector after the pandemic emergence, compared to the pre-pandemic assessment of the assumption. The company's going concern will be evaluated based on corporate bankruptcy prediction models, multivariate methods that concentrate an aggregate set of indicators that allow a comparative analysis of the financial situation of companies. Three models will be used — Altman's Z'-Score model (2002), Carvalho das Neves and Silva's model (1998), and Lizarraga's model (1998) — which combined will assess the bankruptcy risk.

2. Literature Review

2.1. Performance definition and financial analysis

The Oxford Business English Dictionary defines *performance* as "how well something works" (Parkinson & Noble, 2021, p. 403). That said, from a financial perspective, the performance evaluation intends to assess how a company works financially.

As Brealey et al. (2020) claim, this assessment can be drawn from financial statements, such as the Balance Sheet, Income Statement, and Cash Flow Statement. However, the authors explain that it is not drawn directly from these accounting data but from its analysis with the help of indicators. The latter enable the summary of information, alerting senior management to potential problems (Brealey et al., 2020).

Performance indicators are then defined as a measure of how something works (Parkinson & Noble, 2021, p. 403). According to Brealey et al. (2020), these are a convenient way of summarising large quantities of financial data, predicting a company's performance, and helping management compare its results over the years and with other firms.

Performance indicators are very helpful for analysts to ask the right questions yet seldom answer them (Carvalho das Neves, 1989). According to Fabozzi (2012), these indicators can evaluate a company's performance on different levels, depending on the intended assessment. As stated by the author, there are five aspects of operating performance and financial condition that can be analysed to assess a company's performance: return on investment and profitability, liquidity, leverage, and activity.

The assessment of these different aspects of company performance can be done using univariate or ratio analysis (Beaver, 1966). The classification of the study as univariate derives from the fact that it analyses the state of a company through the analysis of a single independent variable (Peres, 2014).

According to the previously mentioned author, the variables are examined separately without attempting to identify an integrated relationship between two or more that would help understand the organisation's position. Beaver (1966), whose application involved examining ratios separately in order to categorise businesses as healthy or bankrupt, was the first author to illustrate the usefulness of this technique for the classification of firms.

Nevertheless, Hughes (1993) and Bellovary et al. (2007) claim that there are some limitations to this univariate analysis of corporate bankruptcy. For them, the main issue with univariate methods is that the actual combination of the effect of the various ratios used individually is based uniquely on the subjective judgment of the financial analyst.

Also, Carvalho das Neves (1998) states that one of the main assumptions of this approach is that it does not allow an integrated analysis of the indicators, which weakens the accuracy of the classification. The separate analysis of indicators should not serve as a basis for either decision-making or failure identification, as business performance is a multifaceted event and, as such, no single indicator by itself will be able to capture its effects fully (Rendas, 2021).

Due to its limitations, Altman (1968) claims that univariate analysis of financial indicators is no longer accurate enough to predict failure. Even so, this analysis still has high prominence for a company's management (Carvalho das Neves, 2014). It is critical to evaluate a firm's financial health and its strengths and weaknesses in the abovementioned measures, such as profitability, liquidity, leverage, and activity (Samonas, 2015). The author adds that the primary advantage of financial ratios is the possibility to compare them with ratios of the firm's industry, competitors, the economy in general, and even the company's past performances.

As the literature claims, some of the elements that influence a company's performance derive from already-known factors. Macroeconomic influence, the firm's industry, quality of management, operating factors and the firm's financial position are some of the most critical issues that can affect the functioning of a company (Samonas, 2015), as shown in Figure 1. That is why performance evaluation is crucial for corporate management: it provides information on how a company is being managed.

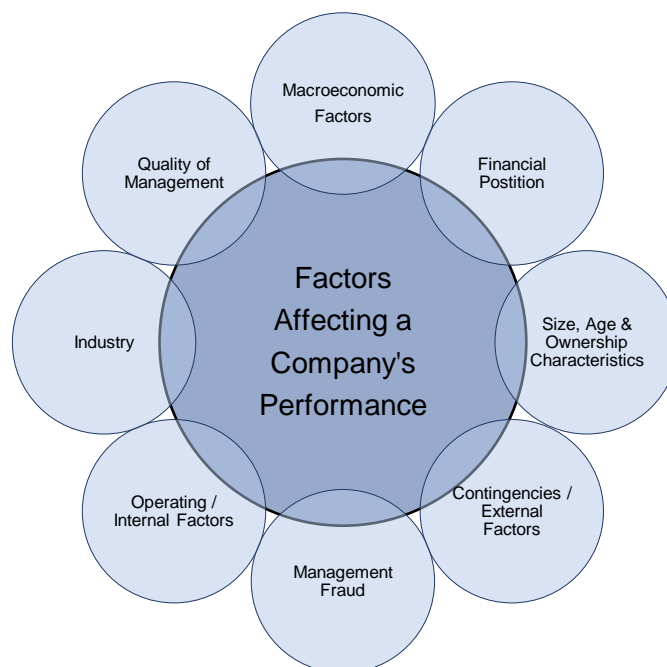


Figure 1 - Factors affecting the performance of a company, adapted from Samonas (2015)

Even though ratio analysis is widely used, users still point out some important limitations to keep in mind. According to Peres and Antão (2016), one of its limitations is that a single financial ratio is of little use. For the analysis to be trustworthy, a set of ratios should be selected based on the analyst's professional acumen.

On the other hand, Brealey et al. (2020) mention that ratios look mainly at the past and not the future. In addition, Samonas (2015) states that these ratios deal with numbers but fail to address qualitative aspects such as product quality or customer service, which are vital for a business. The author also claims that there may be earnings manipulation in financial ratio analysis, which means that financial information can be distorted to present more attractive results. For instance, some companies postpone payments to trade creditors at the end of the fiscal year to increase their cash balance above average, which will result in better performance of some ratios (Samonas, 2015).

2.1.1. Profitability

The study of corporate profitability aims to assess how efficiently the company's resources are applied to generate income (Chen & Shimerda, 1981). In other words, profitability ratios aim to measure the company's ability to earn profits, which is the main objective of every business (Heikal et al., 2014). According to Neves (2003), cited by Jorge (2010), a profitability ratio is an indicator that relates the net result, which can be a profit or loss, with sales or another capital amount. As claimed by Breia et al. (2014), these aim to assess the sustainability of the equilibrium in the long term. Several profitability ratios are elaborated from the information in the financial statements, such as the Balance Sheet and Income Statement (Brealey et al., 2020).

The following ratios will be addressed in this dissertation: Return on Assets (Equation 1); Financial Return on Assets (Equation 2); Return on Equity (Equation 3); Return on Invested Capital (Equation 4); Operating Profit Margin (Equation 5); and Net Profit Margin (Equation 6).

The Return on Assets can be interpreted as the income generated by each unit of total capital (Husna & Satria, 2019). This indicator measures the degree of efficiency with which a company's management uses its assets to generate earnings, regardless of its form of financing (Rakićević et al., 2016). That is, this ratio does not consider whether capital is financed by the firm's equity or borrowed capital (Brealey et al., 2020).

The outcome of the ratio is a good indicator of return if its value is high (Samonas, 2015). The author adds that it stands as a measure of comparison to other companies or industries' ratios of return and, as high the value of the ratio is, the greater the capacity of the company's assets to generate net income. The ratio, according to Brealey et al. (2020), Samonas (2015) and Fabozzi (2012), is as follows in Equation 1:

$$\text{Return on Assets} = \frac{\text{Net income}}{\text{Total assets}} \quad (1)$$

There are other ratios that evaluate a company's assets' profitability, such as the Operating Return on Assets and the Financial Return on Assets. Instead of measuring assets' return based on the net income, the Operating Return on Assets measures how effectively a business employs its assets in its daily operations (Fabozzi, 2012). On the other hand, the Financial Return on Assets measures the income available to debt and equity investors per currency of the firm's total assets. It considers financial expenses as the remuneration of liabilities and net income as the actual remuneration of equity (Breia et al., 2014).

$$\text{Financial Return on Assets} = \frac{\text{After tax interest payments} + \text{Net income}}{\text{Total assets}} \quad (2)$$

The ratio in Equation 2 is considerably important once it allows a better comparison between companies with different forms of financing (Brealey et al., 2020). According to Fabozzi (2012), companies with higher levels of debt benefit from a lower amount of taxes payable — a tax shield — since taxes are calculated from income after financial expenses. Therefore, taxes will be lower the higher the financial expenses. Subtracting the tax shield from financial expenses enables this ratio to remove

the capital structure choice from the analysis, making it possible to compare different firms at this level (Brealey et al., 2020).

As Fabozzi (2012) claims, from the investors' point of view, it is more beneficial to assess the return the firm can generate on their investment rather than the company's total debt and equity investment. In other words, investors prefer information on how efficiently a company utilises its equity. That is measured by Return on Equity, shown in Equation 3. Regarding Samonas' (2015) point of view, this ratio evaluates if the return on their investment — equity — outweighs the risk of holding capital in the company.

Moreover, Brealey et al. (2020) add that this ratio is a favourite among shareholders. ROE assesses whether the relation between net income and equity is acceptable by comparing it to capital market yields, considering the cost of financing. That said, it is clear that the higher the value of the ratio, the better.

$$\text{Return on Equity} = \frac{\text{Net income}}{\text{Total equity}} \quad (3)$$

The outcome of this ratio is affected by the financing policy of each company. For example, companies with similar net income and total assets can have two different values of ROE depending on their capital structure (Schubita & Alsawalhah, 2012).

According to Walsh (2006), at the individual business level, a strong ROE will maintain the financial framework for a thriving, expanding company. In terms of the total economy, a strong ROE influences industrial investment, GDP growth, employment, and the government's tax revenue (Walsh, 2006). As a result, it is essential to both individual businesses and the modern market economy.

Since total assets are also financed by cyclical liabilities, such as lenders and other operations' creditors, one should use the Return on Invested Capital ratio to assess the efficiency of allocating the invested capital to profitable investments (Brealey et al., 2020), as present in Equation 4. In contrast with ROA, it does not consider the total assets as capital invested. Thus, invested capital can be obtained by adding the equity value with long-term liabilities (Damodaran, 2007).

$$\text{Return on Invested Capital} = \frac{\text{Net operating profit after taxes (NOPAT)}}{\text{Long term liabilities} + \text{Total equity}} \quad (4)$$

Net operating profit after taxes (NOPAT) represents the value of the operating profit with taxes deducted. The reason why the tax shield is subtracted from debt interest is that it allows the calculation of the income the company would have earned being entirely financed by equity (Brealey et al., 2020). The authors add that tax advantages of debt financing are picked up afterwards when comparing this value with the company's Weighted Average Cost of Capital (WACC), which already includes an adjustment for interest tax benefits.

According to Samonas (2015), comparing this ratio's value with the WACC reveals whether invested capital is being used effectively. On the one hand, a value of the ROIC greater than WACC means that the company is adding value when investing in its operations. On the other hand, if WACC is greater than the ROIC, the company is destroying value as it invests more capital (Samonas, 2015).

Another important profitability ratio based not on the return but on margin is the Operating Profit

Margin in Equation 5. This ratio evaluates the profits earned on the company's operations (Samonas, 2015). It calculates the profit margin after all costs and expenses, except for interest and preferred stock dividends (Gitman et al., 2015). That is, it assesses how well management has run the business before considering financial policies (Fridson & Alvarez, 2011).

$$\text{Operating Profit Margin} = \frac{EBIT}{\text{Net sales}} \quad (5)$$

A higher value of the operating margin is desired since lower values, compared with similar firms, may mean higher operating costs.

According to Fabozzi (2012), the Operating Profit Margin is affected by several factors, such as: (i) changes in sales volume, which affect the cost of goods sold and sales; (ii) changes in sales price, which affect revenues; (iii) changes in the cost of production, which also impact cost of goods sold; and (iv) expenses from venues, leasings, bad debt or advertising.

Another useful margin is the Net Profit Margin (Equation 6), which measures the percentage of each sale's remaining euros after deducting all costs and expenses, including interest, taxes, and preferred stock dividends (Fabozzi, 2012). Therefore, one can say that it evaluates the effectiveness with which revenue is converted into profit through value-added management processes (Fabozzi, 2012).

$$\text{Net Profit Margin} = \frac{\text{Net income}}{\text{Net sales}} \quad (6)$$

In terms of results for this ratio, the higher its value, the better. A high-profit margin is preferred since lower values of Net Profit Margin may mean higher interest charges due to higher values of debt (Fabozzi, 2012). Nevertheless, according to Brealey et al. (2020), it is not accurate to assess a company's profitability based on its portion of debt. When a company is partly financed by debt, part of its revenues must be paid as interest which, solely based on this ratio, does not mean the company is less profitable than others financed by equity (Brealey et al., 2020).

2.1.2. Financial equilibrium and liquidity

A company's liquidity reflects a firm's ability to satisfy its short-term liabilities using assets that can be converted into cash the quickest (Saleem & Rehman, 2011). This analysis is essential for banks that grant short-term loans since they are more concerned with the borrower's ability to repay debt than with how the overall assets are covered (Carvalho das Neves, 2006). According to Fridson and Alvarez (2011), the greatest danger a lender faces is the risk that the borrower will face illiquidity issues, which are characterized by an inability to raise cash to pay short-term debts. Hence the use of liquidity indicators.

As Breia et al. (2014) claim, two companies with similar values of short-term assets do not necessarily possess similar compositions. One company may be composed of assets that may be converted into cash in a short period — liquid assets — and the other of customers and inventories. That said, a company with its short-term assets mainly composed of customers and inventories will bear a greater risk of illiquidity since, in case of customer default or shortage of sales, it would be impossible

to convert them into cash (Breia et al., 2014). On the other hand, a company that has a lot of liquid assets is less prone to liquidity problems (Fabozzi, 2012). The author also states that liquid assets are usually listed in financial statements as current assets since they represent the resources needed for daily operations of their company's long-term capital investments and are easily transformed into cash.

According to Brealey et al. (2020), there is another reason managers focus on liquid assets: their book values are usually reliable. On the other hand, inventory and fixed assets such as real estate are more challenging to assess. However, according to the authors mentioned above, more liquidity is not always a good factor once it may indicate careless use of capital. Efficient enterprises do not leave excess cash in their bank accounts, allow customers to postpone paying their bills or leave stocks piling up in the warehouse (Brealey et al., 2020).

There are some important liquidity measures that are going to be addressed next: Working Capital (Equation 7); Working Capital Requirements (Equation 8); Cash Position (Equation 9); Current Ratio (Equation 10); Quick Ratio (Equation 11); and Cash Ratio (Equation 12).

Working Capital, Equation 7, compares the coverage of short-term liabilities by short-term assets through the difference between the two (Gill et al., 2010). Moreover, Breia et al. (2014) assume that permanent capital should cover short-term items related to the exploration cycle which are not covered by the exploration itself once they have continuous renewal. It corresponds to the difference between current assets and current liabilities, where current assets include cash, marketable securities, inventories, and accounts receivables. There is full coverage when Working Capital exceeds zero, but that does not guarantee the fulfilment of future obligations (Breia et al., 2014).

$$\text{Working Capital} = \text{Current assets} - \text{Current liabilities} \quad (7)$$

On the other hand, Working Capital Requirements compares short-term assets with short-term liabilities, which are allocated to the operating cycle (Talonpoika et al., 2016). Thus, assets of cyclical nature are considered — customers, inventories, advances to suppliers, and state receivables — as well as cyclical liabilities — suppliers, advances from customers, and state payables (Breia et al., 2014). These authors claim that negative values of Working Capital Requirements, an indicator presented in Equation 8, indicate a self-sufficient operating cycle generating a surplus. On the contrary, positive values of this measure indicate that Working Capital is being pressured, as the operating cycle needs to be financed by other non-cyclical assets (Breia et al., 2014).

$$\text{Working Capital Requirements} = \text{Cyclical assets} - \text{Cyclical liabilities} \quad (8)$$

Another important measure of liquidity relates to the past two. Cash Position is the difference between the Working Capital and the Working Capital Requirements (Breia et al., 2014), as shown in Equation 9. That said, Cash Position is higher the lower the value of Working Capital Requirements. Cash Position is positive if the operating cycle generates sufficient surplus — Working Capital exceeds Working Capital Requirements. On the other hand, if Working Capital Requirements has a higher value than Working Capital, the exploration cycle is pressuring the Working Capital (Breia et al., 2014).

There might be cash flow problems, so evaluating their origin and possible causes is crucial. It might be a one-time cause that stems from planning issues, unforeseen events, or a recurring incidence.

According to Breia (2013), cited by Rendas (2021), one-off mistakes can be mitigated by changing forms of financing or negotiating loan terms. Contrarily, a recurrent problem requires a deeper assessment of its origin to mitigate it.

$$\text{Cash Position} = \text{Working capital} - \text{Working capital requirements} \quad (9)$$

The Current Ratio presented in Equation 10, compares, as the Working Capital, the current liabilities with current assets (Fridson & Alvarez, 2011). The authors state that this ratio can portray how many times the company would be able to pay its short-term liabilities by converting all its short-term assets to cash. Therefore, if CR is greater or equal to one, current assets can cover current liabilities, which means that the company can fulfil its short-term obligations. If CR is lower than one, the company cannot pay its short-term obligations even if it converts all of its current assets into cash (Fabozzi, 2012).

$$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} \quad (10)$$

Nevertheless, changes in the Current Ratio can be deceptive. For instance, if a company borrows a large amount of capital from a bank and invests it in marketable securities, the current liabilities rise, and so do the current assets (Brealey et al., 2020). While Working Capital remains unaffected, the CR changes. Another problem with this ratio is that it ignores the timing of receivables and payables (Samonas, 2015). According to the same author, if all bills are due this week and inventory is the only current asset which cannot be sold until the end of the month, the CR tells very little about the company's ability to survive.

The Current Ratio groups all current asset accounts together, assuming they are all easily converted into cash, which, as seen in the example before, does not happen every time. Therefore, even though it is important to evaluate the short-term financial balance globally, it is also crucial that it is done in detail, allowing the perception of the risks that may be latent to it (Fabozzi, 2012). Then, in addition to the Current Ratio, other ratios that distinguish the composition of short-term assets should be considered, such as Quick and Cash Ratios.

The difference between the Current and the Quick ratios is that the latter excludes inventory from the short-term assets account (Saleem & Rehman, 2011). In other words, the Quick Ratio, presented in Equation 11, indicates the extent to which a firm can pay its short-term obligations without resorting to the least liquid component of the current assets (Fabozzi, 2012). The author claims that this ratio gives a more conservative view of liquidity, evaluating a company's liquidity in certain unpredictable situations such as shortage of sales or obsolescence of the inventories.

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Marketable securities} + \text{Receivables}}{\text{Current liabilities}} \quad (11)$$

The higher the value of the ratio, the better (Saleem & Rehman, 2011). If QR is greater or equal to one, cash, marketable securities, and receivables accounts would be enough to cover short-term liabilities. Although better than the CR, Quick Ratio still disregards when payments and receipts are due (Samonas, 2015).

Finally, the Cash Ratio evaluates the risk of customer default (Equation 12). A Cash Ratio greater or equal to one means that cash and marketable securities are sufficient to pay the current liabilities. However, this ratio often displays values lower than the unit since most companies do not usually have large net amounts available (Brealey et al., 2020). That is why the Cash Ratio, according to Bunda and Desquilbet (2008), is also called the absolute liquidity ratio since it shows the number of times the firm would be able to pay its short-term obligations using its most liquid assets.

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Marketable securities}}{\text{Current liabilities}} \quad (12)$$

2.1.3. Leverage

As a complement to the liquidity ratios, leverage ratios help assess a company's medium and long-term obligations, like bank or bond loans (Samonas, 2015). These ratios allow an analysis of the company's capital structure, that is, whether the firm is financed by its own equity or borrowed capital (Samonas, 2015). That said, they can evaluate the business's vulnerability to risk and the degree of debt burden.

As Modigliani and Miller (1958) claim, cited by Antão and Bonfim (2008), there is no optimal capital structure that can valorise a company the most. There are some advantages and disadvantages to each form of financing, as shown in Table 1, and evaluating them is the best way to decide the capital structure.

Table 1 - Advantages and disadvantages of capital structure decisions

Debt financing	Advantages	Interest rates are fixed at the beginning of the loan, meaning that if a company's business volume increases, final profits will also increase	Brealey et al. (2020)
		Maintaining control over the company since there is no need to share decision power	Chua et al. (2011)
		A company can lower its tax rate if it has more financial expenses (tax shield)	Bradley et al. (1984); Brealey et al. (2020)
	Disadvantages	If the company's business volume decreases, the profits will be lower since the interest rates are fixed	Brealey et al. (2020)
A possible downgrade of the company's credit rating in the eyes of investors		Hundal et al. (2020)	
Risk of insolvency due to the lender's legal power to demand the company's assets or goods in case of default		Fabozzi (2012)	
Equity financing	Advantages	An attractive solution for financing operations when starting a business since investors tend to take a long-term and sustainable view, not demanding an immediate return	Fabozzi (2012)
		Investors usually have a lot of experience and contacts	Carpenter & Peterson (2002)
	Disadvantages	Investors demand a higher rate of return than a lender's interest rate (cost of borrowed capital)	Durand (1952)
		Share the company's control with other investors who may not have the same goals or visions as the founders	Chua et al. (2011)

According to Antão and Bonfim (2008), there is a financial trade-off between incurring debt or financing the business with equity: bankruptcy costs are lower with lower levels of debt, but there are tax advantages for high debtors. The analysis of this trade-off and, therefore, the optimal capital structure depends on factors such as profitability. According to DeAngelo and Masulis (1980), cited by Antão and Bonfim (2008), higher profitable firms face higher tax rates than less profitable ones. This situation leads more profitable firms to take on higher levels of debt to benefit from some fiscal benefits — the tax shield mentioned in section 2.1.1 (Bradley et al., 1984). That is why, as profitability increases and bankruptcy costs decrease, firms tend to accumulate higher debt levels (Antão & Bonfim, 2008).

According to Samonas (2015, p. 38), even though every category of financial performance analysis, including liquidity and profitability, provides information about financial viability, “solvency ratio analysis provides a measure of whether a company is using a successful debt strategy and will likely remain solvent in the long run”.

There are some important leverage indicators that are going to be addressed: Total Debt Ratio (Equation 13); Debt Structure Ratio (Equation 14); Debt-to-Equity Ratio (Equation 15); and Interest Coverage Ratio (Equation 16).

The Total Debt Ratio measures the proportion of assets financed with debt (Van der Wijst & Thurik, 1993). Therefore, it is calculated by dividing total liabilities by total assets, as shown in Equation 13, and its value means the proportion of total capital in the form of debt (Fabozzi, 2012).

If this ratio equals zero, the company is financed only by equity. On the other hand, if it reaches the unit, the company is financed solely by debt (Samonas, 2015). The ratio can even take negative values when debt exceeds total assets. That can happen under a technical bankruptcy situation, meaning equity is lower than zero (Beneish & Press, 1995). According to Leal (2013), cited by Rendas (2021), a higher value of this debt ratio reveals greater dependence on lenders because of the associated risks and lower bargaining power. Nonetheless, a low value is not ideal either, once it could mean a low tax shield utilisation.

Although it is not consensual, according to Fernandes et al. (2018), cited by Rendas (2021), this indicator should assume values lower than 0.70.

$$\text{Total Debt Ratio} = \frac{\text{Total liabilities}}{\text{Total assets}} \quad (13)$$

It can also be important to differentiate liabilities in terms of their distribution over time. According to Rist and Pizzica (2014), the Debt Structure Ratio does that (Equation 14). This ratio relates long-term debt with total liabilities, and the outcome of it indicates the proportion of liabilities that are in the form of long-term debt (Rist & Pizzica, 2014). Therefore, a low debt structure reveals a significant quantity of liabilities with short-term commitments to be satisfied in a year or less.

As stated by Rendas (2021), to determine whether a low debt structure is exerting negative pressure on cash flows, its value should be carefully examined concurrently with cash flow indicators. On the other hand, a high debt load indicates that a sizable portion of the liabilities must be paid off in the medium to long term.

$$\text{Debt Structure Ratio} = \frac{\text{Long term liabilities}}{\text{Total liabilities}} \quad (14)$$

Debt-to-Equity Ratio, shown in Equation 15, evaluates the relation between capital invested by the owners and the capital provided by lenders (Marlina & Danica, 2009). An organisation financing its operations and expansion primarily through creditors rather than earnings has high debt-to-equity values (Samonas, 2015). According to the same author, most lenders have credit guidelines for this ratio. As Samonas (2015) claims, a two-to-one proportion could be the highest sustainable value, but it depends on the firm's industry.

$$\text{Debt - to - Equity Ratio} = \frac{\text{Total liabilities}}{\text{Total equity}} \quad (15)$$

At last, there is another important measure to be mentioned. The Times-Interest-Earned Ratio or Interest Coverage Ratio illustrates a company's ability to cover interest payments with operating income (Samonas, 2015). According to Brealey et al. (2020), banks prefer to lend capital to businesses whose earnings cover interest costs. Then, interest coverage is measured by the ratio of Earnings Before Interest and Taxes (EBIT) to interest payments, as in Equation 16.

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest payments}} \quad (16)$$

Although it may differ depending on the industry, a figure greater than two is typically considered a favourable indicator (Samonas, 2015). The previously cited author states there are numerous variations of this ratio where, for instance, Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) might be used instead of EBIT. However, the ratio's concept does not change.

2.1.4. Activity

As Fabozzi (2012) claims, an analyst can compare the sales within a period with the assets that generated those revenues to assess the firm's productivity from a more general perspective. That can be done through activity or efficiency ratios. Thus, these ratios can evaluate the benefits produced by the totality of the firm's assets or by specific assets as well, such as the accounts receivables or inventory (Fabozzi, 2012). According to Rist and Pizzica (2014), activity ratios gauge a company's relative efficiency depending on how its assets, leverage, or other Balance Sheet items are used. There should be a balance between having few assets and too many: in the case of lower levels of inventory, there may be a risk of productive disruption and consequent loss of sales; on the other hand, having high levels of assets, especially inventory piling up in the warehouse, is a very inefficient use of cash (Rist & Pizzica, 2014).

The activity indicators that will be analysed can be divided into: turnover ratios and average periods. In the first group, there is the Asset Turnover ratio (Equation 17). The remaining ratios whose purpose is to measure average periods are the Accounts Receivable Period (Equation 18), Accounts Payable Period (Equation 19), Inventory Holding Period (Equation 20), and Cash Conversion Cycle (Equation 21).

The Asset Turnover ratio, or sales-to-assets ratio, according to Brealey et al. (2020), shows how many times the value of a firm's total assets is generated in revenues. In other words, it illustrates how much sales revenue is generated by each euro of total assets (Fabozzi, 2012) and its formula is presented below in Equation 17. Similar to several other financial ratios, this ratio contrasts a flow measure — net sales — of the entire year with a “snapshot” measure at a point in time — total assets (Brealey et al., 2020, p. 753).

$$\text{Asset Turnover} = \frac{\text{Net sales}}{\text{Total assets}} \quad (17)$$

If the value of the ratio is close to one, it means that the company assets turn over almost once during the year (Fabozzi, 2012). That is why Carvalho das Neves (1989) states that a high ratio value can mean a company is overutilizing its assets. On the other hand, a low value may mean that company assets are underperforming.

Another way to assess the efficiency of the credit operation is by calculating the average length of time for customers to pay their bills. According to Banco de Portugal (2021), this metric indicates the average number of days between a credit sale date and the date when the purchaser remits payment (Equation 18).

$$\text{Accounts Receivable Period} = \frac{\text{Customers}}{\text{Net sales} \times (1 + \text{VAT})} \times 365 \quad (18)$$

A lower collection period is generally preferred over a higher one. High levels of this ratio may mean collection problems with customers, which affect the company's liquidity (Jorge, 2010). However, low values of this ratio can also have a downside since it may mean that a company's credit policy is too strict (Rist & Pizzica, 2014).

The authors mentioned above believe that customers who do not find their creditor's terms very friendly might choose to search for alternative options with more flexible terms. According to Jorge (2010), if the Current and the Cash Ratios show values far from each other, there should be an assessment of this collection period ratio in order to instigate whether the cause of the company's reduced liquidity is the delay of customer receivables.

The Accounts Payable Period ratio gauges the quickness at which a business pays its debt (Jorge, 2010). The ratio relates the creditors' account with the cost of sales (Equation 19). A low value of this indicator may reveal a company's low bargaining power over its suppliers, while high values may signal cash flow issues (Breia et al., 2014).

For instance, companies sometimes use available cash for short-term investments or to increase their working capital, which is why their payable period increases (Rist & Pizzica, 2014). Even though that may be advantageous in terms of investment or liquidity, the relationship with suppliers can deteriorate if late payments are recurrent. It may reach the point where they renegotiate the terms to more disadvantageous ones or even cease to do business with the company (Breia et al., 2014; Rist & Pizzica, 2014).

$$\text{Accounts Payable Period} = \frac{\text{Suppliers}}{\text{Cost of sales} \times (1 + \text{VAT})} \times 365 \quad (19)$$

Another ratio can also be helpful depending on the company's industry: Inventory Holding Period (Equation 20). This ratio measures the number of days that inventory is kept in the warehouse and is calculated by relating the inventory level to the Cost of Goods Sold (COGS) (Samonas, 2015).

$$\text{Inventory Holding Period} = \frac{\text{Inventory}}{\text{COGS}} \times 365 \quad (20)$$

Finally, the Cash Conversion Cycle is calculated from the three previously reviewed ratios according to the following Equation 21:

$$\text{Cash Conversion Cycle} = \text{Inv. Holding Period} + \text{Acc. Receivable Period} - \text{Acc. Payable Period} \quad (21)$$

According to Banco de Portugal (2021), this statistic attempts to convey the length of a company's operational cycle, from the purchase and transformation of stocks to the sale of goods or services. Depending on the firm's activity, it varies, and since industrial enterprises also include the transformation period, one would anticipate a longer length for them than for commercial firms.

A high value of the CCC may be due to difficulties in collecting money from customers or selling products in inventory, resulting in difficulties in cash flow. On the contrary, low values of this ratio mean that suppliers are financing the company's operations. That can lead to supplier dissatisfaction, resulting in a deterioration of their relationship with the company (Jahani & Shabanzadeh, 2016).

2.2. Going concern

The coronavirus pandemic threatened the activities of several businesses mainly due to supply chain interruptions, changes in customer demand, and risks to workforce health (Ferreira et al., 2021). During the past two years, companies have been severely affected financially, some even declaring bankruptcy, creating an environment of uncertainty in the markets (Tashanova et al., 2020).

First of all, bankruptcy can be defined as the "inability of a company to continue its current operations specifically when: (i) the company's operating cash flow is insufficient to meet obligations already assumed; or (ii) the company is unable to obtain resources for the maintenance of its current operations" (Peres, 2014, p. 7).

There are two most common bankruptcy types: debt service default and technical default (Nunes, 2012, cited by Peres; Shi & Li, 2019). The debt service default occurs when income begins to be insufficient to cover expenses, resulting in negative net values. However, these results can be improved if management takes corrective compensation measures (Beneish & Press, 1995).

On the other hand, technical default is defined as the state following debt service default when, for lack of action by management, the negative results are recurrent (Beneish & Press, 1995). This accumulation of negative results leads the company to insolvency regarding the assumed responsibilities (Wilkins, 1997). According to IAPMEI (2013), cited by Peres (2014), this type of default is defined when a firm's liabilities exceed the value of its assets, that is, negative equity values.

After defining bankruptcy, it is important to frame it within the going concern concept. As Carvalho (2013) affirms, when bankruptcy occurs in a company subject to statutory audit, it is usual to check whether the possibility of this situation had been previously warned by the statutory auditor (ROC) in one of its audit reports.

According to the same author, there are even two types of errors associated with the auditor's assessment of the continuity of companies: the first error deals with the situation in which the auditor does not warn about the possibility of cessation of activity, but it does occur; the second portrays the situation in which the auditor warns about the possibility of bankruptcy and this, in turn, does not occur. The latter usually generates significant dissatisfaction among companies since it releases a false suspicion that can, in some cases, severely damage their reputation and activity (Carvalho, 2013).

There are certain situations in which bankruptcy is partly attributed to the negative opinion of the auditor — the self-fulfilling prophecy (Citron & Taffler, 2001). That is why assessing the going concern of an unhealthy company is a process that requires considerable care and consideration, and the auditor's opinion should be supported with all kinds of corroborating information (Vasconcelos, 2017).

The going concern underlying assumption is, therefore, the premise that the company will continue to operate normally in the foreseeable future and that there is no intention to cease activity or to reduce its operations significantly (Mutchler, 1985). That said, management must ascertain the entity's ability to continue operating to prepare its financial statements based on this assumption (Decree-law 158/2009, 2009).

There are some cases when financial statements should be prepared considering other assumptions, adequately corroborated, and the reason why the company is not in continuity. The existence of indicators that may call into question the going concern of a company or the management's own will to cease activity are examples of these situations (Carvalho, 2013).

As established in the Portuguese Accounting Standards (SNC) by Decree Law 158/2009 (2009), the going concern assessment of a company, which should be done when preparing the financial statements, should take into account all information about the future, considering the 12 months following the Balance Sheet date. In addition to evaluating future aspects such as the evolution of the global economy or expected profitability, this analysis should also consider the company's recent activity, its access to credit or its ability to generate profit (Carvalho, 2013).

Notwithstanding, if an event that questions the going concern assumption occurs between the Balance Sheet date and when the financial statements are authorised for issue, the entity should rectify the financial information and prepare it under another assumption (NCRF, 2009).

In crises, management, due to its corporate functions, is in an accessible position to commit fraud, manipulating accounting records through fraudulent financial statements (AICPA, 2002). The auditor is obligated to be alert to any evidence of fraud in the financial statements (Hogan et al., 2008). Therefore, the auditor is responsible for assessing the financial statements' reliability and the assumption on which they were prepared in an unbiased manner.

The auditor should collect sufficient audit evidence to support one's assessment that the company can continue to operate in the future or if there is any uncertainty associated with its future

activity (Carvalho, 2013). When assessing the inherent risk of default, the auditor should evaluate several factors that may give indications about the company's ability to continue operating, such as (i) experience and knowledge of management; (ii) atypical pressures on management; (iii) economy and financial conditions of competition; (iv) negative operating cash flows; (v) inability to obtain financing; and (vi) extension of payment terms (Carvalho, 2013).

Another tool that is quite useful in verifying the going concern assumption of a company is the “prospective information”, that is, any future financial information (Pereira, 2006, p. 57). One of these tools, as will be addressed later in section 2.2.1, is bankruptcy prediction models.

In conclusion, financial indicators such as those mentioned in section 2.1 — profitability, liquidity, leverage, and activity — along with bankruptcy prediction models, are not only a way to enhance the corrective action of management decision-makers but also a tool for the auditor to evaluate and support his judgment of the going concern assumption.

2.2.1. Bankruptcy prediction models

Even though used often, these models see themselves significantly developed whenever there is an economic crisis (Demyanyk & Hasan, 2010). Bankruptcy prediction models are mainly based on financial factors, but they are not the only element. According to Inácio (2010), cited by Carvalho (2013), two identical firms on financial terms can be in entirely disparate situations regarding bankruptcy. Factors such as management capability or maintaining credibility with third parties may be reasons for these distinct situations (Inácio, 2010, cited by Carvalho, 2013).

According to Bellovary et al. (2007), the literature on these models dates back to the 1930s. From that time until Altman's 1968 model, bankruptcy prediction models focused on univariate discriminant analysis, using single ratios to assess the company's healthiness. Then, univariate models lost some importance in predicting failure due to their limitations (Bellovary et al., 2007). These limitations paved the way for the introduction of multivariate models, which will be the object of this bankruptcy study.

The multivariate prediction models use a variety of variables to forecast possible outcomes (Harrell et al., 1996). The number and nature of the variables can vary from model to model, as well as the methods employed to develop them (Mensah, 1984). For instance, in the early stages of multivariate models, as stated by Bellovary et al. (2007), discriminant analysis was a prevalent method for model development.

The multivariate discriminant analysis (MDA) method for model development consists of three steps, according to Hughes (1993): (i) establish two mutually exclusive groups, in this case, failed and future operating companies; (ii) gather financial ratios for both groups; and (iii) identify from the collected ratios those that best set apart the two groups. The most challenging step would be defining the two exclusive groups since it stems from observing the specific characteristics of those groups (Peres, 2014).

According to Altman (1968), the method is a linear process of combining discriminant variables in the form represented below.

$$Z = \alpha + \beta_1x_1 + \beta_2x_2 + \beta_nx_n \quad (22)$$

In Equation 22, Z is a value transformed into a score used to classify the object. The α is a constant, β s are the discriminant coefficients or weights, and x s are the values of independent discriminant variables — financial ratios in this case (Altman, 1968).

With its introduction, some univariate analysis' limitations were tackled, mainly by integrating different variables in the same model (Vasconcelos, 2017). It was Altman (1968) who pioneered this method, introducing his bankruptcy prediction model in 1968 named Z-Score. However, even though it was an improvement from univariate models, technological advancements propelled the development of even more prominent ones, such as logit analysis (Bellovary et al., 2007).

The multivariate model development methods are considered classical statistical models and, according to the studies of Mensah (1984), Aziz and Dar (2004), Bellovary et al. (2007), Peres (2014) and Shi and Li (2019), the most used for predicting corporate bankruptcy.

2.2.1.1. Altman's Z-Score

It is not only a simple, user-friendly model, but it is also widely accepted as a valid model for assessing the financial difficulties of a company (Bellovary et al., 2007; Shi & Li, 2019). Z-Score is a model developed by Edward Altman in 1968 based on the premise that combining several ratios added greater accuracy in predicting corporate bankruptcy compared to the singular use of financial indicators.

When mentioning previously developed methodology, Altman (1968) pointed out that the emphasis of those univariate models was on individual signals of impending problems, which can be susceptible to faulty interpretations. There is a potential ambiguity in comparing companies' performance based on singular ratios because it may lead to inaccurate conclusions. As the example given by Altman (1968) himself, a low-profit firm with solvency issues can be seen as a potential default. Nevertheless, the situation may not be considered precarious due to its above-average liquidity.

That is why, according to Libby (1975), cited by Carvalho (2013), Altman developed a multivariate discriminant model based on a set of financial ratios selected as capable of predicting bankruptcy situations. This selection started with 22 potentially helpful financial measures from the Balance Sheet and Income Statements of 66 companies in the manufacturing industry, based on their popularity in the literature and their potential relevancy to the study (Carvalho das Neves, 2014).

Then, Altman (1968) selected five ratios from this list as the best combined-performing variables to predict bankruptcy. The author explains that they were chosen by: (i) observing statistical data from various alternative functions; (ii) assessing the correlation between relevant variables; (iii) observing the predictive accuracy of various combinations; and (iv) the analyst's opinion.

Thus, Altman (1968) obtained the following model based on five ratios with their respective weights (Equation 23):

$$Z = 0,012x_1 + 0,014x_2 + 0,033x_3 + 0,006x_4 + 0,999x_5 \quad (23)$$

Where,

$$\begin{aligned} Z &= \text{overall index} \\ x_1 &= \frac{\text{Working capital}}{\text{Total assets}} \\ x_2 &= \frac{\text{Retained earnings}}{\text{Total assets}} \\ x_3 &= \frac{\text{EBIT}}{\text{Total assets}} \\ x_4 &= \frac{\text{Market value of equity}}{\text{Book value of total liabilities}} \\ x_5 &= \frac{\text{Net sales}}{\text{Total assets}} \end{aligned}$$

According to Altman's paper of 1968, a score below 1.80 would mean that the company was bankrupt. On the other hand, a score higher than 3.00 meant that the company was stable and financially healthy. The author added that between 1.80 and 3.00 was considered a "grey area", representing results susceptible to misclassification.

Nonetheless, Altman has attempted to define a criterion inside this uncertain zone that distinguished between bankrupt and non-bankrupt companies (Peres, 2014). If a company has a Z-Score below 2.70, it has bankruptcy problems, and, on the contrary, it is healthy if the Z value is over 2.70. Still, because it is in the "grey zone," it is more prone to a faulty result and for the company to be misclassified (Altman, 1968).

One main problem with the 1968 model was that it was developed solely for publicly traded companies. That prompted discoveries, and more inclusive models were designed. In 1983, Altman came up with a revised model, including non-listed companies, substituting the market value for the book value of equity in x_4 (Altman et al., 2017). There was a new model estimation, reaching new weights and a new classification interval, and the indicators were maintained. For this purpose, a sample of unlisted manufacturing firms was used, culminating in the new Z'-Score model represented in Equation 24.

$$Z' = 0,717x_1 + 0,847x_2 + 3,107x_3 + 0,420x_4 + 0,998x_5 \quad (24)$$

With a Z' score below 1.23, the company will have a high probability of default, and, on the other hand, if the rating value Z' exceeds 2.90, the company will be considered healthy. However, if Z' value is between 1.23 and 2.90, then the firm does not have a defined classification — it is the "grey zone", undefined for this model (Peres, 2014).

In 2002, Altman would still propose another revised model for the Z-Score based on the fact that the Asset Turnover ratio attached to the variable x_5 prompted great sectorial sensitivity, which made the comparison between companies from different sectors inaccurate. This ratio tends to vary from industry to industry which stems from the different use of capital in each sector (Altman, 2002). Therefore, Altman introduced a model excluding the turnover ratio (x_5). This model also has the particularity of integrating a constant so that the value zero becomes the threshold of bankruptcy (Altman et al., 2017). Equation 25 displays the latest revised model.

$$Z'' = 3,25 + 6,56x_1 + 3,26x_2 + 6,72x_3 + 1,05x_4 \quad (25)$$

According to Altman (2002, p. 20), one of the main reasons for developing a credit scoring model in the first place was to “estimate the probability of default and loss with a certain level of risk”. That is why the author admits that linking these scores to the rating of some credit agencies, such as Moody’s or Standard & Poor’s (S&P), is helpful. In his study, Altman (2002) links the credit scores with ratings from the S&P, as can be observed in Table 2, establishing that ratings of D or below define bankrupt companies.

Table 2 - S&P ratings based on Z''-Score, adapted from Altman (2002) and Carvalho das Neves (2014)

Z-Score	Rating	Definition
8.20	AAA	Prime
7.60	AA+	High quality
7.30	AA	
7.00	AA-	
6.90	A+	Medium-to-high quality
6.70	A	
6.40	A-	
6.30	BBB+	Low-to-medium quality
5.90	BBB	
5.70	BBB-	
5.30	BB+	Speculative investment
5.00	BB	
4.80	BB-	
4.50	B+	Highly speculative investment
4.20	B	
3.80	B-	
3.20	CCC+	Substantial risks
2.50	CCC	Extremely speculative
1.80	CCC-	Low expectation of payment
0	D	In default

However, Peres and Antão (2016) point out some limitations to Altman’s model. One of the most significant shortcomings is the loss of effectiveness over time. For example, according to Peres (2014), the original Z-Score model had a predictive accuracy of 95% for firms in bankruptcy situations and 97% for healthy companies up to one year before potential bankruptcy. Nevertheless, the effectiveness of the model declines considerably in the following years. It decreased from 95% to 72%, 48%, 29% and 36%, respectively, for the companies in default situations in the second, third, fourth and fifth years.

Another two limitations of the Z-Score and other multivariate discriminant models, according to Carvalho das Neves (2014), are: (i) assuming that the variables used to classify the groups are normally distributed; and (ii) assuming that the variance and covariance, measures of dispersion, are equal for all groups.

2.2.1.2. Carvalho das Neves and Silva's model

Carvalho das Neves and Silva's model was very important in the Portuguese context of bankruptcy prediction models (Vasconcelos, 2017). Through data from 187 companies in 1994, of which 87 were in a bankrupt situation and 100 were in a stable situation, Carvalho das Neves and Silva (1998) developed a bankruptcy prediction model. According to Peres (2014), the authors mentioned above analysed 70 ratios from other authors' studies, like Beaver (1966) and Altman (1968), and combined them in order to separate defaulting companies from normal operating ones by applying the logit method. The proposed model was based on the discriminant Z-Score model's assumptions but with indicators more relevant to the Portuguese panorama (Reis Duarte, 2014). The result was the following model (Equation 26):

$$Z_2 = -0,950 + 2,518x_2 + 1,076x_6 + 5,566x_7 + 0,00254x_8 + 0,156x_9 \quad (26)$$

Where,

$$Z_2 = \text{overall index}$$

$$x_2 = \frac{\text{Retained earnings}}{\text{Total assets}}$$

$$x_6 = \frac{\text{Current assets}}{\text{Total assets}}$$

$$x_7 = \frac{\text{Cash Flow}}{\text{Total assets}}$$

$$x_8 = \frac{\text{State and other public entities [assets - liabilities]}}{\text{Net sales}} \times 365$$

$$x_9 = \frac{\text{Financing and bank loans}}{\text{Current assets}}$$

For this model, the developers defined the critical point at Z_2 as equal to 0.37. The companies with a value of Z_2 higher than 0.37 are classified as being in a normal situation and those below this value are classified as bankrupt (Vasconcelos, 2017). This model presents a classification efficiency rate of 66.3% for firms in distress and 85.9% for firms considered to be in financially healthy (Peres, 2014).

2.2.1.3. Lizarraga's 1998 model

Lizarraga's model was proposed in 1998 in an attempt to determine whether Altman's bankruptcy prediction model, as initially conceived, was the most appropriate for Spanish companies or whether it needed some corrections (Lizarraga, 1998).

To develop it, the author devoted himself to a group of firms, which he considered to represent the biggest problem in applying Altman's model. Based on this group of companies, Lizarraga developed the following improvements to Altman's 1968 model: (i) re-estimated the weights of the variables, using discriminant analysis and logit analysis in parallel; (ii) extended the applicability of this model to unlisted companies by adapting the variable x_4 ; and (iii) required that the minimum time between the date of the last statements used and the date of bankruptcy should not be less than nine months (Lizarraga, 1998).

This model, in addition to having been designed particularly for Spanish companies, also shows great effectiveness in predicting bankruptcy for Portuguese companies in some sectors — tourism, transportation, tertiary, and manufacturing sectors (Peres & Antão, 2018; Peres & Antão, 2019; Peres et al., 2022). Its equation is as follows in Equation 27:

$$Z_3 = -0,928 - 0,257x_1 + 1,222x_2 + 6,148x_3 + 0,471x_4 - 0,045x_5 \quad (27)$$

The variables in the model are the same as those presented above for the Altman 1983 model. As far as the results of this model are concerned, the bankruptcy frontier is for $Z_3 = 0$. In this case, firms with $Z_3 < 0$ are bankrupt, while those with $Z_3 > 0$ are healthy. In comparison with Altman's model, the results obtained for Spanish firms were superior, with an efficiency percentage of 84.17% in the first year (Lizarraga, 1998).

2.3. Financial disclosure

First and foremost, it is essential to acknowledge the extreme importance of financial information once its disclosure allows many kinds of financial decisions from investors, customers, or the own company's management (Carvalho, 2013).

According to the same author, that is why this information must be trustworthy: a business decision based on misleading information may have disastrous outcomes for the company and society. As Jonas and Blanchet (2000) claim, cited by Martínez-Ferrero et al. (2015), the financial reporting process is dependent on three factors that will influence its quality: (i) the inclusion of all company transactions; (ii) the information about the application of accounting principles; and (iii) the awareness of the decisions made.

According to the relevant authorities, such as the Financial Accounting Standards Board (FASB), the main required characteristics of financial information should be reliability, relevance, transparency, and clarity (Martínez-Ferrero et al., 2015). Financial information should, therefore, be prepared with the utmost attention and carefulness, faithfully describing the company's situation (Carvalho, 2013).

2.3.1. Accounting

Having established the importance of financial information, one can now deal with the definition of accounting and its branches. According to the Oxford Business English Dictionary authored by Parkinson and Noble (2021, p. 5), *accounting* can be defined as "the work of keeping and checking the financial records of a person, a company, or an organisation".

Despite its relatively clear definition, there is some discussion about its label as social science, art, or technique. As Mautz (1963) states, although its formalisation as a social science cannot be perceived as explicit, conclusive, and unanimous, the hints towards a scientific vision are doubtless.

Thirty-five years later, in 1998, Schmidt went further than that and labelled accounting as factual social science due to its concern for understanding how individuals in this area create, modify, and interpret accounting phenomena in which they inform their users. Another characteristic of accounting

is that it is influenced by its surroundings: politics, social, economic, and legal factors, as well as geographical disposition (Rodrigues et al., 2011).

It is important to frame Portugal and Spain in the current international accounting normative. Portugal follows the international directives of accounting and, as such, possesses a system that comprises a set of norms to which companies must comply.

While companies listed on a regulated market or which belong to the financial or insurance sector can follow the international accounting normative described in the International Accounting Standards Board (IASB), others must follow the Portuguese Accounting Standards (SNC), which has been in force since the 1st of January of 2010. The companies to which it is applicable are, according to the Decree-Law 158/2009 (2009):

- a) Companies covered by the Commercial Companies Code (CSC).
- b) Companies that are regulated by the Commercial Code.
- c) Individual establishments of limited responsibility.
- d) Public companies.
- e) Cooperatives.
- f) Complementary groups of companies and European groups of economic interest.

Companies' management executives are obliged to prepare and present the year's financial statements at the board meeting, a process named accountability (Guimarães, 2009). Only after the partners' and shareholders' approval of these statements is the company compelled to hand over a set of documents to competent authorities every year.

According to the 65th article of the Commercial Companies Code (CSC), this set of documents includes the management report and the annual financial statements. It can also be added, when applicable, the non-financial report of the company, the supervisory body's feedback if it exists, and the Legal Certification of Accounts if the company is compelled to it.

Nevertheless, the obligation to audit accounts is not mandatory for all enterprises. It depends on the type of company and its size. Along with all the listed companies, every public limited and private limited company that does not have a fiscal council and which, for two consecutive years, exceeds at least two of the following limits under article 262 of the Decree-Law 262/86, are obliged to have their accounts audited:

- Total assets: 1 500 000 €;
- Total net sales and other income: 3 000 000 €;
- Number of employees on average during the fiscal year: 50.

Spain also follows the European Union (EU) accounting normative referred to in the IASB. In 2007, the Royal Decree 1514/2007 approved the General Chart of Accounts (PGC), a broad adaptation of the regulations to the international standards known as International Financial Reporting Standards (IFRS). This PGC applies to every company that: (i) has issued securities in trading processes on regulated markets or multilateral trading systems in any member state of the EU; (ii) is part of a group of companies that prepares consolidated financial statements; and (iii) the currency of the primary environment in which the company operates is other than the Euro (TPC Group, 2021).

However, for small and medium-sized enterprises (SMEs), another PGC was designed to simplify criteria, reduce financial reporting costs, and facilitate understanding (Sousa et al., 2019).

On a 12-month basis, companies are required to file the annual accounts, which comprise the Balance Sheet, the Income Statement, the Statement of Changes in Equity, the Cash Flow Statement, and the notes to the financial statements (Royal Decree 1514/2007, 2007).

Ultimately, and as in Portugal, not every Spanish company is compelled to audit its accounts. In accordance with article 263 of the Capital Companies Law (LSC), every company is obliged to have their accounts audited except the ones that do not exceed at least two of the following limits for two consecutive years:

- Total assets: 2 850 000 €;
- Total net sales and other income: 5 700 000 €;
- Number of employees on average during the fiscal year: 50.

2.3.1.1. Accounting standardisation history in Portugal and Spain

It is important to frame the historical evolution of accounting in both Portugal and Spain. The evolution of accounting in the current context is characterised by an international standardisation and harmonisation phenomena (Saraiva et al., 2015). While accounting standardisation aims at the uniformity of accounting practices, harmonisation is more related to each country's social, economic, and cultural specificities (Lemos, 2006).

This phenomenon is easily understood when analysing, for example, European Union's economic strategy: a single economy, one stock exchange and one currency. This strategy's success depends on the existence of financial reporting based on the same accounting model (Pineiro et al., 2013).

Some milestones are important to highlight when referring to the historical evolution of accounting in Portugal. The first one, in 1963, was the creation of the Industrial Contribution Code (CCI), marking the starting point of accounting standardisation in Portugal. Apart from the fact that accounting began to serve as the foundation for estimating a company's actual profit, accounting professionals were also referenced for the first time (Saraiva et al., 2015).

After this first landmark, the Portuguese evolution of accounting normative can be divided into three different moments, according to Gomes and Pires (2010), cited by Pineiro et al. (2013). The first moment was between 1974 and 1988 when the Accounting Standards Commission (CNC) was established, as well as the first Professional Organisation Committee (POC/77). According to its first article, the POC established that it would apply to any company except for credit and insurance institutions (Decree-Law 47/77, 1977).

After undergoing several changes over the years, the POC was reformed in what can be considered the second moment of the evolution of accounting in Portugal (Gomes and Pires, 2010, cited by Pineiro et al., 2013). It is considered to last from 1989 to 2004 and is characterised by Portugal's accession to the European Union and its directives on accounting. This new POC, described in the Decree-Law 410/89, incorporates expected characteristics of financial information, accounting principles and measurement criteria, leaning towards standardisation (Alves & Antunes, 2010).

From 2005 to 2010, specific organisations were required to use the IASB standards set by the EU as of the fiscal year 2005. As a result, the Portuguese regulations were irreversibly adjusted to these norms, culminating in ratifying the System of National Accounts (SNC). That marked the third historical moment of accounting in Portugal, on the report of Gomes and Pires (2010).

In Spain, the first significant event in accounting standardisation history was the creation of the first PGC in 1973. It was a Spanish adaptation of 1957's French version and was highly influenced by tax legislation (Cubillo, 1973, cited by Cañibano & Uceda, 2006).

With Spain's entrance into the European Economic Community (EEU), there was a significant shift. Primarily, the Auditing Law, passed in 1988, regulated the practice of auditing individual and consolidated financial statements, which became mandatory for many Spanish companies for the first time (Law 19/1988, 1988). The Accounting Audit Institute (ICAC) was also established to produce statutory accounting standards to control the presentation of individual and consolidated financial accounts and regulate and monitor the auditing profession (Cañibano & Uceda, 2006).

Until Spain acceded to the EU, the subordination of financial reporting to tax legislation was a prominent characteristic. However, Law 19/1989 and subsequent measures established a clear distinction between accounting and tax rules (Law 19/1989, 1989).

The EU strategy towards harmonisation brought about Spain's second major reform in accounting regulations. The EU aspired to ratify accounting legislation by implementing IFRS in consolidated accounts for public companies. New accounting standards were released in 2004, first for the banking industry and then a new PGC in 2007, to adapt its content to IFRS principles (Mora, 2017).

In 2013, the EU issued Directive 2013/34 under the premise "Think Small First" (EU, 2013). The Auditing Law 22/2015 was then released, and although its primary purpose was to regulate the auditing profession, it included modifying the Spanish accounting legislation according to the EU's 2013 directive. This change turned out to be enormous for smaller entities, as the "Think Small First" approach would significantly affect the reduction of existing requirements for SMEs (Mora, 2017).

2.3.2. Financial statements

As conveyed above, financial information disclosure is crucial for companies and their stakeholders in decision-making situations (Welc, 2022). According to Martínez-Ferrero et al. (2015), this data set is also vital for counteracting information asymmetry — a common problem in the corporate panorama. Disclosure of financial information by companies is done through financial statements.

These financial disclosures convey the business activities and financial performance of a company. Government agencies and auditors often audit them to ensure not only reliability but also for fiscal and investment purposes (Zain et al., 2006). There are three primary financial statements: (i) the Balance Sheet, (ii) the Income Statement, and (iii) the Cash Flow Statement.

The Balance Sheet provides an overview of the company's financial condition at a specific time, generally at the end of the year (Brealey et al., 2020). This financial statement comprises assets, equity, and liabilities, helping the reader quickly understand the financial strengths and weaknesses of the business (Samonas, 2015).

However, as Fridson and Alvarez (2011) claim, the Balance Sheet format has two shortcomings. The first one is that the asset values shown in the Balance Sheet are frequently elusive in practice due to the difficulty of their measurement. The other limitation is that everything in a company has value. However, not every item can be assigned a specific value and recorded on a balance sheet category.

The Income Statement, in turn, covers a range of time, usually a year, and shows how profitable the firm has been (Brealey et al., 2020). In other words, it summarises a company's operating performance over time (Fabozzi, 2012). This financial statement starts with the value of revenues of the company, and the following accounts relate to the costs and expenses, which are subtracted from the initial revenue amount.

Therefore, the Income Statement's bottom line consists of the owners' earnings for the period, the result of the comparison between revenues and expenses (Fabozzi, 2012). According to Fridson and Alvarez (2011), after taking on some initial conclusions from the year's statement, the analyst must compare it with other companies' Income Statements or even with prior financial statements of the company itself.

Finally, complementing the other two, the Cash Flow Statement illustrates how efficiently a company generates cash to pay its obligations and finance its operations and investments (Fabozzi, 2012).

According to Samonas (2015), the importance of cash flows lies in the fact that a company's liabilities are satisfied with cash and not with profit, as discussed before. A company can be very profitable and still be unable to pay its obligations. That is why the Cash Flow Statement is an important analytical tool to determine whether a company can generate enough cash to meet its obligations (Higgins et al., 1995). The authors add that this statement provides important information about the quality of the earnings. The higher the correlation between income and cash flow, the higher the earnings quality. The FASB instructs that a Cash Flow Statement accompanies the other two financial statements (Fridson & Alvarez, 2011). FASB also requires cash flows to be classified as operating, investing, and financing so that these three types report the net cash provided or used (Fridson & Alvarez, 2011).

Thus, financial statements reflect the results of management's stewardship or, in other words, management's accountability for the resources under their control (Koen & Oberholster, 1999). The analysis and interpretation of these results is the last phase in the accounting cycle. This interpretation process links financial statements and decision-making (Koen & Oberholster, 1999).

However, the interpretation of the financial statements' information can differ depending on the objective of the individual or entity analysing it (Osadchy et al., 2018). There are different aspects to be evaluated with distinct degrees of importance for the different recipients of financial information.

According to Koen and Oberholster (1999), there are two categories of interested parties: internal and external users. On the one hand, internal users are usually employed by the firm and are responsible for managing the company or some company's departments (Luca, 2008).

Financial statements are not the only type of information these users have access to. However, it remains crucial for deficiencies spotting and the decision-making process in general — for example

improvement of operations and investment decisions (Higgins et al., 1995). Apart from analysts and managers, owners, regardless of the enterprises' form, are also part of this internal group.

External users, on the other hand, are every stakeholder who might be interested in the company and its financial statements (White et al., 2002). As Koen and Oberholster (1999) state, these users have limited access to financial information and, thus, analyse and make decisions based on the financial statements disclosed by the company. These external users could be investors, customers, suppliers, creditors, and regulators (Higgins et al., 1995). Potential investors can be, as well, users of financial information disclosed by companies to assess a company in terms of its inherent risk, return, and ability to pay dividends (Wiesel et al., 2008).

However, there is a problem related to the financial information disclosed to the public: the possibility that these documents have been subject to fraud. As Hogan et al. (2008) point out, there are three conditions that are usually inherent to the disclosure of fraudulent financial information. The first one is the existence of incentives or pressure to commit fraud. These can arise due to: (i) pressure to meet analyst forecasts; (ii) compensation clauses and incentives; (iii) the need for external financing; or (iv) poor performance (Dechow et al., 1996; Erickson et al., 2006).

The second one is the existence of conditions for fraud to be easily put in place. These conditions may have to do with the nature of the industry or the entity's operations, such as lack of process monitoring, ineffective management control, or the degree of complexity of the organisation's structure (Hogan et al., 2008).

Finally, the third one refers to the existence of some rationalisation for committing it. A study by Nelson et al. (2002), mentioned by Hogan et al. (2008), affirms that the degree of accounting standards' accuracy influences managers' attempts to adulterate earnings. If they are precise, managers' earnings management is often not vetoed by auditors, and fraud may occur. However, in the case of less precise standards, the likelihood of the auditor demanding changes in potential fraudulent situations is higher (Hogan et al., 2008).

Fraudulent situations in financial reporting by companies are a problem that the firms themselves and regulatory bodies attempt to deal with. If, on the one hand, the management body has the primary responsibility for fraud prevention and detection, auditors, as already mentioned, have a crucial role in combating corporate fraud (Carvalho, 2013).

2.4. Non-financial disclosure

In addition to the financial disclosure previously discussed, which has long been recognised as an essential element of the information reported to stakeholders — investors, business partners, customers, among others — there are other types of disclosure of relevant exposure. According to Filipe (2022), there has been, over the years, an increasing complexity of the business reality. The author points factors such as globalisation, technological progress, and the evolution of information platforms as the main drivers of this increased complexity. However, other causes have been shaping business priorities, such as political and social crises and the growing concern with environmental sustainability.

To respond to these new areas, companies have begun to take an interest in the subject of Corporate Social Responsibility (CSR).

This theme has been developed not only in the business world but also at the academic level so that it can be defined, and its areas studied. According to Carroll and Shabana (2010), CSR is deeply related to others with which it is interrelated, such as stakeholder management, sustainability, citizenship, and business ethics. Even though this concept was already discussed in 2010, as Lindgren and Swaen (2010) add, its conceptualisation was still at a primitive stage, and there were still some inconsistencies and shortcomings. According to the same authors, at that time, the only certainty was that CSR was important for organisations from the perspective of fulfilling their obligations to their stakeholders.

This section is intended to complete the analysis of the information disclosed by companies, which began with the financial information in the previous section. Non-financial information is considered fundamental to the set of information disclosed by the companies, being an accessory to financial information. However, this empirical analysis of the non-financial report will not have its practical consummation since it is not the object of this dissertation to assess the impact in corporate sustainability in the sector in question.

Thus, this section will begin with a more focused approach to concepts related to non-financial reporting, such as sustainable development and Triple Bottom Line (TBL). After this introductory analysis, it will proceed to a deeper analysis of the CSR concept, addressing theories underlying the disclosure of information on social responsibility by companies and the channels through which they do it.

2.4.1. Sustainable development

According to the Brundtland report, sustainable development can be considered as the process of change in which resource exploitation, technological progress, business, and institutional investment are in harmony to meet human needs and aspirations, not only in the present but also in the future (World Commission on Environment and Development, 1987). Despite this globally accepted definition, proponents of sustainable development differ in their emphasis on certain aspects: (i) the definition of sustainable; (ii) what is to be developed; (iii) how to relate development and the environment; and (iv) for how long (Parris & Kates, 2003). Therefore, that is a concept in constant development, with people in business and academics developing their theories and visions to eventually achieve a unanimous concept in the scientific community or a standard business practice.

In recent years, the number of companies that join activities related to social responsibility has been increasing, allocating more resources to this type of initiative (Latapí et al., 2019). That has happened because, in an increasingly global and competitive corporate world, innovations and paradigm shifts that put companies in a position of prominence regarding their competitors are imperative.

According to Leite et al. (2007), that is where sustainability comes in. Companies resort to sustainability reports, where their transparency and social responsibility are evidenced, to position

themselves positively in the market. Therefore, these are current standard practices because of their potential to improve a company's image among its stakeholders.

That said, it is possible to frame sustainable development from a perspective based on three pillars: an environmental, a social, and an economic component. In the interconnection of these three components, there is another pertinent concept based on sustainable development: the Triple Bottom Line (CCE, 2002).

The TBL approach was introduced in 1994 by John Elkington to address economic and social issues in a more integrated way so that progress could be made on the environmental level (Elkington, 2004). According to Norman and MacDonald (2004), the success or health of a company cannot be measured only by the traditional financial assessment but also by its ethical and environmental dimensions. The authors add that one of the advantages of this concept is that, as in financial management, models can be used to facilitate its assessment. These models can measure, evaluate, audit, and report data on its activity, which is crucial in managing the three bottom lines.

As Elkington (1998) affirms, for a company to be sustainable, it must assert itself positively in the three dimensions mentioned above. Moreover, to achieve this positive balance or win-win-win situation, as he described in 1994, companies must cooperate with their suppliers, customers, and other stakeholders, including the competition. That will bring benefits not only in terms of corporate citizenship but also by acquiring some competitive advantages.

Therefore, the Triple Bottom Line model serves as a basis for companies' non-financial reporting since these three dimensions are particularly important in CSR reporting.

2.4.2. Corporate Social Responsibility

According to Amaral (2010), CSR has been present in human life, even unconsciously, since very early, dating back to the fifteenth century. However, one of the first references to this theme only appeared in 1953 and was authored by Bowen (Amaral, 2010). As Carroll (1999) states, social responsibility consists of the obligations entrepreneurs must adopt — policies and measures — that meet the principles and objectives of the society in which the company is inserted.

According to the World Business Council for Sustainable Development (2000, p. 8), "Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large".

The company's relationship with its stakeholders is essential, along with social and environmental contributions, acknowledging that these should be voluntary (Marrewijk & Werre, 2003). However, this proactivity should not be considered an "optional add-on" to a company's core activities but an inherent characteristic of the company's management (ECC, 2002, p. 6). This panoramic management, which translates into better social and environmental performance, will concede the company its image and reputation, as Ballesteros et al. (2015) state.

With the emergence of the pandemic, some people thought it necessary to rethink the three-sided panorama of economic, social, and environmental aspects. As stated by Hakovirta and Denuwara (2020), cited by Filipe (2022), the pandemic raised doubts about the basis of the CSR model. The same

authors then suggest that the threefold model should be revised, proposing that it should consider another category: human health.

Finally, it is important to re-emphasise the role of globalisation and progress in raising awareness of this issue, also leading to changes in the process of disclosure of information by companies, mainly voluntarily. This non-financial reporting can have different motivations and be done in different ways, as it will be addressed below.

2.4.3. Motivation for CSR disclosure

Once the importance of sustainable development and social responsibility has been recognised from a corporate perspective, it is preponderant to disclose the corresponding information so that it may reach stakeholders and other interested parties. This information, which will be addressed later, is usually disclosed in the form of sustainability reports, occurs voluntarily and is an increasingly common practice in companies.

Some theories seek to explain companies' motivations for information disclosure, and they can be divided into two categories: economic and socio-political.

Economic theories are based on economic motivations, while the motivations of socio-political theories are linked to other aspects, such as the relationship between the parties involved. Some of the most mentioned theories in the literature are agency theory and signalling theory, as economic theories, and legitimacy theory and stakeholder theory, as socio-political theories (Melé, 2008).

While economic theories seek to explain the motivations for reporting based solely on economic factors, which may limit the scope of social and environmental disclosure, socio-political theories seek to provide a more comprehensive and systemic perspective. The latter argue that companies influence and are influenced by the community in which they operate (Carroll & Shabana, 2010).

Before individualising each category and defining them, it is important to emphasise that they cannot be asserted in isolation as drivers of information disclosure, being more advisable to combine the various theories to demystify the act of reporting.

2.4.3.1. Agency theory

This hypothesis defines a relationship between two parties: the principal who will delegate work to the agent, who will perform that work. According to Jensen and Meckling (1976), this theory intends to describe this relationship between parties using a contract metaphor. In this context, the two entities are integral parts of a company, with the principal hierarchically superior to the agent.

In the relationship between the principal and the agent, there may be two types of agency problems with which this theory struggles (Eisenhardt, 1989). According to the same author, the first concerns the conflict of visions and goals between the principal and the agent, which can be seen by the differences in risk preferences. This dichotomy leads to a preference for different courses of action, which can lead to friction.

The second problem is the difficulty and expense of monitoring the agent's work by the principal. In this situation, the principal cannot confirm that the agent has acted according to his preferences

(Eisenhardt, 1989). These two problems are the genesis of so-called agency conflicts, which can also be caused by the existence of different levels of information between the two parties (Shapiro, 2005).

According to Jensen and Meckling (1976), agency conflicts will give rise to costs that can be called agency costs. Among the most relevant agency costs are: (i) the losses to the principal when the agent does not act following its interests; (ii) the costs associated with the attempt of monitoring and controlling the agent and its work; and (iii) the cost of the principal's loss of welfare due to divergence with the agent (Jensen & Meckling, 1976).

The agency theory intends, therefore, to explain one of the reasons why managers voluntarily disclose information: knowing that the principal will seek to control its activity, the agent will see in the voluntary disclosure a proactive way to demonstrate that one acts according to the principal's preferences (Watson et al., 2002, cited by Filipe 2022).

2.4.3.2. Signalling theory

On the other hand, this theory assumes that information asymmetry exists between two parties: the company and its stakeholders. Initially designed to explain information asymmetries in the labour market, it was easily adapted to voluntary corporate disclosure, where CSR is included (Ross, 1977, cited by Omran and Ramdhony, 2015). It was termed signalling theory because, in practice, in the existence of unequal information, the company issues a signal (CSR information) to its stakeholders voluntarily. This action aims to signal to relevant stakeholders that the company is better than its competitors, reducing uncertainty before investors, attracting them, and improving its reputation (Connelly et al., 2011).

The implementation, monitoring, and reporting of environmental and social measures are the most influential contributors to a favourable reputation, as opposed to any reports of financial performance — for example, the generation of financial surpluses (Omran & Ramdhony, 2015). According to Mahoney (2012), this theory suggests that companies that choose to disclose CSR reports do so impartially and fairly. However, only those with good environmental and social performances choose to do so voluntarily.

As Milgrom (1981) states, cited by Mahoney (2012), when there is asymmetry or lack of information, stakeholders always tend to assume the worst. In this sense, companies that have engaged more in CSR will benefit from the disclosure of these reports, while companies that have not invested in CSR disclosure will not benefit as much.

Signalling theory suggests that stakeholders use different types of information, if it is present in their voluntary reports, to conclude about companies' actions (Mahoney, 2012). However, Gugerty (2009), cited by Mahoney (2012), adds that when faced with proactively disclosed CSR information, stakeholders cannot always distinguish companies as good or bad regarding social responsibility.

To conclude, voluntary disclosure of CSR information reduces the asymmetry of information between the company and its stakeholders, helping the company build a good reputation and increase its value.

2.4.3.3. Legitimacy theory

This theory, in turn, already fits into the sociopolitical theories and focuses mainly on the close relationship between the company and society. According to Tilling (2004), legitimacy theory considers that a company has rights guaranteed by society itself. However, for the company to be able to subsist and claim its rights, it must ensure that its activities meet the values and norms imposed by society. There is a kind of implicit social contract between the two parties in which society allows the company to enjoy its rights if it fulfils its duties (Tilling, 2004).

It is expected that if there is a divergence of this agreement between parties, that is, when the company acts in disagreement with the principles and norms imposed by society, the contract is said to be in breach. That can lead to a legitimacy gap and, consequently, affect the company's reputation (Barros, 2008). It is in the companies' interest to keep society satisfied with their action plan, maintaining the legitimacy of their activities.

Regarding the attempt to legitimise a company's activities before society, Lindblom (1993), cited by Rodrigues (2013), states that this can be divided into two types: proactive or reactive. While the proactive strategy consists of a voluntary action that aims to avoid a possible legitimacy gap, the reactive strategy is a response by the company to a confrontation by some member of the society, dissatisfaction, or non-compliance of the entity itself (Lindblom, 1993, cited by Rodrigues, 2013). According to O'Donovan's research (2002), it is easier to maintain the current legitimacy level than to recover or restore it after it has been questioned.

Legitimacy theory argues that the more likely society is to change its perception of the company, the more willing an organisation will be to manage these changes. Then, the company will attempt to alter social perceptions, expectations, or values currently in vogue (Dowling & Pfeffer, 1975; Lindblom, 1994, cited by O'Donovan, 2002). It is generally accepted that this attempt to change social perceptions by the entity, or even changes in its activity, is accompanied by disclosure (O'Donovan, 2002).

In this sense, companies disclose their CSR report to legitimise their activity, showing commitment to comply with the social agreement and keeping their reputation intact or improving it, which is quite important to them (Filipe, 2022).

2.4.3.4. Stakeholders' theory

Before presenting the stakeholder theory, it is imperative to define what stakeholders are. According to Freeman (1998, p. 174), stakeholders are "groups and individuals who are benefited or harmed by the actions of the company and whose rights are violated or respected by these same actions". Stakeholders are, in other words, all individuals who have some interest in the decisions of a company and are affected by them. Therefore, stakeholder theory deals with the relationship between a company and its stakeholders, highlighting the importance of social responsibility in this parameter (Freeman & McVea, 2001).

Each company has its stakeholder hierarchy, and not all share the same level of importance or decision power (Ullmann, 1985, cited by Barros, 2008). The author adds that social responsibility reports

are strategically used to manage a company's relations with its stakeholders and proposes a structure to analyse CSR based on stakeholders' power, strategic stance, and economic performance.

Regarding stakeholder power, the greater its importance or control over the company assets, the greater the effort an organisation should make to keep them pleased (Amaral, 2012; Ullmann, 1985, cited by Barros, 2008).

Strategic stance refers to how companies respond to external demands. There could be two types of positions in this matter, active and passive. The active posture implies constant tracking and managing the relationship with the most important stakeholders. On the contrary, a company that incorporates a passive stance does not put effort into monitoring or managing stakeholders' expectations.

The last one relates to the economic performance of a company. It is easily understood that in a period of poor economic performance, a company has more to deal with than investing in social and environmental-linked causes, decreasing then its social action (Amaral, 2012; Ullmann, 1985, cited by Barros, 2008).

Thus, the continuity of a company in the long term is heavily linked with stakeholder approval and satisfaction, which implies that their expectations are managed as well as their necessities. That is why communication between both parties is so critical to a successful relationship, and it is usually done by disclosing information (Rover et al., 2012, cited by Filipe, 2022).

2.4.4. CSR disclosure

As previously mentioned, companies have been progressively adopting CSR disclosure because of the opportunity it gives them to gain a competitive advantage.

Currently, although some legislation requires the disclosure of certain relevant non-financial aspects, the disclosure of CSR remains mostly a voluntary and proactive decision by companies. As a characteristic of a voluntary decision without any content obligation, the reporting of non-financial information is endowed with a high range of disclosed issues. It can only be assumed that it is part of the TBL in its social, environmental, and economic dimensions.

CSR reporting can be disclosed in a variety of ways. Initially, many companies included social and environmental information in a chapter of their annual reports. However, due to its impracticality and lack of cohesiveness, other forms emerged, such as independent reports (Monteiro et al., 2019). Thus, as it is usually done, companies can disclose CSR information through sustainability reports, integrated reports, or their website (Filipe, 2022).

The consequent demand for this type of reporting over time has required the creation of international models adopted by companies in their quest for transparency. Some international bodies, such as the EU, the United Nations (UN), and the Organisation for Economic Cooperation and Development (OECD), have been essential drivers of this type of endeavour, as well as other organisations and initiatives created with the specific purpose of contributing to this field, such as the Ethos Institute, the International Organisation for Standardisation (ISO), and the Global Reporting Initiative (GRI), for example.

It is also important to mention that organisations oriented towards accounting harmonisation, such as those dealt with in section 2.3, are influential in harmonising disclosure on CSR. Prominent among these are the FASB and the IASB. Some of these bodies' contributions and initiatives to the area will be discussed below.

The UN is an intergovernmental organisation created to promote international cooperation. In 2015, at the UN Summit for Sustainable Development, the 2030 Agenda was agreed upon. Also, seventeen goals for sustainable development (SDGs) were established to guide companies towards social and environmental responsibility (UN, 2015).

The ISO 26000 standard is a voluntary international standard that guides entities to act socially responsibly. This standard, which aims to complement other instruments and not replace them, proposes that companies comply with seven principles: (i) accountability and responsibility; (ii) transparency; (iii) ethical behaviour; (iv) respect for stakeholder interests; (v) respect for legal regulations; (vi) respect for international standards of behaviour; and (vii) respect for human rights (ISO, 2010).

Finally, the GRI is an initiative whose mission is to guide organisations towards accountability for the impacts of their activity and transparency, as well as developing a global and consistent language for reporting their activity (GRI, 2021). In 2016, the GRI Standards were released as the first sustainability reporting standards developed by the Global Sustainability Standards Board. These standards provide companies with guidelines that can be followed in: (i) defining the content of the report and its quality; (ii) contextualising the company in an attempt to develop a cohesive report and taking into account its strategy; and (iii) defining performance indicators that intend to measure and report the performance of the three dimensions.

According to Nikolaeva and Bicho (2011), the GRI is the primary reference for companies' voluntary disclosure of information to satisfy stakeholders and improve their reputation.

2.4.4.1. Sustainability report

As Monteiro et al. (2019) affirm, a sustainability report is a voluntary act of disclosure whose goal is to illustrate the economic, social, and environmental performance of an organisation, ideally including not only positive aspects but also negative ones. According to GRI (2021), the report aims to measure and present information on company performance towards sustainable development to stakeholders. As aforementioned, although these reports' field of pertinence is vast and still unsure, it is undoubtedly rooted in the concept of TBL.

The sustainability report is substantially different to the traditional financial report. While the latter is intended to report mandatory information to shareholders, investors or other interested stakeholders, the sustainability report aims to disclose voluntary information to various possible recipients (Domingos, 2010, cited by Filipe, 2022). Although it is considered the most used way of disclosing non-financial information, sustainability reports still have issues.

As Rodrigues (2013) mentions, one of the issues is their lack of transparency. Companies, in their search for recognition and reputation, sometimes are not as transparent as recommended in their

CSR reports. It is very challenging to select priorities regarding what content should be included in the report, even though it should comply with what is expected from the stakeholders (Rodrigues, 2013).

Another issue with these reports relates to how is a company's CSR performance measured and evaluated. It is still difficult to find an equilibrium between expectations and actual possibilities regarding a subject with fundamentally endless courses of action (Nielsen & Thomsem, 2007, cited by Rodrigues, 2013).

There is still one more issue worth mentioning: the disconnection between the information presented in the report and the company's business model or strategy. That makes it difficult for stakeholders to understand how sustainability can affect the value-creation process of an organisation (Eccles & Serafeim, 2015, cited by Monteiro et al., 2019).

Nevertheless, as mentioned above, there have been many developments in these reports' structure, content, and quality in the past few years, mainly because of GRI and its norms. According to Rohweder (2004), cited by Rodrigues (2013), the report has some guide steps intended to help companies prepare their reports. It must include the report's goal, schedule, resources, content, and a decision about distribution. Since the report is a vital communication tool, everything presented must be considered for clarity, necessity, correctness, reliability, and value (Rodrigues, 2013).

According to Monteiro et al. (2019), traditionally, companies published financial and CSR reports separately because the link between both was not perceived. Even if the CSR information were to be included in the financial report, it would be through a chapter with no regard for the company's strategy, management, and operations (Ernest & Young, 2014, cited by Monteiro et al., 2019). The report would then become too long and hard for stakeholders to understand.

To improve the disclosure of CSR information, another report has been developed with the same intent as the sustainability report. The integrated report aims to value both financial and non-financial information under previously defined parameters, linking investment decisions with strategy options and the company's conduct (Monteiro et al., 2019). That said, the integrated report appears as one viable alternative to the disclosure of CSR information to the stakeholders of a firm.

3. Methodology

As explained in section 1.2, the research questions aim to assess the impact of the COVID-19 pandemic on companies in the audiovisual production sector in Portugal and Spain. The initial question aims to assess the sector's financial situation before the pandemic, as the derived questions intend to measure: (i) the economic-financial effects of the pandemic and (ii) whether there have been changes in verifying the going concern assumption in the sector's companies.

Thus, the impact will be studied, in the first instance, at the level of profitability, liquidity, capital structure, and efficiency of the sector's firms and, in the second part, through the verification of the going concern assumption.

Therefore, data regarding companies in the Portuguese and Spanish audiovisual production sector will be used to achieve the proposed objectives and answer the research questions.

The Portuguese companies in this sector are included in CAE (Rev. 3) 5911 - Production of films, videos, and television programs. Spanish companies in the same sector are included in two CNAEs: CNAE 5915 - Motion picture and video production activities; CNAE 5916 - Television program production activities.

To obtain the average sectorial data, data from the sectors between 2016 and 2020 will be accessed through the Bank of Portugal and the Bank of Spain databases. On the other hand, to obtain individual data on companies, the SABI database of Bureau van Dijk will be used.

To achieve a feasible, thus representative sample, there will be the need to restrain the scope of the analysis during the study's period. That will occur in two phases: (i) applying the requirements for Legal Certification of Accounts to all companies in the audiovisual production sector in each country; and (ii) implementing a procedure that not only reduces the sample size but also eliminates outliers.

Next, with the set of companies already defined and using Microsoft Excel, one will determine the impact caused by the pandemic. One will calculate the selected ratios from the accounts present in the financial statements and implement the bankruptcy prediction models, which were all reviewed in sections 2.1 and 2.2. Since data comes from three different sources (SABI, BdP and BdE), there is a need to calculate each one of the ratios from the accounts obtained, according to the literature reviewed. To compare the values from the set of companies to the sectorial averages, one will calculate a sample average through the mean of each indicator.

These sample and sectorial ratios and models will generate results, which will be discussed. There will be particular emphasis on the analysis of the results registered, the evolution in time, the comparison between sample and sector and, evidently, the impact of the pandemic in 2020. From there, conclusions will be drawn in line with the research questions and the purpose of this dissertation.

3.1. Population and sample

As previously stated in the methodology section, four sets of data were analysed related to the audiovisuals production sector. However, to obtain the average sectorial data, there was the need to broaden the search scope and use more general data from the economic activity 59 gathered through BdP and BdE databases.

The four sets of data analysed were: (i) Portuguese companies from the CAE 5911 — PT's sample averages; (ii) Spanish companies from the CNAEs 5915 and 5916 — ESP's sample averages; (iii) Portuguese sectorial averages for the CAE 59 — Sector 59 PT; (iv) and Spanish sectorial averages for the CNAE 59 — Sector 59 ESP. For simplicity reasons, they will be referred to as entities.

These entities' data were objected to a two-phase restraining, as proposed initially. In the first phase, recurring to SABI database, a set of companies from Portugal's CAE 5911 and Spain's CNAEs 5915 and 5916 was selected. These had to comply with articles 262 and 263 of the CSC and CCL, respectively. This meant that the items Total Assets, Operating Revenue, and the number of employees had to register minimum values, in this case, for all the years in study.

Through this first procedure, there were 11 Portuguese companies and 36 Spanish companies. While the Spanish set of companies was representative enough, that did not happen with the Portuguese sample. There was the need to broaden the scope of the study for the Portuguese sample, forgoing the minimum values for every year under study. Therefore, the Portuguese companies had to comply instead with the minimum values established in article 262 of the CSC in at least one of the years under study. This way, the companies' set was composed of 27 of them, which made the sample more representative.

In the second phase, new restraints were applied to the same three accounts to eliminate possible future outliers. These three items were extracted for the set of companies obtained, and the mean and standard deviation of each were calculated. Then, lower and higher limits were estimated through the expression $\text{lim} = \bar{x} \pm 0,5 \times \delta$, as in normal distributions — \bar{x} being the mean and δ the standard deviation.

These minimum and maximum values for each item and set of companies were then introduced in the SABI database to restrict the set previously obtained. At first, these intervals were defined as mandatory for all the years of study. The problem was that the Portuguese sample became too small for a representative analysis. That was why, for the Portuguese sample, these intervals were defined, once again, for "at least one year" instead of all the years in study. This way, there were seven Portuguese companies left to analyse and 33 Spanish companies, making a total of 40 companies, which were the final set of companies to be analysed.

3.2. Statistical approach

To evaluate the companies in terms of the four aspects of operating performance and financial condition — profitability, liquidity, leverage, and activity — one will use all the financial indicators mentioned in the literature review in section 2.1, except for the Inventory Holding Period, as it will be explained afterwards. The ratios used are presented in the following Table 3 and will be calculated from the financial statements — Balance Sheet, Income Statement and Cash Flow Statement — of the sectorial averages and the companies in the samples.

Table 3 - Financial ratios

Profitability	Return on Assets (Eq. 1); Financial Return on Assets (Eq. 2); Return on Equity (Eq. 3); Return on Invested Capital (Eq. 4); Operating Profit Margin (Eq. 5); and Profit Margin (Eq. 6).
Liquidity	Working Capital (Eq. 7); Working Capital Requirements (Eq. 8); Cash Position (Eq. 9); Current Ratio (Eq. 10); Quick Ratio (Eq.11); and Cash Ratio (Eq. 12)
Leverage	Total Debt Ratio (Eq. 13); Debt Structure Ratio (Eq. 14); Debt-to-Equity Ratio (Eq. 15); and Interest Coverage Ratio (Eq. 16)
Activity	Asset Turnover (Eq. 17); Accounts Receivable Period (Eq. 18); Accounts Payable Period (Eq. 19); and Cash Conversion Cycle (Eq. 21)

To assess the verification of the going concern assumption in the firms included in both samples, one will use three bankruptcy prediction methods: (i) the Altman model (2002); (ii) the Carvalho das Neves and Silva model (1998); and (iii) Lizarraga's model (1998).

As referenced above, these models were developed from statistical methods, such as MDA and logit analysis. Despite not being the most recent, these statistical techniques continue to have a great preponderance in the study of corporate bankruptcy (Bellovary et al., 2007; Peres & Antão, 2019). According to Aziz and Dar (2004) and Peres and Antão (2019), between 1968 and 2012, statistical typology was the most used, and among these, 43% were based on multivariate discriminant analysis and 38% on logit analysis.

Despite that, apart from Altman's model, reckoned by many as the most important bankruptcy prediction model, these were chosen based on their applicability to the geography and sector under study: while Carvalho das Neves and Silva's model is a capital model for the Portuguese reality, Lizagarra's was conceived for Spanish companies, with excellent efficiency among Portuguese companies as well (Peres & Antão, 2018; Peres & Antão, 2019; Peres et al., 2021).

The three models will be confronted to assess whether a company is Bankrupt or Non-Bankrupt. A company, sector or sample will then be considered Bankrupt if: all three models present concordant results on the company's bankruptcy; two of the models present the result Bankrupt. Otherwise, firms, or sectors which, in at least two models, present the result Non-Bankrupt, will be considered healthy.

3.3. Variables

Table 4 shows the variables resulting from the application of the bankruptcy prediction models presented above. The variables x_1 , x_2 , x_3 and x_4 are common to Altman's model (1968) and Lizarraga's model (1998), the latter also including x_5 . The remaining variables — x_6 , x_7 , x_8 and x_9 — as well as x_2 , are used in Carvalho das Neves and Silva's model (1998).

Table 4 – Variables used in the study's bankruptcy prediction models

Variable	Formula
x_1	$\frac{\text{Working capital}}{\text{Total assets}}$
x_2	$\frac{\text{Retained earnings}}{\text{Total assets}}$
x_3	$\frac{\text{EBIT}}{\text{Total assets}}$
x_4	$\frac{\text{Book value of equity}}{\text{Book value of total liabilities}}$
x_5	$\frac{\text{Net sales}}{\text{Total assets}}$
x_6	$\frac{\text{Current assets}}{\text{Total assets}}$
x_7	$\frac{\text{Cash Flow}}{\text{Total assets}}$
x_8	$\frac{\text{State and other public entities}}{\text{Revenues}} \times 365$
x_9	$\frac{\text{Financing and bank loans}}{\text{Current assets}}$

4. Results presentation and discussion

The analysis of the results will proceed, dividing it according to the indicators' category – profitability, liquidity, leverage, and activity – and the bankruptcy's risk analysis. The ratios were chosen considering their popularity and wide use, as well as Altman's model. On the other hand, Carvalho das Neves' model was chosen because it is very important in the Portuguese bankruptcy reality, whereas the Lizarraga model adapts very well to the Iberian reality, particularly in Spain.

The interpretation of the results obtained will be carried out through four different procedures: (i) evaluation of the performance and comparison to some measures' reference values; (ii) analysis of the evolution over time; (iii) a comparative analysis of the companies with the sector, both in Portugal and Spain; and (iv) assessing the impact in 2020, comparing the before and after the outburst of the pandemic.

4.1. Financial indicators' results

4.1.1. Profitability

Starting with ROA, it can be said that, except for the last two years in Sector PT 59, the values of this indicator were positive. That means that in 2019 and 2020, the respective entity failed to generate positive results per unit of total capital, when in all other entities they did. By separately analysing each entity, one can notice that the sample of Spanish companies presented the best performance, with solid values equal to or above 8.04%, since the reference value for a good indicator lies at 5% (Nasdaq, 2021). The remaining entities presented lower values, with some approximations to this reference value by the Portuguese sample.

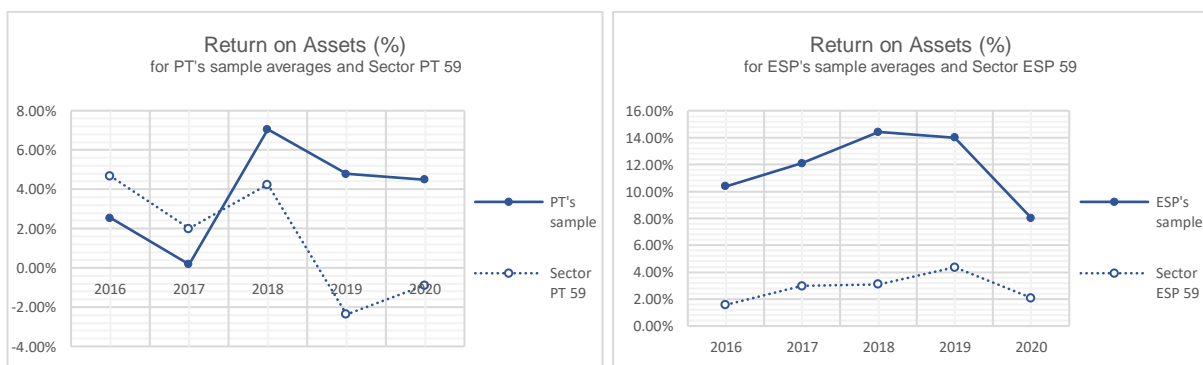


Figure 2 - Return on Assets for: Portuguese entities; Spanish entities

Regarding the evolution over time, as seen in Figure 2, both countries' sectors and samples behaved congruently, despite the difference in values. In the Spanish sample, there was an increase in the ROA from 2016 until 2018, followed by a decrease until 2020. That means the peak of this indicator in the interval under study was in 2018. The Spanish sector behaved similarly but increased from 2016 until 2019, dropping in 2020.

The Portuguese sample's performance of ROA started with a decrease from 2016 to 2017, reaching values close to zero. This decrease was mainly due to a considerable fall in the indicator of a specific company — SPI, S.A. — which registered high negative values for Net Income. In 2018, on the other hand, this company recovered substantially, which boosted the sample's average ROA to 7.05%. The next couple of years were marked by a descendant tendency. Sector PT 59 evolved equally, except that it registered an increase in the year 2020 after a decrease to negative values from 2018 to 2019.

From the analysis of the evolution in time of this indicator, it can be detained that the only entity that did not behave as expected in 2020 was Sector PT 59. While the other three entities — PT's sample averages, ESP's sample averages and Sector ESP 59 — suffered a drop in 2020, which would be expected with the pandemic, the Portuguese sector improved its ROA performance from 2019 to 2020. That happened because, from 2018 to 2019, the sector had already suffered a significant drop in this indicator's value, reaching negative values due to high operating costs. In 2020, despite registering drops in the revenue value, the operating costs decreased considerably, which is why the sector reported an increase in 2020 — although still registering negative values.

As reviewed in the literature above, it is valid, as well, to consider financial expenses as the income available to debt investors along with Net Income — as equity investors' remuneration. That is done with the ratio of Financial Return on Assets (Figure 3), which, in this case, presents itself quite like ROA in terms of values and evolution in all four entities. That means the financial expenses did not represent considerable values compared to the Net Income and Total Assets. The only entity that registered a difference in its behaviour was the Portuguese sector in 2020. While ROA reported a 1.49 pp increase that year, the Financial ROA only registered a 0.11 pp increase due to higher financial expenses with taxes deducted.

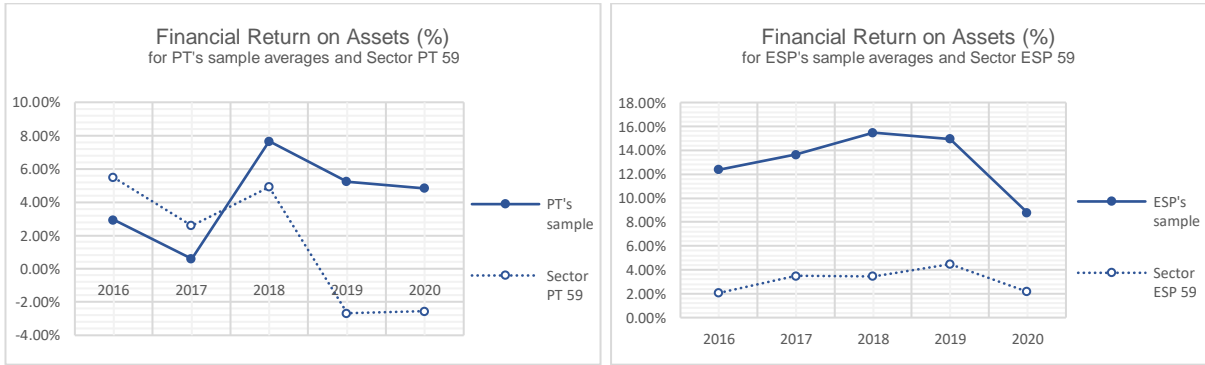


Figure 3 - Financial Return on Assets for: Portuguese entities; Spanish entities

Turning to the ROE, the sample of Spanish companies presented values considerably higher than the other three entities (Figure 4). These markedly higher values, specifically the two peaks in 2018 and 2020, were due to high ROE ratios in four companies — Antena 3 Noticias Sociedad Limitada., VEO Television SAU, Plano a Plano Productora Cine y Television SL and Telson Servicios Audiovisuales SL.

If these companies were to be removed from the study, the ROE would lie between 20 and 30% (Figure 5), which would still be higher than the remaining entities' ROEs. The other entities registered lower values, occasionally approaching the reference values — 15 to 20% (Forbes, 2021) — with the

Portuguese sample recording the highest values of the three. Sector PT 59 registered negative values for this ratio in 2019 and 2020 due to negative Net Income values.

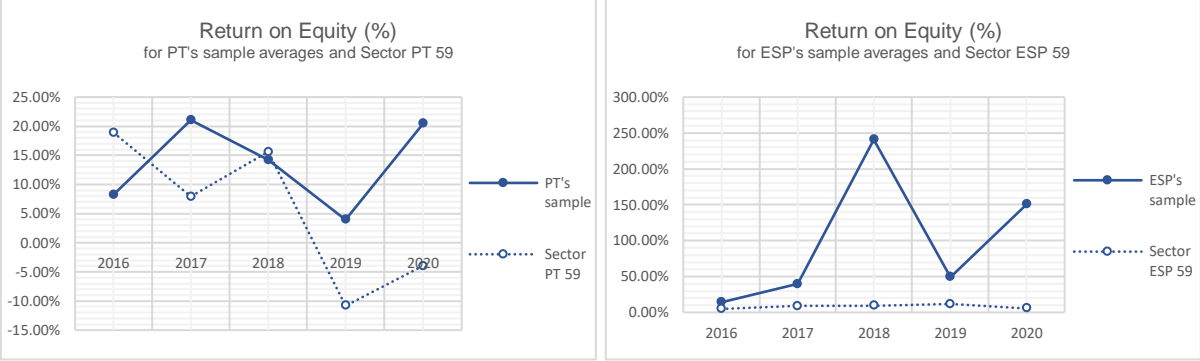


Figure 4 - Return on Equity for: Portuguese entities; Spanish entities

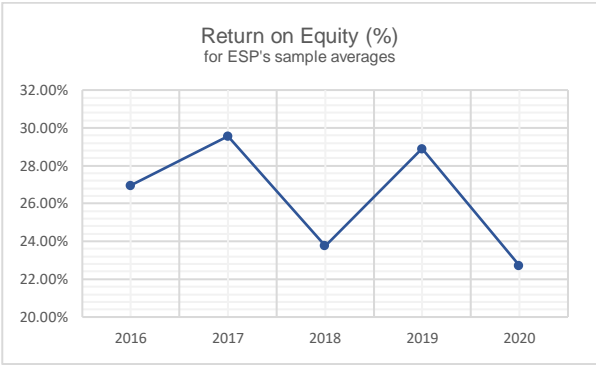


Figure 5 - Return on Equity (%) for ESP's sample without considering companies: Antena 3 Noticias Sociedad Limitada., VEO Television SAU, Plano a Plano Productora Cine y Television SL and Telson Servivios Audiovisuales SL

From the analysis of Figure 4, one can notice that the evolution of each sample compared to the respective sector was not as homogeneous as in the previous two ratios. While the Spanish sector presented a growing trend until 2019, decreasing only in 2020, the ESP's sample started by increasing substantially from 2016 to 2018, taking a significant drop in 2019. It is then followed by a recovery in 2020. This evolution in the Spanish sample would be different if the four companies mentioned above were removed from the study. In that case, there would be annual variations, with increases followed by decreases, both of lower magnitude.

The Portuguese sector did not present a trend as well, varying annually, while the respective sample started with growth from 2016 to 2017, then a downward trend until 2019, after which it went up in 2020.

Besides the Spanish sector, all the entities presented growth in 2020, despite the emergence of the pandemic. In the Portuguese sample, this was mainly due to the considerable recovery in the Net Income of the company SPI, S.A., as mentioned above. In Sector PT 59, it was due, as well, to an increase in the Net Income from 2019, although it remained negative. The Spanish samples registered a significant increase in 2020 because of the high performance of the four mentioned companies' ROEs.

In the case of their removal from the study, the Spanish sample would register a decrease in the year of the pandemic outbreak due to decreases in the revenue and, subsequently, Net Income.

The following ratio analyses the return not on a company's whole assets but on the company's capital through equity and debt. The Return on Invested Capital (Figure 6) behaved similarly to ROE. Besides the sample of Spanish companies, the values of this ratio were as high as 14.51% and as low as -2.55%. In the sample of Spanish companies, the analysis was unbalanced by some specific companies.

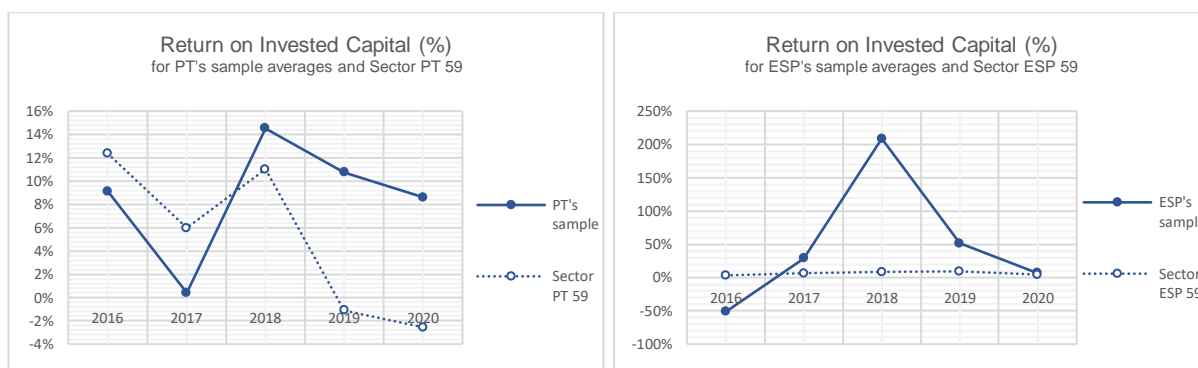


Figure 6 - Return on Invested Capital for: Portuguese entities; Spanish entities

That said, the four companies referred to in the previous ratio were removed to assess this indicator's more coherent evolution (Figure 7). As can be detained from the analysis of the figure below, there is still an unbalanced value for 2016 with -58.48%. That was due to a lower value of this ratio for another company — Factoria Plural SL. However, by removing this company from the study in addition to the other four, these ratios' values were balanced and lay between 20 and 40%, with a downward trend.

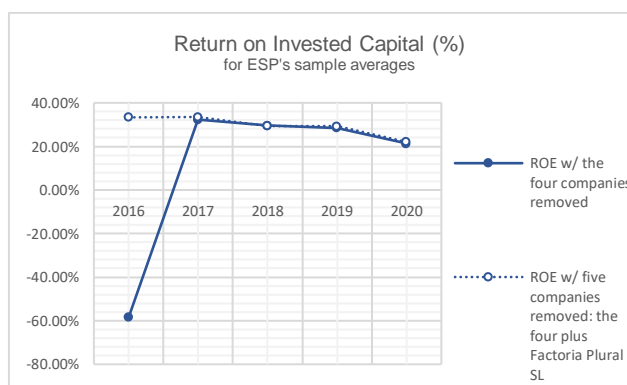


Figure 7 - Return on Invested Capital for ESP's sample without considering companies: Antena 3 Noticias Sociedad Limitada., VEO Television SAU, Plano a Plano Productora Cine y Television SL and Telson Servicios Audiovisuales SL (solid line); and plus, Factoria Plural SL (dashed line)

In terms of evolution, both the Portuguese sector and sample behaved congruently (Figure 6), with a decreasing trend in general, apart from the recovery in 2018. The Spanish sector had a growing trend, despite the decrease in 2020, which was not congruent to the sample's evolution, even if removing the five companies unbalancing the results. Without those companies this indicator would show a downward trend in the years under study, pointing to a more heterogeneous Sector ESP 59. In this

indicator, all the entities registered a drop in their value in 2020, even when removing the five companies mentioned above from the sample.

The following ratios present the effectiveness with which revenue is converted into profit: the first bears in mind operating costs; the second includes all the costs deducted from revenue until net income. Understandably, the Operating Profit registered higher values than the Net Profit Margin in all four entities, as seen in Figures 8 and 9 below. ESP's sample presented higher margins for both indicators, while the Portuguese sample registered the minimum value for the two ratios in 2017. However, this value was due to the low revenue value of one specific company — SPI, S.A. — which, after deducting operating expenses, made EBIT negative and, consequently, Net Income.

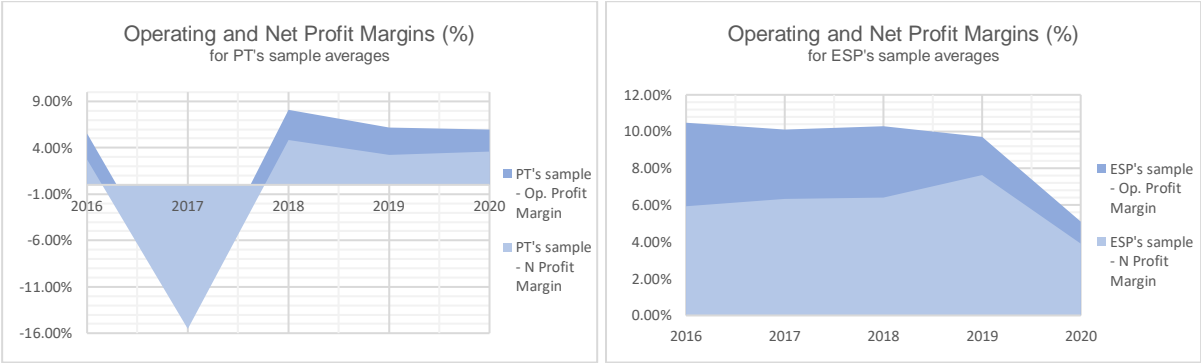


Figure 8 - Operating and Net Profit Margins for: Portuguese sample; Spanish sample

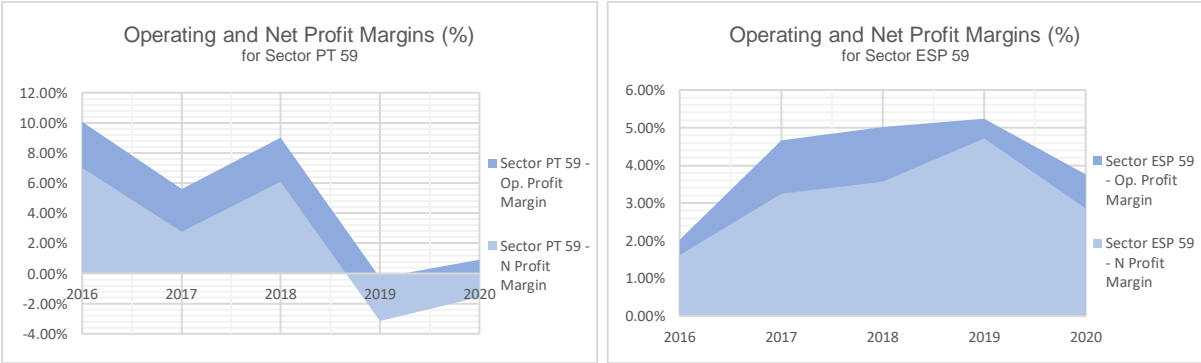


Figure 9 - Operating and Net Profit Margins for: Portuguese sector; Spanish sector

In terms of evolution, one can say that both ratios evolved similarly in the Spanish reality. They reported an increase — besides the Spanish sample's Operating Profit Margin, which was tendentially decreasing — from 2016 to 2019, followed by a transversal drop in 2020 for both entities' indicators.

In the case of the Portuguese reality, there was a considerable minimum value in 2017. However, if the company SPI, S.A. was to be removed, the variation would be lower, even though the evolution of the sample would be similar (Figure 10). Both sector and sample decreased in 2017, followed by an increase in 2018. Then, while in the PT's sample's Operating Profit Margin, there was a downward tendency until 2020, in the sample's Net Profit Margin and the sector's both ratios, there was a decrease in 2019 followed by a slight increase in 2020.

In 2020, from the analysis of both Figures 8 and 9, it can be noted that the Spanish entities registered a decline in these ratios' performance, especially the sample. Despite the decline in revenue

values this year, which also affected the EBIT and Net Income values, there were greater percentages of operating expenses, which prompted these indicators' decline.

The Portuguese sector, in its turn, registered a slight increase in 2020 because, even though the revenue took a considerable hit in 2020, the operating expenses were considerably lower than the ones reported in 2019. That said, revenue decreased from 2019 to 2020, while EBIT and Net Income increased. At last, the Portuguese sample registered slight non-congruent variations for both indicators, decreasing the Operating Profit Margin and increasing the Net Profit Margin. However, if removing the company SPI, S.A. from the sample, the sample would register a decline in both indicators' performance.

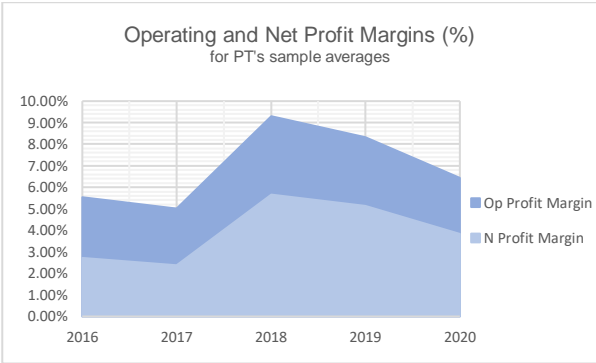


Figure 10 - Operating and Net Profit Margins for PT's sample without considering company SPI, S.A.

4.1.2. Liquidity

The Cash Position is one of the most critical liquidity measures. As reviewed in the literature, it relates the Working Capital and the Working Capital Requirements, and its value is intended to be positive. Table 5 shows the sign of the Cash Position and its components so that the origin of the eventual positive or negative results can be ascertained.

The only entity to present positive values during all the years under study was Sector PT 59, which happened even though the Working Capital was negative for the first three years and the Working Capital Requirements were negative from 2016 to 2020. On the other hand, for PT's sample, both WC and WCR were positive, resulting in a negative CP value from 2016 to 2018. Although the CP in the last two years under study was positive, the positive WCR was pressuring the WC, which brought about this negative trend.

Also, the WC and WCR were positive for all years under study in the Spanish sample and sector. That, however, does not mean that the CP was always negative — it was positive in the last two years in the sample and the first two years in the sector — but it does mean that the Working Capital was being pressured by the exploration cycle.

From the analysis of the table below, the tendency in the audiovisuals production sector and sample in both countries was to have positive values for both WC and WCR — 75.00% of the total scenarios. From this scenario — $WC > 0$ and $WCR > 0$ — 66.67% resulted in negative values of CP.

Table 5 - Sign of Working Capital, Working Capital Requirements and Cash Position

Year	Sample						Sector					
	PT's 5911			ESP's 5915/5916			PT's 59			ESP's 59		
	WC	WCR	CP	WC	WCR	CP	WC	WCR	CP	WC	WCR	CP
2016	+	+	-	+	+	-	-	-	+	+	+	+
2017	+	+	-	+	+	-	-	-	+	+	+	+
2018	+	+	-	+	+	-	-	-	+	+	+	-
2019	+	+	+	+	+	-	+	-	+	+	+	-
2020	+	+	+	+	+	+	+	-	+	+	+	-

Analysing Table 6, one can ascertain that even though the Cash Position for the sample averages was negative, that does not mean that most companies in the sample presented negative values of CP. In the Portuguese sample, for example, there were more companies with positive values for the Cash Position in all years but the first, which would not be evident by analysing solely the table above. As for the Spanish sample, only in 2020 did most companies register positive CP values, which is in line with the sign of the sample averages.

Table 6 - Percentage (%) of companies in each sample to register positive Cash Position values

Year	Sample	
	PT 5911	ESP 5915/5916
2016	42,86%	45,45%
2017	57,14%	33,33%
2018	57,14%	39,39%
2019	57,14%	45,45%
2020	71,43%	54,55%

From the observation of Figure 11, it can be concluded that there was no evolutionary trend, nor were the sectors and samples much congruent, which suggests a more significant dissimilarity among the companies of each sector during this period. While the Portuguese sample significantly increased from 2016 to 2020, the respective sector registered relatively constant values.

As for the Spanish sample, it started with a decrease until 2018, followed by an increase until 2020. On the other hand, the Spanish sector presented itself with a downward tendency over all the years under study. In 2020, the year of the pandemic, only the Spanish sector registered a decrease in the values of Cash Position.

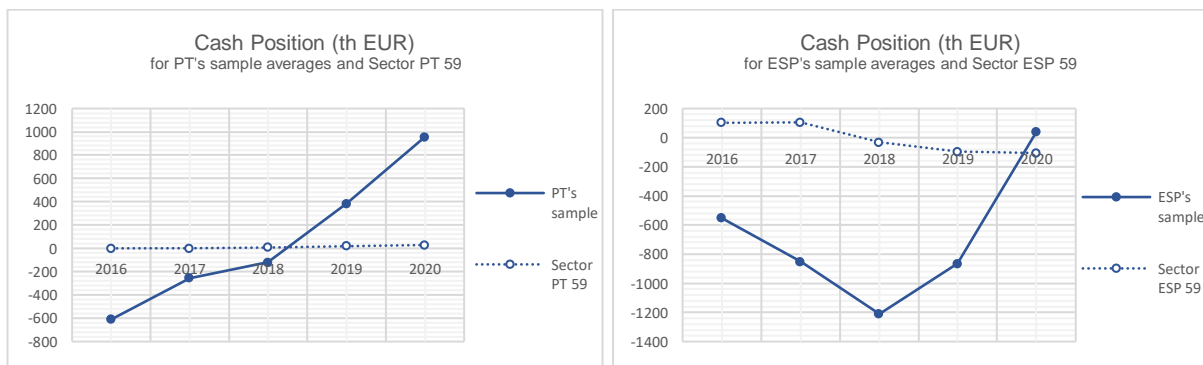


Figure 11 - Cash Position for: Portuguese entities; Spanish entities

The following three indicators to be analysed — Current, Quick and Cash Ratios — relate to assets that can be liquidated relatively easily with current liabilities. These three indicators' evolutions are displayed for each entity in Figures 12 and 13.

By analysing the four plots below, one can state that the CR was globally higher than the unit — except for the first three years in Sector PT 59 — which means that current assets could cover short-term liabilities. However, according to the Bank of America (2021), the reference value for this indicator is around 1.20. That means that the Portuguese sector (Figure 13) did not comply with the reference for all the years under study. Quick Ratio also presented values higher than the unit for the samples, which means that Cash, Marketable Securities, and Receivables could also cover short-term liabilities for these two entities.

From the analysis of Figure 12, one can state that the gap between CR and QR is slight, highlighting the companies' low inventory level in the sample. On the other hand, Figure 13 portray that the same does not happen for the sectors. Both sectors registered higher gaps between CR and QR, illustrating higher inventory levels. As already explained, the economic activity 59 in both Portugal and Spain includes companies not only from the audiovisual production section but from other related activities — post-production, distribution, screening. Therefore, these higher values of inventories for the sector may reflect activities other than production.

The four figures below also portray high levels of receivables for all entities since there is a higher gap between QR and Cash Ratio.

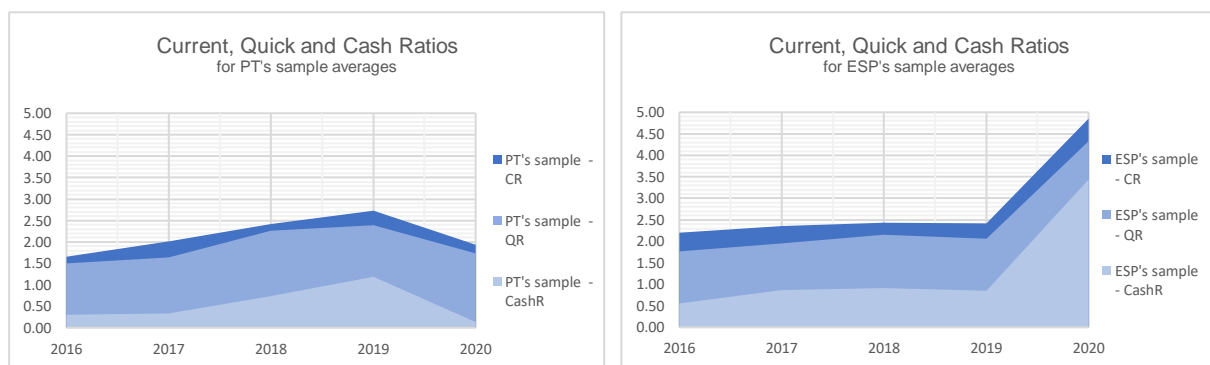


Figure 12 - Current, Quick and Cash Ratios for: Portuguese sample; Spanish sample

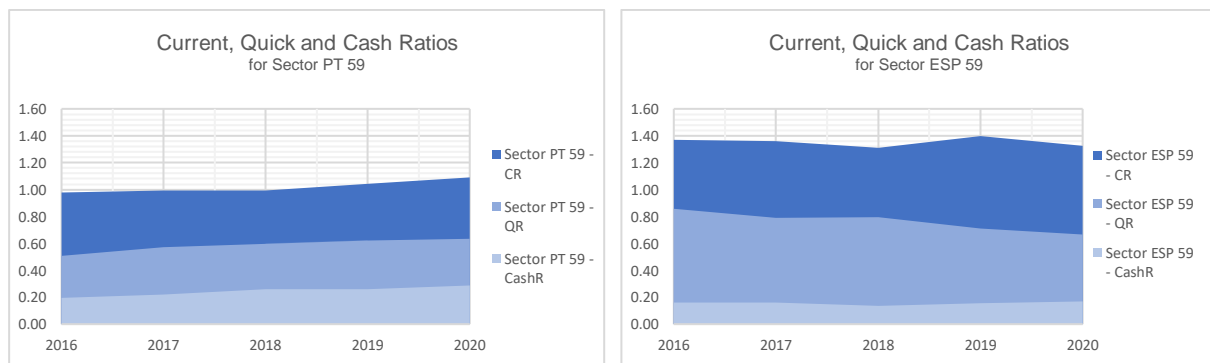


Figure 13 - Current, Quick and Cash Ratios for: Portuguese sector; Spanish sector

In terms of evolution, the Portuguese sector presented a slight evolutionary trend in all three indicators. On the other hand, the Spanish sector presented practically constant values for CR and Cash Ratio, while QR presented a slightly declining trend. The evolution of QR highlights that the value of receivables decreased over the study's timeframe.

In turn, the Portuguese sample presented an increasing trend until 2019, followed by a decrease in 2020. This evolutionary tendency was mainly influenced by the performance of two companies, whose increasing values influenced the sample. These two companies were Endemol Portugal, Unipessoal, LDA and Warner Bros, International Television Production España, S.L. - Sucursal in Portugal.

The Spanish sample also showed a slight upward trend until 2018, registering, in 2020, a considerable increase. However, this considerable increase was not transversal to all the companies in the sample but rather to two of the total 33 studied: Producciones Mandarinina S.L. and Contubernio SL.

Without these two companies in the sample, the evolution of these indicators for the Spanish sample would be an increasing trend until 2018, followed by a decrease in 2019 and 2020, all with slight variations, as portrayed in Figure 14.

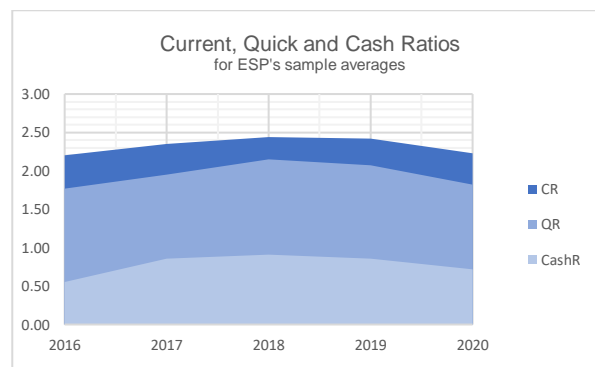


Figure 14 - Current, Quick and Cash Ratios for ESP's sample without considering companies: Producciones Mandarinina S.L. and Contubernio SL

From this evolutive analysis, one can ascertain that there is no parallel between each sector and its respective sample, which can point out the heterogeneity of the companies in the sector.

In 2020, there was a decrease in the Portuguese sample and the Spanish sector, the latter being slight. The Spanish sample showed a significant increase that year due to the two outperforming companies mentioned above. If those two companies were to be left out of the study, there would be, in turn, a decrease in the value of this indicator in 2020. The Portuguese sector registered a slight increase that year.

4.1.3. Leverage

The Total Debt Ratio measures the percentage of total assets financed by debt. According to Fernandes et al. (2018), this ratio should assume values lower than 0.70 for the company to be healthy and attractive to outside investors. From the analysis of the Figure 15, apart from the Portuguese sector, all three other entities registered values below the reference value. It is also important to investigate,

from each sample, the percentage of companies that presented values of Total Debt Ratio greater than 0.70, and thus, be considered less healthy at the sight of possible investors.

These percentages are registered in Table 7 below. Apart from PT's sample averages in 2017, most companies registered values lower than 0.70 for the Total Debt Ratio, which is considered a good indicator.

Table 7 - Percentage (%) of companies with values of Total Debt Ratio > 0.70

Year	PT's sample	ESP's sample
2016	14,29%	30,30%
2017	57,14%	30,30%
2018	14,29%	27,27%
2019	14,29%	24,24%
2020	14,29%	24,24%

From the analysis of the evolution of this indicator (Figure 15), one can ascertain that the values for this ratio were relatively constant in the sectors, with a decreasing trend in the Spanish one. On the other hand, the Portuguese sample was the entity that presented more variations, recording an increase from 2016 to 2017 and a decrease in 2018, followed by an increase until 2020. Also, the samples and respective sectors presented homogeneous behaviour, apart from the difference in values.

Also, there were no signs of a drastic change in the capital structure in 2020, except for the Portuguese sample. However, through the individual analysis of the companies that make up the samples, one can see that only one company had a considerable variation in this ratio from 2019 to 2020 — Endemol Portugal, Unipessoal, LDA. In 2020, this company recorded liability levels almost eight times higher than last year, contributing to this indicator's value increase. As for the Spanish sample, no company showed significant changes in its capital structure from 2019 to 2020.

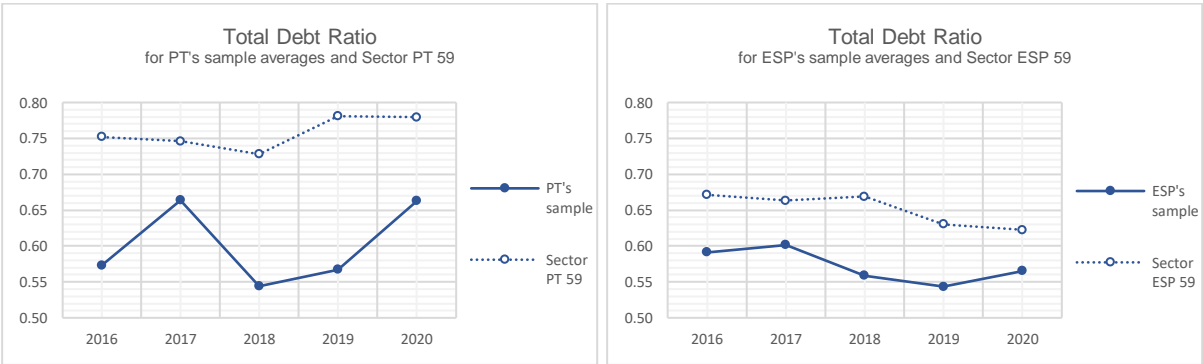


Figure 15 - Total Debt Ratio for: Portuguese entities; Spanish entities

The Debt Structure Ratio presents the choice of debt the companies take, that is, the option for current or long-term debt. In the four entities, there was more current debt than non-current since every entity recorded values below 0.50. These lower values of this ratio give more prominence to the liquidity analysis once it is essential to ensure that the company's liquidity safeguards the current debt — the majority in this case.

From the analysis of Table 8 below, one can notice that few companies possessed overall values of long-term debt higher than current for each country's sample, corroborating the prominence of short-term debt in the sector.

Table 8 - Percentage (%) of companies with higher levels of long-term debt rather than current

Year	PT's sample	ESP's sample
2016	0,00%	12,12%
2017	14,29%	6,06%
2018	14,29%	6,06%
2019	14,29%	9,09%
2020	14,29%	15,15%

Both the Portuguese sample and sector registered an upward trend, particularly the sample, with the highest growth between 2016 and 2018 (Figure 16). That means that long-term debt was becoming more common in this sector in Portugal.

In the Spanish case, the sector and the sample tended to decrease in the first years, growing in 2020. The Spanish sector started with constant values in 2016 and 2017, followed by a sharp decrease in 2018. The sample, in its turn, showed a moderate downward trend until 2018, the year after which it grew, with a considerable increase in 2020.

In Spain, the evolution shows that if the long-term debt decreased in the first years under study, the last two years illustrate the comeback of the long-term debt option. Therefore, one can see that in 2020, the year of the pandemic outburst, all the entities showed increases in long-term debt compared to total debt.

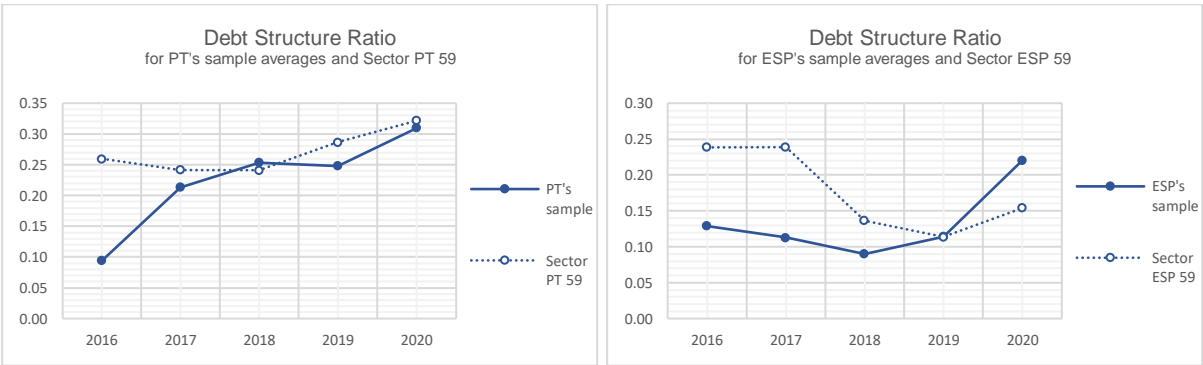


Figure 16 - Debt Structure Ratio for: Portuguese entities; Spanish entities

The following ratio to be analysed is the Debt-to-Equity Ratio, which shows how many times total liabilities are higher than total equity. Through the analysis of Figure 17, one can conclude that only PT's sample in 2017 recorded liabilities inferior to equity.

The following figure points out two other situations worthy of analysis. The first is the peak of ESP's sample in 2018. This high value is not a reflection of the 33 companies present in the sample, but one specifically — VEO Television SAU — which registered a value of total liabilities 171 times higher than total equity. The other mentionable point is the value of the same sample in 2020. This negative value is, as well as the maximum, the result of one specific company that had negative equity values for 2020 — Plano a Plano Productora Cine y Television SL.

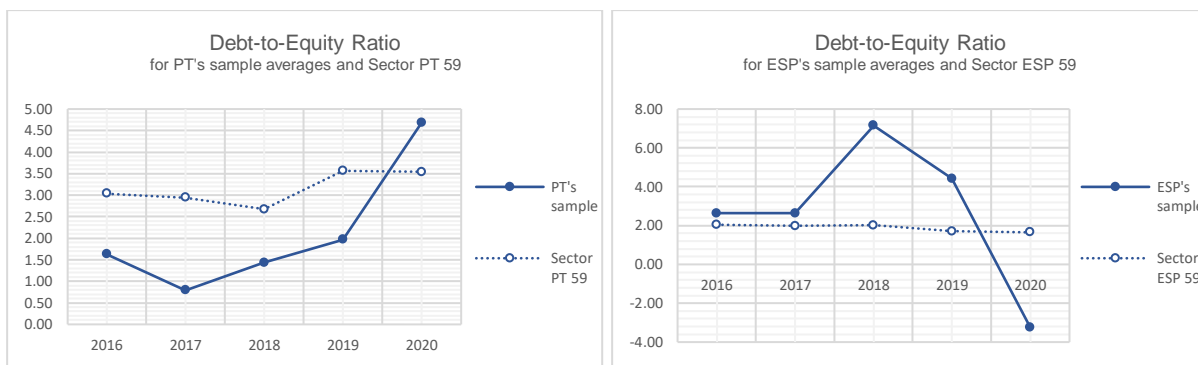


Figure 17 - Debt-to-Equity Ratio for: Portuguese entities; Spanish entities

In terms of evolutive behaviour, both the Portuguese sample and sector tended to evolve increasingly over time. The Spanish sector registered relatively constant values while the respective sample registered considerable increases and decreases, mainly due to the companies referred to above. If the mentioned above companies' results were to be removed from the analysis, the evolution in time of the Spanish sample would be characterised by a moderate decrease in the first three years, followed by a significant increase in 2019 (Figure 18). This increase, however, would still be justified by a single company's performance — Antena 3 Noticias Sociedad Limitada. In the same plot, there is the evolution in time of the Spanish sample without all the extraordinary values of this ratio: it is characterised by a downward trend in all years under study.

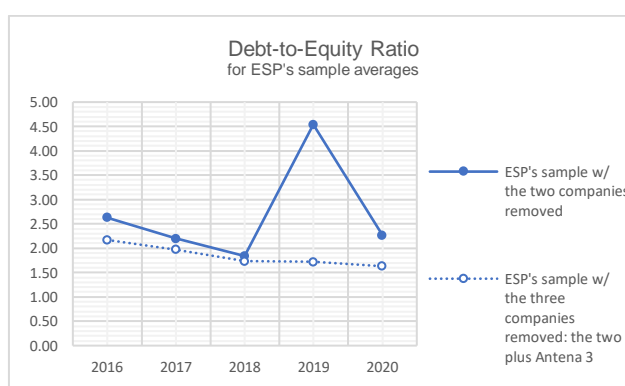


Figure 18 - Debt-to-Equity Ratio for ESP's sample without considering companies: VEO Television SAU and Plano a Plano Productora Cine y Television SL (solid line); and plus, Antena 3 Noticias Sociedad Limitada (dashed line)

In 2020, while the sectors remained almost without variation, the samples varied considerably. In the Spanish sample, as already mentioned, there was a considerable decrease due to the performance of the companies Plano a Plano Productora Cine y Television SL and Antena 3 Noticias Sociedad Limitada. Without these two companies, this ratio would decrease slightly. In the Portuguese sample, the increase of more than double in 2020 was also due to one specific company — SPI, S.A. Removing this company from the analysis would still result in an increase, albeit minor.

As reviewed in the literature, a proportion of two (liabilities) to one (equity) could be considered the highest sustainable value for investors and lenders, depending on the industry (Samonas, 2015). Regarding this as the reference value, one can ascertain that, even with the removal of the

outperforming companies in the Spanish and Portuguese samples, the Sector PT 59 and the first two years of the ESP's sample averages would be above this reference.

At last, Interest Coverage Ratio aims to measure the degree to which EBIT cover interest payments. According to Samonas (2015), a value greater than two is typically a favourable indicator, which was not the case solely for the Portuguese sector in 2019 and 2020 (Appendix C). Values were way above the reference in all the other entities, especially for both samples.

In terms of evolution, from the analysis of Figure 19, one can note the peak in both samples' year 2017. These values were way above the remaining, and it was due to specific overperforming companies — Indaloymedia SL (Spain) and Endemol Portugal, Unipessoal Lda (Portugal). From the analysis of Figure 19, one can note that both samples behaved similarly, despite the difference in values.

Figure 20 shows that the Spanish sector had an increasing trend until 2019, followed by a decrease in 2020. On the other hand, the Portuguese sector presented decreases from 2016 to 2017 and from 2018 to 2019 while increasing in 2018 and 2020. As can be understood by the analysis of the figure below, these variations were negligible compared to the sample's evolution. Also, there was no direct congruence between the sectors and samples, both in evolution and values, which points to a more heterogeneous sector in terms of this ratio.

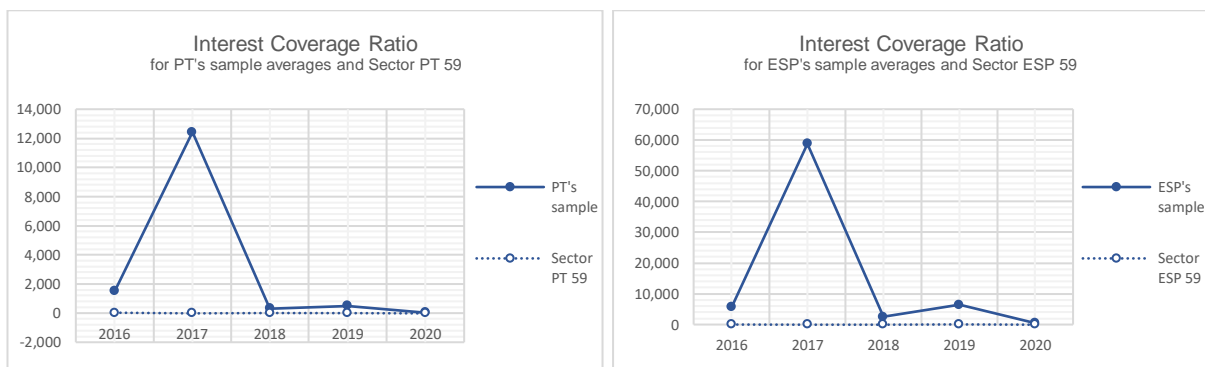


Figure 19 - Interest Coverage Ratio for: Portuguese entities; Spanish entities

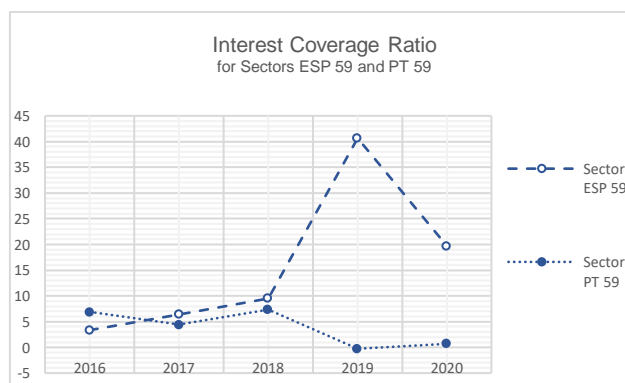


Figure 20 - Interest Coverage Ratio for Spanish and Portuguese sectors

In 2020, as seen in the table of Appendix C, there were decreases in this indicator's performance in all entities but Sector PT 59. These differences are particularly evident in the Spanish and Portuguese samples, although less in the latter.

4.1.4. Activity

This next section aims to measure the efficiency of the sector's operations. The first indicator to be analysed is the Asset Turnover ratio, which measures the sales revenue per euro of total assets. That said, the higher the value, the better it is since it means more efficiency in turning assets into revenue.

Through the analysis of Figure 21, one can note that the samples registered the highest values, particularly the Spanish sample. At the same time, the sectors presented values lower than one. That means that the remaining companies in the sector which are not included in the samples recorded lower values for this indicator.

In terms of evolution, one can note a parallel between sectors and respective samples. Both the Spanish sector and sample have shown a downward trend over time, while the Portuguese entities presented a more rising tendency, with both sectors registering the lowest variations.

In the year 2020, when the pandemic started, there was a decrease in the Asset Turnover ratio across all entities. That happened mainly because of a reduction in revenue values compared to a relatively stable value of assets from 2019 to 2020.

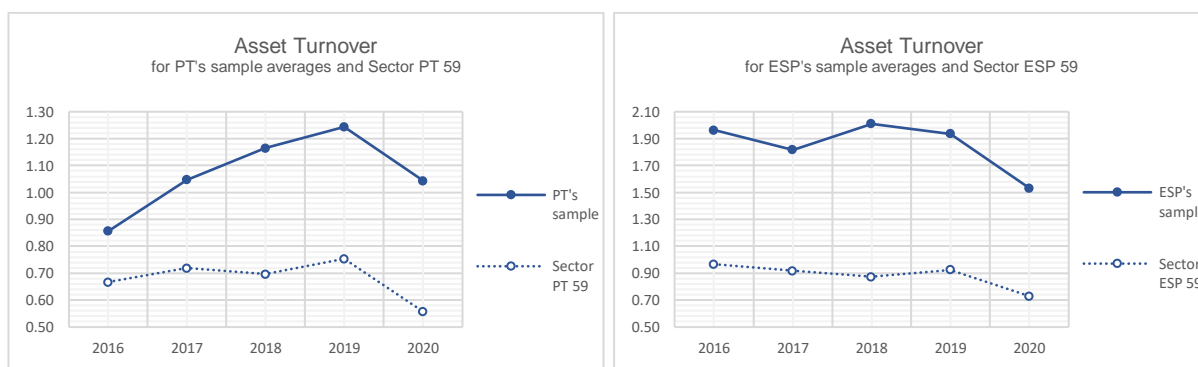


Figure 21 - Asset Turnover for: Portuguese entities; Spanish entities

Finally, the last activity indicator measures the duration of the operating life cycle. As reviewed in the literature, it relates not only to the Accounts Payable Period and the Accounts Receivable Period but also to the Inventory Holding Period. However, since there are no inventory levels in most companies under study, one calculated the Cash Conversion Cycle according to the difference between the Accounts Receivable and Accounts Payable Periods.

From the analysis of Figure 22, one can note a significant difference between sample and sector values. While both samples had positive values, the sectors registered negative values for this indicator. That can be explained by the values of the Accounts Receivable and Payable Periods. There are higher collection periods than credit for the samples, while for the sectors, there are higher credit periods, resulting in negative values for CCC.

This indicator can also be analysed through the perspective of receivables. As mentioned in the literature, it is helpful to evaluate the Accounts Receivable Period by relating it to the liquidity analysis, particularly the Current, Quick and Cash Ratios. As already concluded in the liquidity analysis above, the values of the Current and Quick Ratios were far from the Cash Ratio, especially in the samples. Complementing this analysis with this activity indicator's performance, one can conclude that the

distance between CR and Cash Ratio was due to high values of receivables, which are taking too long to be paid by customers.

Therefore, for the samples, it can be said that greater receivables' values contribute to positive values for the cycle. As for the sectors, the lower gap between QR and Cash Ratio highlights lower values of receivables, which, in line with high payable periods, turn this indicator's value negative.

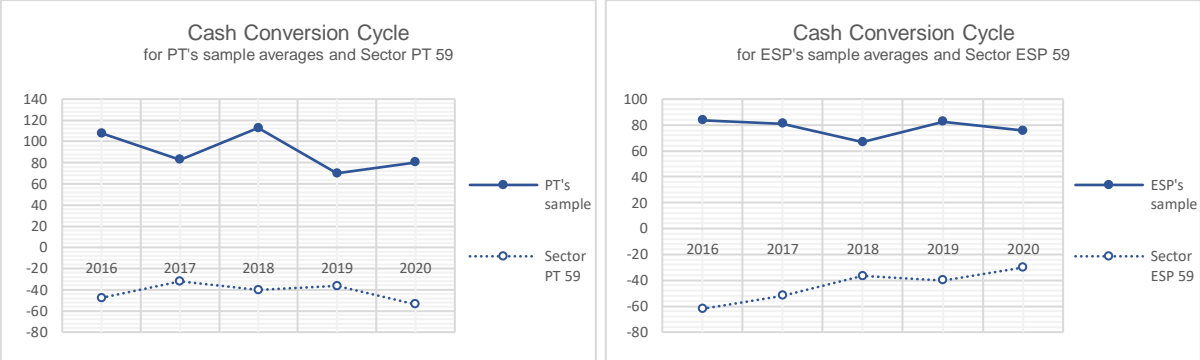


Figure 22 - Cash Conversion Cycle for: Portuguese entities; Spanish entities

In terms of evolution, the Spanish sector showed an increasing trend, due to the combined evolution of both its components. As for the Portuguese sector, it registered a decreasing trend from 2018 mainly due to an increase in the payables period.

The Spanish sample presented a similar evolution as the Accounts Receivable Period ratio since the payables period is relatively constant. There was a decreasing trend overall except for 2019, with the values not varying much. On the other hand, the Portuguese sample reflected both its components once they registered the highest variations. It started with a decrease in 2017 due to higher growth in the payables period (52 days) than in the receivables period (27 days). However, this 52-day increase in the payables period in 2017 was due to the performance of one company specifically — SPI, S.A. — whose high value unbalanced the sample's averages. If this company was removed from the analysis, the evolution would be similar but with lower variations (Figure 23). In 2018, despite the decrease in both credit and collection periods, the sample recorded its maximum value. That happened because the decline in the credit period was sharper than in the collection.

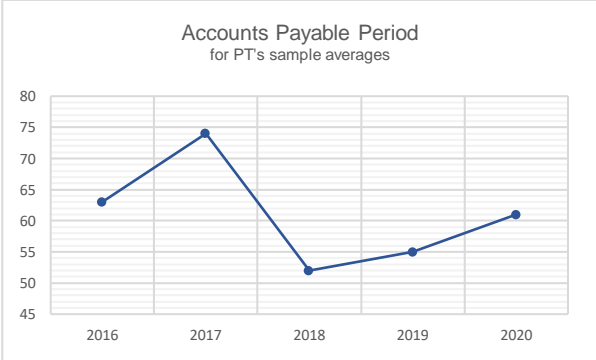


Figure 23 - Accounts Payable Period for PT's sample without considering company SPI, S.A.

In 2020, there was no global trend among entities for the CCC. Both the Portuguese sample and Spanish sector increased their values slightly, while the other entities registered slight declines.

Regarding the Accounts Receivable Period, there was an increase in the days customers take to pay in both Portuguese entities in 2020. The pandemic brought problems to companies, which could result in an extension of payment deadlines, as this indicator portrays. In the Spanish entities, on the other hand, there was a slight decline.

In turn, the Accounts Payable Period also registered increases in the Portuguese entities. At the same time, for the Spanish reality, this indicator stayed almost without variation for the sample, registering a decrease for the sector.

4.2. Bankruptcy prediction models' results

To verify the going concern assumption, one chose to use three bankruptcy prediction models that classify a company as Bankrupt or Non-Bankrupt: Altman's Z''-Score (2002); Carvalho das Neves and Silva (1998); and Lizarraga (1998). These were calculated separately for each entity, as reported in Appendices G and H.

From the analysis of these appendices, one can conclude that Z''-Score presented predominantly Non-Bankrupt classifications for every entity under study. Carvalho das Neves and Silva's model produced more Bankrupt results for the Portuguese sector, contrarily to what happened to the other three entities. Lizarraga's model, in turn, presented mostly Bankrupt values for the Portuguese sector and sample, as does the Spanish sector, while the respective sample recorded more Non-Bankrupt outputs.

Also, from the analysis of Appendices E and F, one can see the results for each company of each country's sample. From the assessment of Z''-Score, one can see that most of the companies for both samples presented values above 6.40. That means that, according to the S&P rating of this model's scores, most companies would be classified with a rating of A- or better, signalling a medium-to-high quality investment.

This separate analysis was the starting point for classifying these companies and sectors according to their bankruptcy situation. Therefore, the next step was to compare the models' results to come up with a conclusion on the entities' situation. Tables 9 and 10 illustrate the outcome of the combination of the three models for every entity in all years under study.

Table 9 - Percentages (%) of companies with Non-Bankrupt and Bankrupt results according to the 3 models combined for the Portuguese sample; state of the Portuguese sector

Year	Portuguese sample		Portuguese sector
	% Non-Bankrupt	% Bankrupt	State
2016	57,14%	42,86%	Bankrupt
2017	42,86%	57,14%	Bankrupt
2018	57,14%	42,86%	Bankrupt
2019	71,43%	28,57%	Bankrupt
2020	71,43%	28,57%	Bankrupt

Table 10 - Percentages (%) of companies with Non-Bankrupt and Bankrupt results according to the 3 models combined for the Spanish sample; state of the Spanish sector

Year	Spanish sample		Spanish sector
	% Non-Bankrupt	% Bankrupt	State
2016	75,76%	24,24%	Non-Bankrupt
2017	81,82%	18,18%	Non-Bankrupt
2018	75,76%	24,24%	Non-Bankrupt
2019	78,79%	21,21%	Non-Bankrupt
2020	78,79%	21,21%	Bankrupt

From the analysis of the results in the tables above, one can conclude that, for the Portuguese sample, there were more healthy companies than bankrupt in all years under study except for 2017. It can be seen, as well, an increasing number of Non-Bankrupt companies in the last years of the study, that is, companies that verified the going concern assumption.

On the other hand, the Portuguese sector was classified as Bankrupt in all years under study. Therefore, there was a notable difference between the sector and the companies in the sample. That may mean that the remaining companies composing the sector could have experienced more difficulties during this timeframe than the ones in the sample.

As for the Spanish sample, there were significantly more Non-Bankrupt companies than there were Bankrupt, with more than 75.00% every year under study.

The sector was classified as Non-Bankrupt for all years under study but the last. Contrarily to the Portuguese reality, there was a general concordance between the sector and the companies in the sample, apart from 2020. While there were more Non-Bankrupt companies in the sample, the sector was classified as Bankrupt in that year. That may mean that the remaining companies from the sector could have experienced constraints due to the pandemic and, thus, contributed to the sector's classification that year.

In 2020, only the Spanish sector registered a different classification from 2019 due to a decrease in the cash flow values. All the other entities — Portuguese sector, Portuguese companies, and Spanish companies — presented the same result and percentages of healthy and defaulting companies.

Tables 11 and 12 below illustrate the percentages of compliance of the three models and, from those, the percentages of healthy and failed companies for the Portuguese and Spanish samples. From the analysis of the Portuguese sample table, it can be concluded that, apart from 2019, the concordance in all three models was below 50%. In 2020, there was significant discordance, registering the same result in the three models in only 14.29% of the companies. From those situations, however, the Non-Bankrupt classification was the most common, with percentages over 65.00% for the study's timeframe.

On the other hand, in the Spanish sample, the same result in the three models was the most common scenario. The level of concordance increased in 2018, the year from which it decreased. From these companies with the same result in the three bankruptcy models, almost every company was classified as healthy, with percentages over 85.00% for all years under study.

In 2020, there was a decrease in the compliance of the three models in both samples, especially in the Portuguese, which can be seen as a result of the pandemic.

Table 11 - Percentages (%) of Portuguese companies that present the same result in the three models; and from those, the percentages of bankrupt and healthy companies

Year	% Same result (3x)	% Non-Bankrupt	% Bankrupt
2016	42,86%	66,67%	33,33%
2017	42,86%	66,67%	33,33%
2018	42,86%	100,00%	0,00%
2019	71,43%	80,00%	20,00%
2020	14,29%	100,00%	0,00%

Table 12 - Percentages (%) of Spanish companies that present the same result in the three models; and from those, the percentages of bankrupt and healthy companies

Year	% Same result (3x)	% Non-Bankrupt	% Bankrupt
2016	63,64%	95,24%	4,76%
2017	60,61%	95,00%	5,00%
2018	75,76%	92,00%	8,00%
2019	72,73%	91,67%	8,33%
2020	66,67%	86,36%	13,64%

Thus, it can be concluded that there were more healthy companies in Spain, which its sector results can corroborate. Nevertheless, there were more healthy companies than defaulting in both samples in all the years under study, apart from the Portuguese sample in 2017.

In the sectors, there was a significant difference between countries. While the Portuguese sector was classified as Bankrupt for this study's timeframe, the Spanish sector was classified as Non-Bankrupt every year apart from 2020. That may mean a difference in each country's remaining companies in the sector, except for 2020.

5. Conclusion, limitations and insights for future research

5.1. Answer to the research questions

Once the results have been obtained and analysed, it is now imperative to answer the research questions posed initially. There was an initial research question, from which two main questions were derived, guiding the impact assessment of the pandemic in this sector. That said, answering these research questions provides a verdict on this sector's current economic-financial situation and going concern assessment compared to the period before the pandemic.

Research Question - What was the audiovisual production sector's financial situation in both countries prior to the pandemic?

In terms of profitability, there was a difference between the sector's behaviour in both countries before 2020. The Spanish sector presented relatively constant and solid values for the rates of return, with ROA tendentially increasing and ROE not suggesting a particular trend. On the other hand, the Portuguese sector presented more variations, especially in the year before the pandemic, 2019, when it registered a considerable hit in the rates of return due to higher operating expenses and, consequently, lower Net Income values.

Liquidity-wise, the Spanish sector indicated coverage of their current liabilities in the short term, with constant values over the years. As for cash availability, the sector presented positive values in the first two years of the study, registering negative values for 2018 and 2019. In turn, the Portuguese sector only registered full coverage of current obligations by liquid assets in 2019. That means that its overall liquidity was not satisfactory even though it reported positive cash values from 2016 to 2019.

From the analysis of the capital structure of both countries' sectors, it can be stated that they are mainly composed of debt rather than equity. Both countries' sectors presented minor variations of their capital structure over time, with the Portuguese showing values slightly above the attractiveness threshold for investors and lenders, while the Spanish sector showed values below this threshold. It is also possible to note that most of the debt is for the short term.

Finally, there was a relatively constant efficiency in turning assets into sales over this timeframe in both countries, with the Spanish sector presenting the highest values. It is also important to note that there was a higher payables period than receivables for all years under study in both countries' audiovisual production sectors.

Derived Question 1 - Regarding financial issues, how did the pandemic impact the companies in the sector?

As explained initially, this impact was measured, in the first instance, at the level of profitability, liquidity, leverage, and activity. From the analysis, in terms of profitability, a decrease in the measures of return and margins can be noted in the Spanish sector. That is corroborated by both sample and sector data and is due to considerable declines in revenue values from 2019 to 2020. The Portuguese companies in the sample also presented a decrease in the rates of return and margins, even though slight.

On the contrary, the Portuguese sector highlighted a different scenario. This sector's analysis alerted a considerable decline in these indicators' value in 2019 due to higher operating expenses. A considerably lower value of operating expenses in the next year explains the profitability indicators' performance increase in 2020, even though there was a reduction in revenue values from 2019 to 2020 in the sector.

In terms of liquidity, even though one can mention a slight decline in these indicators — Current, Quick, and Cash Ratios — for both Portuguese and Spanish companies in the sector, there was no alarming drop caused by the pandemic. Another liquidity indicator was studied — Cash Position — whose values indicated some cash problems in the sector. However, in 2020, the number of companies with positive values of this measure increased by almost 15 pp in Portugal and nearly 10 pp in Spain. Overall, the pandemic did not significantly affect the sector's liquidity in both countries in 2020.

Assessing the sector's capital structure, one can note that there was an increase in the proportion of liabilities in the companies of both countries' samples, especially in Portugal — liabilities increased almost 10 pp compared to equity. From the analysis of each country's sector values, one can ascertain that they showed greater values of liabilities than the respective samples. That means that the remaining companies in the sector, most of them micro-companies, contributed to these higher debt values in their capital structure.

It can also be seen that debt was mainly for the short term. There were considerably fewer companies with more long-term than current debt in both countries' samples in all years under study. In 2020, there was an increase in the values of long-term debt for the sector in both countries.

As previously stated, the sector saw a decline in revenue values in 2020. That is why the efficiency of generating revenue from assets decreased that year. In terms of the collection and credit periods, there was a difference in this sector between Portugal and Spain. While in Portugal, the collection and credit periods increased — which means that it took more time for customers and companies in the audiovisual production sector to pay their dues — in Spain, there were slight decreases in these periods — meaning that the pandemic did not affect much of the capacity of payment of the customers and audiovisual production companies.

Derived Question 2 – Was there an impact of the crisis on the going concern assessment of this sector's companies?

The answer to this question is more straightforward than the previous one. The three bankruptcy prediction models combined different indicators and provided a direct answer on the state of bankruptcy of a company or sector.

From the analysis of these models for the four entities, one can note that the pandemic only affected the going concern assumption of the Spanish sector, which encompasses the totality of the companies from the audiovisuals sector in Spain — large, medium, small, and micro-companies. All the other entities registered the same results as the year 2019.

That said, one can ascertain that, from this analysis, the pandemic did not affect the going concern assumption much. Both samples presented the exact percentages of healthy and defaulting companies from 2019 — more than 70% being healthy — and the Portuguese sector remained in a state of bankruptcy as in 2019, meaning that the pandemic did not cause it.

While in the Portuguese reality, one can say that the pandemic did not change the outcome of the bankruptcy risk, in the Spanish, since there were conflicting results, one can only conclude that: the sample constituted of small-to-medium and large enterprises presented the same number of healthy and defaulting companies as in 2019; the sector, which includes much more diverse companies in terms of size, presented a different result than in 2019.

In addition, it is important to note that in 2020 both sectors presented themselves as bankrupt, which means that there were companies in the sectors other than those studied in the samples contributing to this result.

5.2. Conclusions

In 2020, the appearance of the SARS-CoV-2 virus altered the world panorama as people knew it. The resulting pandemic and the successive states of emergency declared by different countries profoundly impacted society — on business, the population, and the way of life in general (Tashanova et al., 2020; Suppawittaya et al., 2020).

In the audiovisual production industry, this impact translated, in the first instance, into a halt in productions and paradigm shifts. These changes imposed by the new reality led, for example, to postponements in ongoing productions, the extension of production periods, and the adoption of new procedures (Vieira & Costa, 2021). In a second instance, it translated into economic-financial, social and structural consequences in the sector. Hereupon, this dissertation was developed around the study of the economic and financial impact of the pandemic's emergence on this sector, both in Portugal and Spain.

First and foremost, it was noted that the sector in Portugal and Spain, despite the difference in size and, consequently, values, behaved with some degree of similarity.

From the results obtained and their analysis, it can be concluded that there was a global decline in the performance of the indicators studied in 2020, which was expected. The revenue of this sector showed a considerable decrease from 2019 to 2020, as reviewed in the literature, because of (i) the long inactive period of most productions, (ii) decrease of TV advertising, and (iii) the closure of cinemas (Blásquez et al., 2020). This decline motivated reductions in both profitability and efficiency indicators. Regarding the sector's liquidity, one can mention that it was not endangered by the pandemic, even with some indicators' performance declines. In terms of the sector's capital structure, there was a slight increase in the proportion of debt compared to equity. The composition of debt also saw an increase in long-term debt compared to current debt that year, which may signal that the companies in the sector resorted to financing and loans in a period of economical constraints.

From their joint analysis, the bankruptcy prediction models concluded that in terms of verifying the going concern assumption, only the analysis of the Spanish sector indicated a different result in 2020 compared to the remaining years under study — not verifying it. That diverges from the analysis of the respective sample, which remained unaffected in 2020. The remaining analyses — Portuguese sector and sample — showed results equal to 2019.

It is also crucial to point out that in 2020, while both countries' sectors were labelled as Bankrupt, the respective samples presented over 70% of their constituting companies as verifiers of the going concern assumption. These different outcomes may result from the different compositions of the sectors and respective samples. The samples are composed of companies that are obliged to have their accounts audited and, thus, comply with minimum values for assets, revenue and number of employees. On the other hand, the sectors are composed of a greater diversity of firms, mainly micro-firms, as the mentioned above. To ascertain the exact situation of this sector, it would be recommendable to study a more significant and variate sample.

From the separate evaluation of the indicators, it can be seen that the Altman model (2002) presented considerably more favourable results — Non-Bankrupt — while the Carvalho das Neves e Silva and Lizarraga models presented balanced results.

The analysis of the bankruptcy prediction models showcases that the going concern assumption was not affected in the sample analysis. In the first instance, that does not mean that the sector overall was not affected, as one can ascertain from the Spanish sector's analysis. While the respective sample was not affected, the Spanish sector was considered Bankrupt in 2020, contrarily to its result in 2019. That may have to do with the sector and samples' compositions, as already explained. Secondly, it does not mean that the samples' companies were not affected by the pandemic. Due to the latest data available, this dissertation only studies the impact in 2020, the year of the pandemic's emergence. Therefore, it does not study the long-term effects of the pandemic that might have been felt later, in 2021 or even 2022. That would be a recommendation for future research.

It should also be mentioned the difference between the values obtained in the analysis of the sectors and samples even though the evolution, in many indicators, is congruent. That may be due to the different sectors and samples' compositions in terms of size, as stated.

Finally, this dissertation was the first step in what may become a more in-depth investigation of the global impact that the pandemic had on the sector. Thus, some limitations to the study are presented next, as well as suggestions for future lines of research that could enrich the research in this sector.

5.3. Limitations to the study

Although this study's purpose has always been as rigorous and thorough as possible, there have been a few constraints encountered along the way. Thus, this section presents and explains not only some limitations to the study but also some assumptions made.

One of the study's limitations is using data of the sectors classified as CAE and CNAE 59 for calculating indicators for the audiovisual production sectorial averages. As already mentioned in the literature review, the audiovisual production sector is given, in Portugal, by CAE 5911 and in Spanish by two CNAEs, 5915 and 5916. On the other hand, the CAE and CNAE 59 sectors refer not only to audiovisual production but all cinematographic, video, and television programme production, sound recording and music publishing activities. This option for a more ample sector was due to the impossibility of accessing data with greater specificity in the Spanish sector. While for the Portuguese case, access to data for sector 5911 was possible through the Central Balance Sheet Database of the

Bank of Portugal's website, in the Spanish case, the Bank of Spain only provides data for the second level of economic activity — two digits. To circumvent a possible imbalance between the Portuguese and Spanish analysis, one decided to broaden the scope of the analysis to sector 59 in both countries, including companies that also operate in other stages of the audiovisual sector.

Another limitation is the use of a relatively small sample compared to the size of the sectors in Portugal and Spain. In Portugal, the CAE 5911 presents more than 1500 companies, while in Spain, the equivalent sector has more than 3000. Due to the impossibility of analysing all these companies, which would result in a data treatment too extensive for the scope of this dissertation, choices were made regarding which companies to analyse. As stated above, seven companies were analysed in Portugal and 33 in Spain.

The small number of companies analysed was primarily due to the choice of studying larger companies, leaving aside the majority of micro-enterprises. This option was mainly due to the quality of the information disclosed by these smaller companies, which is usually not very rigorous. Secondly, as already mentioned, the number of companies was also restricted in order to remove possible outliers from the samples, which could result in adulterated results. Both these options made the samples small compared to the sector.

As mentioned in the methodology section, some restrictions were applied to the sector during the company selection process. One was the requirement for Legal Certification of Accounts by the companies, according to articles 262 and 263 of the CSC in Portugal and the CCL in Spain, respectively. These articles claim, both in Portugal and Spain, that companies must have their accounts audited if in compliance with minimum values for assets, revenue, and number of employees for two consecutive years. However, for the Portuguese sample to be representative enough in this dissertation, there was the need to broaden the scope and include every company that, for at least one year under study, complied with the minimum values stipulated by the article mentioned above. That constitutes yet another limitation of the study.

It is also important to refer that the heterogeneity of the financial information and degree of disclosure from the three data sources (BdP, BdE and SABI) can constitute a limitation to the study. The inexistence of standard accounts for every indicator and model prompted some of the assumptions discussed ahead.

- Due to the inexistence of data regarding the Retained Earnings for the companies in the samples, these were calculated through the formula: $\text{Retained Earnings} = \text{Equity} - \text{Capital}$.
- For the calculation of Cyclical Assets and Liabilities, there were used the following accounts: $\text{Cyclical Assets} = \text{Customers} + \text{Inventory} + \text{Advances to Suppliers} + \text{State Receivables}$; $\text{Cyclical Liabilities} = \text{Suppliers} + \text{Advances from Customers} + \text{State Payables}$.
- When there were no information about the components of WCR reviewed in the literature, one assumed: $\text{Working Capital Requirements} = \text{Debts from Customers} + \text{Stocks} - \text{Debt to Suppliers}$.
- In the Portuguese sector, there was no information about advances. Therefore, the $\text{Working Capital Requirements} = \text{Customers} + \text{Inventory} + \text{State Receivables} - \text{Suppliers} - \text{State Payables}$.

- In the Spanish sector, there was no information about advances, state receivables, or payables. Therefore, the Working Capital Requirements = Customers + Inventory – Suppliers.
- In the Spanish sector, as there was no information about state payables and receivables, the numerator of the variable x_8 of the Carvalho das Neves and Silva model was calculated through the approximation: State and Other Public Entities [receivables – payables] = Other Accounts Receivables – Other Non-Interest Bearing Credits.
- In the Spanish sample, there was no information about state payables and receivables. Therefore, State and Other Public Entities [receivables – payables] = Assets by Current Taxes – Liabilities by Current Taxes.
- As reviewed in the literature, the Cash Conversion Cycle is calculated through the formula: Cash Conversion Cycle = Inventory Holding Period + Accounts Receivable Period – Accounts Payable Period. Therefore, since there are no inventory levels in most companies under study, one calculated the CCC according to formula: Cash Conversion Cycle = Accounts Receivable – Accounts Payable Periods.
- In the Carvalho das Neves and Silva bankruptcy prediction model, the variable x_7 is the account Cash Flow, and is calculated according to the formula: Cash Flow = EBIT * (1-t) + Δ Working Capital.
- Some variables in the bankruptcy prediction models presented “n.a.” values due to the inexistence of data for those variable’s components. Therefore, as a simplification, these “n.a.” values were marked equal to zero, so it would be possible to calculate the overall score for those companies.

5.4. Insights for future research

After the conclusion of this dissertation, there are some recommendations for future lines of research which were impossible to consummate due to time and scope constraints. Thus, the following recommendations are thought to bring added value to the study of the impact of the COVID-19 pandemic crisis on the audiovisual production sector.

The first, one of the most important, is related to the scope defined in the impact assessment. In this dissertation, the economic-financial dimension was chosen as an essential dimension to study during a crisis. However, others are equally important, such as the social impact, due to its direct impact on the population and ways of life. Thus, it is thought that a study on the social impact of the crisis on the audiovisual production sector, even though difficult to measure, would bring added value to the analysis.

Another important recommendation for future research is to replicate this same study for a more recent time horizon when such data is available. Assessing the impact of the pandemic's emergence and its long-term effects on the sector would also be interesting and valuable, since it can show different results than the ones got in this research.

Finally, the last three recommendations address an extension to the scope of the analysis already advocated. The first refers to the methodology used: the economic and financial analysis

encompasses a wide range of indicators, many of which were not addressed. Thus, using other metrics and models could bring added value to the study.

The second and third recommendations are related to the application of the adopted methodology. As already mentioned in section 5.2, it would be recommendable to apply this methodology to a broader and more variate sample to better understand the sector's bankruptcy risk.

As the third and last recommendation, for a better understanding of what happened to the audiovisual production sector in Portugal and Spain, it would be interesting to extend this analysis to other countries. Then, replicating the analysis to countries with more audiovisual productions — United Kingdom and France — as well as others of similar size — Italy and Germany for Spain and Ireland and Greece for Portugal — could turn out to be insightful of the impact of the pandemic in this sector of the economy.

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7. Appendices

Appendix A – Profitability indicators calculated for each entity.

Entity	Year	Return on Assets	Financial Return on Assets	Return on Equity
PT's sample averages	2016	2,54%	2,94%	8,24%
	2017	0,17%	0,59%	21,05%
	2018	7,05%	7,66%	14,22%
	2019	4,77%	5,23%	3,94%
	2020	4,50%	4,84%	20,43%
ESP's sample averages	2016	10,38%	12,40%	14,09%
	2017	12,08%	13,64%	39,51%
	2018	14,42%	15,48%	240,72%
	2019	14,01%	14,95%	49,26%
	2020	8,04%	8,79%	150,72%
Sector PT 59	2016	4,68%	5,48%	18,88%
	2017	2,00%	2,59%	7,90%
	2018	4,24%	4,91%	15,60%
	2019	-2,37%	-2,67%	-10,83%
	2020	-0,88%	-2,56%	-4,00%
Sector ESP 59	2016	1,57%	2,07%	4,79%
	2017	2,99%	3,49%	8,89%
	2018	3,11%	3,47%	9,39%
	2019	4,37%	4,47%	11,81%
	2020	2,08%	2,19%	5,52%

Entity	Year	Return on Invested Capital	Operating Profit Margin	Net Profit Margin
PT's sample averages	2016	9,11%	5,53%	2,71%
	2017	0,40%	-13,29%	-15,54%
	2018	14,51%	8,09%	4,84%
	2019	10,76%	6,18%	3,20%
	2020	8,61%	5,94%	3,59%
ESP's sample averages	2016	-51,23%	10,48%	5,95%
	2017	28,74%	10,10%	6,35%
	2018	208,74%	10,29%	6,42%
	2019	51,44%	9,70%	7,64%
	2020	6,99%	5,12%	3,92%
Sector PT 59	2016	12,36%	10,07%	7,01%
	2017	5,98%	5,63%	2,79%
	2018	11,01%	9,01%	6,09%
	2019	-1,11%	-0,27%	-3,15%
	2020	-2,55%	0,90%	-1,58%
Sector ESP 59	2016	3,36%	2,03%	1,63%
	2017	6,46%	4,66%	3,25%
	2018	8,10%	5,01%	3,56%
	2019	9,29%	5,24%	4,72%
	2020	4,27%	3,76%	2,85%

Appendix B – Liquidity indicators calculated for each entity.

Entity	Year	Working Capital (th EUR)	Working Capital Requirements (th EUR)	Cash Position (th EUR)
PT's sample averages	2016	845,646	1455,427	-609,782
	2017	998,239	1253,801	-255,561
	2018	1340,517	1461,796	-121,279
	2019	1612,012	1230,005	382,007
	2020	2711,934	1755,321	956,613
ESP's sample averages	2016	4326,276	4877,948	-551,672
	2017	4501,970	5353,256	-851,286
	2018	3674,705	4885,200	-1210,495
	2019	4055,732	4920,314	-864,582
	2020	4784,264	4744,251	40,013
Sector PT 59	2016	-8,100	-8,200	0,100
	2017	-2,700	-3,700	1,000
	2018	-1,400	-10,400	9,000
	2019	12,600	-6,300	18,900
	2020	23,900	-5,000	28,900
Sector ESP 59	2016	222,756	120,763	101,993
	2017	234,260	129,074	105,186
	2018	264,445	296,781	-32,337
	2019	332,390	428,004	-95,614
	2020	223,957	329,355	-105,397

Entity	Year	Current Ratio	Quick Ratio	Cash Ratio
PT's sample averages	2016	1,65	1,50	0,31
	2017	2,01	1,65	0,33
	2018	2,42	2,26	0,73
	2019	2,73	2,39	1,19
	2020	1,94	1,74	0,13
ESP's sample averages	2016	2,20	1,77	0,55
	2017	2,35	1,95	0,86
	2018	2,44	2,15	0,91
	2019	2,42	2,07	0,86
	2020	4,85	4,33	3,44
Sector PT 59	2016	0,98	0,51	0,20
	2017	0,99	0,57	0,22
	2018	1,00	0,60	0,26
	2019	1,04	0,62	0,26
	2020	1,09	0,63	0,29
Sector ESP 59	2016	1,37	0,86	0,16
	2017	1,36	0,79	0,16
	2018	1,31	0,80	0,13
	2019	1,40	0,71	0,16
	2020	1,33	0,66	0,17

Appendix C – Leverage indicators calculated for each entity.

Entity	Year	Total Debt Ratio	Debt Structure Ratio
PT's sample averages	2016	0,57	0,09
	2017	0,66	0,21
	2018	0,54	0,25
	2019	0,57	0,25
	2020	0,66	0,31
ESP's sample averages	2016	0,59	0,13
	2017	0,60	0,11
	2018	0,56	0,09
	2019	0,54	0,11
	2020	0,57	0,22
Sector PT 59	2016	0,75	0,26
	2017	0,75	0,24
	2018	0,73	0,24
	2019	0,78	0,29
	2020	0,78	0,32
Sector ESP 59	2016	0,67	0,24
	2017	0,66	0,24
	2018	0,67	0,14
	2019	0,63	0,11
	2020	0,62	0,15

Entity	Year	Debt-to-Equity Ratio	Interest Coverage Ratio
PT's sample averages	2016	1,63	1498,80
	2017	0,79	12430,27
	2018	1,43	307,19
	2019	1,97	494,19
	2020	4,69	29,15
ESP's sample averages	2016	2,63	5673,17
	2017	2,64	58735,59
	2018	7,14	2460,51
	2019	4,41	6416,59
	2020	-3,24	468,04
Sector PT 59	2016	3,04	6,85
	2017	2,94	4,40
	2018	2,68	7,33
	2019	3,56	-0,26
	2020	3,54	0,71
Sector ESP 59	2016	2,04	3,35
	2017	1,97	6,45
	2018	2,02	9,53
	2019	1,70	40,65
	2020	1,65	19,72

Appendix D – Activity indicators calculated for each entity.

Entity	Year	Asset Turnover	Accounts Receivable Period
PT's sample averages	2016	0,86	171
	2017	1,05	197
	2018	1,17	158
	2019	1,24	118
	2020	1,04	144
ESP's sample averages	2016	1,96	113
	2017	1,82	108
	2018	2,01	93
	2019	1,94	113
	2020	1,53	107
Sector PT 59	2016	0,67	86
	2017	0,72	93
	2018	0,70	90
	2019	0,75	88
	2020	0,56	109
Sector ESP 59	2016	0,97	62
	2017	0,92	57
	2018	0,87	87
	2019	0,93	84
	2020	0,73	82

Entity	Year	Accounts Payable Period	Cash Conversion Cycle
PT's sample averages	2016	63	108
	2017	114	83
	2018	46	113
	2019	48	70
	2020	64	80
ESP's sample averages	2016	29	84
	2017	27	81
	2018	26	67
	2019	30	83
	2020	31	76
Sector PT 59	2016	134	-48
	2017	125	-32
	2018	130	-40
	2019	124	-36
	2020	163	-54
Sector ESP 59	2016	124	-62
	2017	109	-52
	2018	124	-37
	2019	124	-40
	2020	112	-30

Appendix E – Scores and results of each model for every Portuguese company in the sample.

Number	Company	Year	Z ¹ -Score	Z ² -Score Result	C. das Neves	C. das Neves Result	Lizarraga	Lizarraga Result
1.	SHINE IBERIA PORTUGAL, UNIPESSOAL, LDA	2016	3,2500	Non-Bankrupt	-0,9417	Bankrupt	-1,0743	Bankrupt
		2017	5,2144	Non-Bankrupt	1,3783	Non-Bankrupt	-0,9031	Bankrupt
		2018	6,8191	Non-Bankrupt	0,8943	Non-Bankrupt	-0,0859	Bankrupt
		2019	7,8537	Non-Bankrupt	1,2098	Non-Bankrupt	0,0664	Non-Bankrupt
		2020	7,6403	Non-Bankrupt	1,9349	Non-Bankrupt	-0,1583	Bankrupt
2.	ENDEMOL PORTUGAL, UNIPESSOAL, LDA	2016	12,0015	Non-Bankrupt	1,7818	Non-Bankrupt	0,7140	Non-Bankrupt
		2017	13,3461	Non-Bankrupt	2,0560	Non-Bankrupt	1,0887	Non-Bankrupt
		2018	14,3212	Non-Bankrupt	2,5826	Non-Bankrupt	1,7516	Non-Bankrupt
		2019	19,1829	Non-Bankrupt	2,6446	Non-Bankrupt	3,3616	Non-Bankrupt
		2020	9,7180	Non-Bankrupt	2,0785	Non-Bankrupt	-0,0328	Bankrupt
3.	GMTS (GLOBAL MEDIA E TECHNOLOGY SOLUTIONS) - SERVIOS TECNICOS E PRODUAO MULTIMEDIA, SOCIEDADE UNIPESSOAL, LDA	2016	4,2376	Non-Bankrupt	0,5277	Non-Bankrupt	-0,3288	Bankrupt
		2017	3,5276	Non-Bankrupt	-0,2641	Bankrupt	-0,9655	Bankrupt
		2018	5,6424	Non-Bankrupt	1,1492	Non-Bankrupt	0,1008	Non-Bankrupt
		2019	7,8304	Non-Bankrupt	1,7471	Non-Bankrupt	0,7459	Non-Bankrupt
		2020	7,0606	Non-Bankrupt	0,7710	Non-Bankrupt	-0,1781	Bankrupt
4.	SPI, S.A.	2016	-63,8066	Bankrupt	-56,0753	Bankrupt	-27,6412	Bankrupt
		2017	-1,7761	Bankrupt	-4,0188	Bankrupt	-4,5032	Bankrupt
		2018	1,0243	Non-Bankrupt	-3,5300	Bankrupt	-2,7846	Bankrupt
		2019	-0,5950	Bankrupt	-5,5662	Bankrupt	-3,3396	Bankrupt
		2020	7,0712	Non-Bankrupt	3,2675	Non-Bankrupt	-1,0797	Bankrupt
5.	LEOPARDO FILMES, LDA	2016	1,7212	Non-Bankrupt	-1,0686	Bankrupt	-0,5314	Bankrupt
		2017	1,9965	Non-Bankrupt	-0,5551	Bankrupt	-0,5737	Bankrupt
		2018	2,8143	Non-Bankrupt	-0,5426	Bankrupt	-0,4197	Bankrupt
		2019	1,8942	Non-Bankrupt	-1,5232	Bankrupt	-0,3735	Bankrupt
		2020	1,8838	Non-Bankrupt	-0,6181	Bankrupt	-0,4257	Bankrupt
6.	V.C. - VALENTIM DE CARVALHO - FILMES, AUDIOVISUAIS, S.A.	2016	6,2106	Non-Bankrupt	1,9017	Non-Bankrupt	-0,5479	Bankrupt
		2017	5,7567	Non-Bankrupt	0,1246	Bankrupt	-0,5419	Bankrupt
		2018	6,2708	Non-Bankrupt	0,3129	Bankrupt	-0,3386	Bankrupt
		2019	6,1036	Non-Bankrupt	0,4433	Non-Bankrupt	-0,5309	Bankrupt
		2020	6,1682	Non-Bankrupt	0,1969	Bankrupt	-0,5210	Bankrupt
7.	WARNER BROS. INTERNATIONAL TELEVISION PRODUCTION ESPAA, S.L.- SUCURSAL EM PORTUGAL	2016	7,6165	Non-Bankrupt	1,8971	Non-Bankrupt	0,3478	Non-Bankrupt
		2017	14,8117	Non-Bankrupt	4,8150	Non-Bankrupt	2,9874	Non-Bankrupt
		2018	13,4835	Non-Bankrupt	4,2713	Non-Bankrupt	1,8896	Non-Bankrupt
		2019	9,6778	Non-Bankrupt	3,5162	Non-Bankrupt	0,5533	Non-Bankrupt
		2020	10,0765	Non-Bankrupt	1,9294	Non-Bankrupt	0,5283	Non-Bankrupt

Appendix F – Scores and results of each model for every Spanish company in the sample.

Number	Company	Year	Z"-Score	Z"-Score Result	C. das Neves	C. das Neves Result	Lizarraga	Lizarraga Result
1.	GESTMUSIC ENDEMOL SA	2016	13,7227	Non-Bankrupt	3,5782	Non-Bankrupt	2,5418	Non-Bankrupt
		2017	13,9075	Non-Bankrupt	3,7391	Non-Bankrupt	2,5420	Non-Bankrupt
		2018	12,8416	Non-Bankrupt	1,4562	Non-Bankrupt	2,4789	Non-Bankrupt
		2019	12,5230	Non-Bankrupt	0,0329	Bankrupt	2,8105	Non-Bankrupt
		2020	10,8736	Non-Bankrupt	2,3373	Non-Bankrupt	2,7795	Non-Bankrupt
2.	VIACOM INTERNATIONAL MEDIA NETWORKS ESPAÑA SL.	2016	11,2146	Non-Bankrupt	1,3729	Non-Bankrupt	1,4938	Non-Bankrupt
		2017	5,6655	Non-Bankrupt	-1,8753	Bankrupt	0,7791	Non-Bankrupt
		2018	8,0951	Non-Bankrupt	3,1336	Non-Bankrupt	1,1810	Non-Bankrupt
		2019	9,4917	Non-Bankrupt	2,8365	Non-Bankrupt	0,4841	Non-Bankrupt
		2020	11,1972	Non-Bankrupt	2,9223	Non-Bankrupt	1,2594	Non-Bankrupt
3.	LA FABRICA DE LA TELE SL	2016	13,7663	Non-Bankrupt	2,4652	Non-Bankrupt	3,0492	Non-Bankrupt
		2017	14,5577	Non-Bankrupt	3,7378	Non-Bankrupt	3,2106	Non-Bankrupt
		2018	15,7500	Non-Bankrupt	3,7268	Non-Bankrupt	3,4703	Non-Bankrupt
		2019	16,4035	Non-Bankrupt	4,8489	Non-Bankrupt	4,0295	Non-Bankrupt
		2020	15,0125	Non-Bankrupt	2,4579	Non-Bankrupt	3,4102	Non-Bankrupt
4.	SHINE IBERIA SLU	2016	6,2177	Non-Bankrupt	1,7060	Non-Bankrupt	0,1091	Non-Bankrupt
		2017	6,3598	Non-Bankrupt	0,9887	Non-Bankrupt	-0,0004	Bankrupt
		2018	8,7512	Non-Bankrupt	2,8147	Non-Bankrupt	0,8523	Non-Bankrupt
		2019	8,3197	Non-Bankrupt	2,2037	Non-Bankrupt	0,5302	Non-Bankrupt
		2020	8,6209	Non-Bankrupt	2,2407	Non-Bankrupt	0,0668	Non-Bankrupt
5.	BAMBU PRODUCCIONES SL	2016	11,1633	Non-Bankrupt	4,7586	Non-Bankrupt	1,9455	Non-Bankrupt
		2017	8,6218	Non-Bankrupt	3,0160	Non-Bankrupt	0,7012	Non-Bankrupt
		2018	10,2830	Non-Bankrupt	3,3449	Non-Bankrupt	1,4155	Non-Bankrupt
		2019	12,1733	Non-Bankrupt	4,4234	Non-Bankrupt	1,0936	Non-Bankrupt
		2020	9,5621	Non-Bankrupt	1,9725	Non-Bankrupt	0,1737	Non-Bankrupt
6.	7 Y ACCION SL	2016	16,8706	Non-Bankrupt	4,4390	Non-Bankrupt	5,5376	Non-Bankrupt
		2017	22,8207	Non-Bankrupt	7,9878	Non-Bankrupt	8,3714	Non-Bankrupt
		2018	21,6119	Non-Bankrupt	5,7464	Non-Bankrupt	7,2797	Non-Bankrupt
		2019	20,8745	Non-Bankrupt	5,5565	Non-Bankrupt	7,0377	Non-Bankrupt
		2020	17,3303	Non-Bankrupt	5,5279	Non-Bankrupt	5,6501	Non-Bankrupt
7.	BULLDOG TV SPAIN SL.	2016	10,7032	Non-Bankrupt	5,1151	Non-Bankrupt	2,2980	Non-Bankrupt
		2017	18,9718	Non-Bankrupt	7,2827	Non-Bankrupt	5,3331	Non-Bankrupt
		2018	20,9218	Non-Bankrupt	6,1750	Non-Bankrupt	6,5267	Non-Bankrupt
		2019	19,2650	Non-Bankrupt	5,3125	Non-Bankrupt	5,2342	Non-Bankrupt
		2020	12,4559	Non-Bankrupt	3,1869	Non-Bankrupt	2,5253	Non-Bankrupt

8.	ANTENA 3 NOTICIAS SOCIEDAD LIMITADA.	2016	4,1478	Non-Bankrupt	0,5814	Non-Bankrupt	-0,7886	Bankrupt
		2017	4,6888	Non-Bankrupt	0,7788	Non-Bankrupt	-0,6915	Bankrupt
		2018	5,7300	Non-Bankrupt	1,3293	Non-Bankrupt	-0,2666	Bankrupt
		2019	4,2681	Non-Bankrupt	-0,1189	Bankrupt	-0,2701	Bankrupt
		2020	7,2355	Non-Bankrupt	3,2001	Non-Bankrupt	-0,7116	Bankrupt
9.	VEO TELEVISION SAU	2016	8,7073	Non-Bankrupt	-1,7864	Bankrupt	0,4606	Non-Bankrupt
		2017	8,9674	Non-Bankrupt	1,0838	Non-Bankrupt	0,4919	Non-Bankrupt
		2018	5,2922	Non-Bankrupt	-11,2168	Bankrupt	2,6713	Non-Bankrupt
		2019	7,6512	Non-Bankrupt	3,8901	Non-Bankrupt	1,7884	Non-Bankrupt
		2020	9,1015	Non-Bankrupt	2,9964	Non-Bankrupt	1,6436	Non-Bankrupt
10.	XARXA AUDIOVISUAL LOCAL SL	2016	4,2701	Non-Bankrupt	0,3520	Bankrupt	-0,7422	Bankrupt
		2017	4,2450	Non-Bankrupt	-0,0454	Bankrupt	-0,7677	Bankrupt
		2018	4,2715	Non-Bankrupt	-0,0461	Bankrupt	-0,7613	Bankrupt
		2019	4,1352	Non-Bankrupt	-0,0182	Bankrupt	-0,7809	Bankrupt
		2020	4,5398	Non-Bankrupt	0,1044	Bankrupt	-0,7420	Bankrupt
11.	FREMANTLEMEDIA ESPAÑA SA.	2016	-12,8184	Bankrupt	-3,7755	Bankrupt	-2,9739	Bankrupt
		2017	-10,2713	Bankrupt	-3,4705	Bankrupt	-2,6512	Bankrupt
		2018	-10,2916	Bankrupt	-3,8265	Bankrupt	-3,0719	Bankrupt
		2019	-6,3748	Bankrupt	-2,4346	Bankrupt	-2,2756	Bankrupt
		2020	-4,0494	Bankrupt	-1,8536	Bankrupt	-1,9400	Bankrupt
12.	GRUPO GANGA PRODUCCIONES SL	2016	6,2966	Non-Bankrupt	-0,5666	Bankrupt	-0,5868	Bankrupt
		2017	6,0777	Non-Bankrupt	-0,5789	Bankrupt	-0,2134	Bankrupt
		2018	4,4426	Non-Bankrupt	-0,7747	Bankrupt	-0,6547	Bankrupt
		2019	3,9117	Non-Bankrupt	-0,2348	Bankrupt	-0,6005	Bankrupt
		2020	5,4295	Non-Bankrupt	0,6709	Non-Bankrupt	-0,3460	Bankrupt
13.	SUPERSPORT TELEVISION SL.	2016	11,4081	Non-Bankrupt	3,0427	Non-Bankrupt	1,9421	Non-Bankrupt
		2017	11,8590	Non-Bankrupt	2,8529	Non-Bankrupt	2,1116	Non-Bankrupt
		2018	14,8272	Non-Bankrupt	2,7244	Non-Bankrupt	2,9576	Non-Bankrupt
		2019	12,4794	Non-Bankrupt	3,4086	Non-Bankrupt	2,4113	Non-Bankrupt
		2020	13,5344	Non-Bankrupt	2,6617	Non-Bankrupt	4,2563	Non-Bankrupt
14.	WARNER BROS INTERNATIONAL TELEVISION PRODUCTION ESPAÑA SL	2016	8,8149	Non-Bankrupt	2,6646	Non-Bankrupt	1,0595	Non-Bankrupt
		2017	12,0863	Non-Bankrupt	4,1278	Non-Bankrupt	2,0866	Non-Bankrupt
		2018	13,8636	Non-Bankrupt	4,6213	Non-Bankrupt	2,6531	Non-Bankrupt
		2019	15,6563	Non-Bankrupt	3,2493	Non-Bankrupt	2,9395	Non-Bankrupt
		2020	19,0703	Non-Bankrupt	3,2398	Non-Bankrupt	3,6253	Non-Bankrupt
15.	MEGAMEDIA TELEVISION SL.	2016	11,5198	Non-Bankrupt	3,9777	Non-Bankrupt	2,4175	Non-Bankrupt
		2017	13,1701	Non-Bankrupt	4,3857	Non-Bankrupt	2,9599	Non-Bankrupt
		2018	13,6931	Non-Bankrupt	4,0868	Non-Bankrupt	2,9598	Non-Bankrupt
		2019	13,2709	Non-Bankrupt	3,7780	Non-Bankrupt	2,9138	Non-Bankrupt
		2020	12,6638	Non-Bankrupt	2,7945	Non-Bankrupt	2,5249	Non-Bankrupt

16.	PLANO A PLANO PRODUCTORA CINE Y TELEVISION SL	2016	4,5120	Non-Bankrupt	0,4984	Non-Bankrupt	-0,7940	Bankrupt
		2017	5,1534	Non-Bankrupt	1,2085	Non-Bankrupt	-0,1672	Bankrupt
		2018	5,6312	Non-Bankrupt	0,9133	Non-Bankrupt	0,1944	Non-Bankrupt
		2019	6,3031	Non-Bankrupt	1,0676	Non-Bankrupt	0,0979	Non-Bankrupt
		2020	-0,0530	Bankrupt	-3,8270	Bankrupt	-2,8644	Bankrupt
17.	ATRESMEDIA CINE SL.	2016	5,7109	Non-Bankrupt	0,3202	Bankrupt	-0,7308	Bankrupt
		2017	6,0776	Non-Bankrupt	0,4757	Non-Bankrupt	-0,7949	Bankrupt
		2018	4,8099	Non-Bankrupt	-1,2797	Bankrupt	-0,6829	Bankrupt
		2019	6,3937	Non-Bankrupt	0,7937	Non-Bankrupt	-1,0326	Bankrupt
		2020	6,3790	Non-Bankrupt	-0,1995	Bankrupt	-1,2298	Bankrupt
18.	ZEPPELIN TELEVISION SA	2016	11,8858	Non-Bankrupt	3,6901	Non-Bankrupt	2,1303	Non-Bankrupt
		2017	10,5347	Non-Bankrupt	2,5971	Non-Bankrupt	0,9730	Non-Bankrupt
		2018	11,9642	Non-Bankrupt	2,7918	Non-Bankrupt	1,2265	Non-Bankrupt
		2019	10,3797	Non-Bankrupt	1,8424	Non-Bankrupt	1,7188	Non-Bankrupt
		2020	6,9175	Non-Bankrupt	-1,1449	Bankrupt	-1,1245	Bankrupt
19.	TELSON SERVICIOS AUDIOVISUALES SL	2016	1,8970	Non-Bankrupt	-1,8435	Bankrupt	-1,4870	Bankrupt
		2017	0,4523	Non-Bankrupt	-3,3219	Bankrupt	-3,0336	Bankrupt
		2018	-0,5950	Bankrupt	-4,3145	Bankrupt	-2,5478	Bankrupt
		2019	-1,3896	Bankrupt	-2,8976	Bankrupt	-3,4333	Bankrupt
		2020	-2,6147	Bankrupt	-3,4014	Bankrupt	-5,2687	Bankrupt
20.	ADISAR MEDIA SL	2016	15,1788	Non-Bankrupt	4,1923	Non-Bankrupt	3,7776	Non-Bankrupt
		2017	4,2929	Non-Bankrupt	-1,3732	Bankrupt	0,4654	Non-Bankrupt
		2018	6,6307	Non-Bankrupt	2,1544	Non-Bankrupt	1,5628	Non-Bankrupt
		2019	8,4095	Non-Bankrupt	2,3254	Non-Bankrupt	2,2657	Non-Bankrupt
		2020	6,1807	Non-Bankrupt	1,5707	Non-Bankrupt	0,5157	Non-Bankrupt
21.	SECUOYA CONTENIDOS SOCIEDAD LIMITADA.	2016	5,0840	Non-Bankrupt	1,1844	Non-Bankrupt	-1,3568	Bankrupt
		2017	5,0505	Non-Bankrupt	-0,6656	Bankrupt	0,7163	Non-Bankrupt
		2018	3,7342	Non-Bankrupt	0,1855	Bankrupt	-0,4659	Bankrupt
		2019	2,7558	Non-Bankrupt	-1,0896	Bankrupt	-0,4017	Bankrupt
		2020	4,5841	Non-Bankrupt	1,4203	Non-Bankrupt	-0,6328	Bankrupt
22.	TF7 -TV SL	2016	14,6746	Non-Bankrupt	5,0582	Non-Bankrupt	4,4646	Non-Bankrupt
		2017	9,8085	Non-Bankrupt	1,0359	Non-Bankrupt	1,8539	Non-Bankrupt
		2018	9,4153	Non-Bankrupt	1,9631	Non-Bankrupt	2,0200	Non-Bankrupt
		2019	7,7936	Non-Bankrupt	1,2112	Non-Bankrupt	1,7347	Non-Bankrupt
		2020	8,9660	Non-Bankrupt	2,8368	Non-Bankrupt	0,9046	Non-Bankrupt
23.	CASTELAO PICTURES SL	2016	3,6297	Non-Bankrupt	-0,3723	Bankrupt	-0,8793	Bankrupt
		2017	3,0363	Non-Bankrupt	-1,0476	Bankrupt	-0,4661	Bankrupt
		2018	2,9883	Non-Bankrupt	-0,2255	Bankrupt	-0,5831	Bankrupt
		2019	2,3985	Non-Bankrupt	-0,4052	Bankrupt	-0,5748	Bankrupt
		2020	3,7645	Non-Bankrupt	0,9673	Non-Bankrupt	-0,3955	Bankrupt

24.	MAMMA TEAM PRODUCTIONS SL	2016	9,0204	Non-Bankrupt	-0,5316	Bankrupt	-0,0393	Bankrupt
		2017	9,8050	Non-Bankrupt	2,8563	Non-Bankrupt	1,0700	Non-Bankrupt
		2018	12,2679	Non-Bankrupt	3,9344	Non-Bankrupt	1,8699	Non-Bankrupt
		2019	8,1100	Non-Bankrupt	0,0255	Bankrupt	0,0187	Non-Bankrupt
		2020	8,7296	Non-Bankrupt	1,9605	Non-Bankrupt	-0,7778	Bankrupt
25.	FACTORIA PLURAL SL	2016	9,2268	Non-Bankrupt	-69,7641	Bankrupt	0,4540	Non-Bankrupt
		2017	6,8426	Non-Bankrupt	0,8060	Non-Bankrupt	-0,0492	Bankrupt
		2018	8,4489	Non-Bankrupt	2,3444	Non-Bankrupt	0,2294	Non-Bankrupt
		2019	9,3336	Non-Bankrupt	1,6126	Non-Bankrupt	0,2260	Non-Bankrupt
		2020	8,8489	Non-Bankrupt	2,1202	Non-Bankrupt	-0,2438	Bankrupt
26.	PRODUCCIONES MANDARINA S.L.	2016	17,8144	Non-Bankrupt	2,6832	Non-Bankrupt	2,9454	Non-Bankrupt
		2017	23,7065	Non-Bankrupt	1,1312	Non-Bankrupt	4,8563	Non-Bankrupt
		2018	15,3712	Non-Bankrupt	0,5227	Non-Bankrupt	1,0778	Non-Bankrupt
		2019	17,8159	Non-Bankrupt	2,5169	Non-Bankrupt	2,4531	Non-Bankrupt
		2020	41,7126	Non-Bankrupt	2,0985	Non-Bankrupt	12,8184	Non-Bankrupt
27.	CTV, SA	2016	5,9405	Non-Bankrupt	0,5510	Non-Bankrupt	0,4278	Non-Bankrupt
		2017	5,9947	Non-Bankrupt	0,9564	Non-Bankrupt	0,4204	Non-Bankrupt
		2018	6,5180	Non-Bankrupt	0,7091	Non-Bankrupt	0,6179	Non-Bankrupt
		2019	5,8252	Non-Bankrupt	0,2163	Bankrupt	0,4365	Non-Bankrupt
		2020	5,8227	Non-Bankrupt	0,7091	Non-Bankrupt	0,4788	Non-Bankrupt
28.	CONTUBERNIO SL.	2016	14,0096	Non-Bankrupt	4,1255	Non-Bankrupt	2,3227	Non-Bankrupt
		2017	16,1790	Non-Bankrupt	3,2448	Non-Bankrupt	3,6031	Non-Bankrupt
		2018	18,4138	Non-Bankrupt	4,6447	Non-Bankrupt	4,1838	Non-Bankrupt
		2019	18,3656	Non-Bankrupt	2,4864	Non-Bankrupt	3,5204	Non-Bankrupt
		2020	70,2355	Non-Bankrupt	3,1910	Non-Bankrupt	26,5921	Non-Bankrupt
29.	PALMA PICTURES THE MEDITERRANEAN PRODUCTION CENTRE S.L.	2016	3,6963	Non-Bankrupt	-0,3668	Bankrupt	-0,6958	Bankrupt
		2017	4,3560	Non-Bankrupt	0,0098	Bankrupt	-0,3103	Bankrupt
		2018	5,2242	Non-Bankrupt	0,4745	Non-Bankrupt	0,0265	Non-Bankrupt
		2019	5,7421	Non-Bankrupt	0,5798	Non-Bankrupt	0,1711	Non-Bankrupt
		2020	4,4036	Non-Bankrupt	-0,4851	Bankrupt	-0,9330	Bankrupt
30.	INDALOYMEDIA SL	2016	14,5233	Non-Bankrupt	3,2931	Non-Bankrupt	2,3318	Non-Bankrupt
		2017	12,5973	Non-Bankrupt	1,6984	Non-Bankrupt	2,2894	Non-Bankrupt
		2018	13,0159	Non-Bankrupt	3,0309	Non-Bankrupt	2,6484	Non-Bankrupt
		2019	9,5408	Non-Bankrupt	1,0740	Non-Bankrupt	1,6568	Non-Bankrupt
		2020	11,2826	Non-Bankrupt	3,1930	Non-Bankrupt	1,5036	Non-Bankrupt
31.	EL RANCHITO IMAGEN DIGITAL SL	2016	13,8448	Non-Bankrupt	4,3097	Non-Bankrupt	2,7812	Non-Bankrupt
		2017	10,2120	Non-Bankrupt	0,4498	Non-Bankrupt	0,6895	Non-Bankrupt
		2018	16,3472	Non-Bankrupt	3,3381	Non-Bankrupt	3,2100	Non-Bankrupt
		2019	11,7057	Non-Bankrupt	3,4008	Non-Bankrupt	0,9117	Non-Bankrupt
		2020	7,2188	Non-Bankrupt	0,3943	Non-Bankrupt	-1,4795	Bankrupt

32.	SISIFUS PRODUCCIONES S.A.	2016	13,1471	Non-Bankrupt	1,8076	Non-Bankrupt	1,8602	Non-Bankrupt
		2017	15,4357	Non-Bankrupt	3,7066	Non-Bankrupt	2,8871	Non-Bankrupt
		2018	23,3258	Non-Bankrupt	3,0279	Non-Bankrupt	6,5742	Non-Bankrupt
		2019	18,5794	Non-Bankrupt	3,3527	Non-Bankrupt	4,5845	Non-Bankrupt
		2020	18,7615	Non-Bankrupt	3,8595	Non-Bankrupt	4,1765	Non-Bankrupt
33.	ZEBRA PRODUCCIONES SA	2016	6,5516	Non-Bankrupt	0,5940	Non-Bankrupt	0,1511	Non-Bankrupt
		2017	7,5587	Non-Bankrupt	0,9189	Non-Bankrupt	0,3003	Non-Bankrupt
		2018	6,3470	Non-Bankrupt	-0,3978	Bankrupt	-0,5374	Bankrupt
		2019	7,6269	Non-Bankrupt	1,4913	Non-Bankrupt	1,0080	Non-Bankrupt
		2020	8,7990	Non-Bankrupt	2,8905	Non-Bankrupt	1,5455	Non-Bankrupt

Appendix G - Percentages (%) of Bankrupt and Non-Bankrupt companies for each model for the Portuguese sample and state of the Portuguese sector.

Year	Z"-Score			Carvalho das Neves			Lizarraga		
	Sample		Sector	Sample		Sector	Sample		Sector
	Bankrupt	Non-Bankrupt	State	Bankrupt	Non-Bankrupt	State	Bankrupt	Non-Bankrupt	State
2016	14,29%	85,71%	Non-Bankrupt	42,86%	57,14%	Bankrupt	71,43%	28,57%	Bankrupt
2017	14,29%	85,71%	Non-Bankrupt	57,14%	42,86%	Bankrupt	71,43%	28,57%	Bankrupt
2018	0,00%	100,00%	Non-Bankrupt	42,86%	57,14%	Bankrupt	57,14%	42,86%	Bankrupt
2019	14,29%	85,71%	Non-Bankrupt	28,57%	71,43%	Bankrupt	42,86%	57,14%	Bankrupt
2020	0,00%	100,00%	Non-Bankrupt	28,57%	71,43%	Bankrupt	85,71%	14,29%	Bankrupt

Appendix H - Percentages (%) of Bankrupt and Non-Bankrupt companies for each model for the Spanish sample and state of the Spanish sector.

Year	Z"-Score			Carvalho das Neves			Lizarraga		
	Sample		Sector	Sample		Sector	Sample		Sector
	Bankrupt	Non-Bankrupt	State	Bankrupt	Non-Bankrupt	State	Bankrupt	Non-Bankrupt	State
2016	3,03%	96,97%	Non-Bankrupt	30,30%	69,70%	Non-Bankrupt	33,33%	66,67%	Bankrupt
2017	3,03%	96,97%	Non-Bankrupt	27,27%	72,73%	Non-Bankrupt	33,33%	66,67%	Bankrupt
2018	6,06%	93,94%	Non-Bankrupt	27,27%	72,73%	Non-Bankrupt	27,27%	72,73%	Bankrupt
2019	6,06%	93,94%	Non-Bankrupt	30,30%	69,70%	Non-Bankrupt	24,24%	75,76%	Bankrupt
2020	9,09%	90,91%	Non-Bankrupt	21,21%	78,79%	Bankrupt	42,42%	57,58%	Bankrupt