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Financial analysis and comparative study of inventory management
of Greek listed companies in the oil refinery sector

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Patras, Greece, June 2024

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Financial analysis and comparative study of inventory management of Greek listed companies in the oil refinery sector

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Abstract

This study aims to conduct a comprehensive financial analysis and comparative evaluation of inventory management practices among Greek listed companies in the oil refinery sector. Inventory management and identification of weak notes help improve efficiency and profitability. Through financial analysis, decisions are made that are necessary to formulate strategies, especially in an industry characterized by high volatility and significant capital investments.

The dissertation begins with a historical review of oil and a presentation of the branch and the companies. Then the financial analysis and the theory of the numerical indicators that will be used are presented. In the practical part, analysis utilizes financial data from the two largest listed Greek oil refining companies. Through the study of the numerical indicators, the financial performance, liquidity and overall corporate health of the two companies are evaluated. Benchmarking techniques are used to benchmark each company's inventory management practices strengths and areas for improvement. In addition, the study investigates the effect of external factors, such as the current economic conditions of each year, on the efficiency of the companies.

The findings reveal some significant differences in efficiency, liquidity and leverage among the companies surveyed, with some demonstrating superior practices associated with increased profitability and reduced operational risks. Finally, a statistical check is made for the difference between the means of the indices and then all the conclusions of the research are presented.

In conclusion, this research highlights the importance of ratio analysis in maintaining financial stability and competitive advantage in the oil refinery sector of Greece. The insights gained from this benchmarking offer valuable guidance for industry stakeholders to improve management strategies and improve overall financial results.

Keywords

Financial Analysis, KPIs, inventory management, oil, Greek refineries.

Χρηματοοικονομική ανάλυση και συγκριτική μελέτη διαχείρισης αποθεμάτων ελληνικών εισηγμένων εταιρειών του κλάδου των δυλιστηρίων πετρελαίου

Χρήστος Γκαγκαβούζης

Περίληψη

Η παρούσα μελέτη στοχεύει στη διεξαγωγή συνολικής χρηματοοικονομικής ανάλυσης και συγκριτικής αξιολόγησης των πρακτικών διαχείρισης αποθεμάτων μεταξύ των ελληνικών εισηγμένων εταιρειών του κλάδου των δυλιστηρίων πετρελαίου. Η διαχείριση αποθεμάτων αλλά και ο εντοπισμός των αδύναμων σημείων βοηθά στην βελτίωση της αποτελεσματικότητας και της κερδοφορίας. Μέσω της χρηματοοικονομικής ανάλυσης λαμβάνονται αποφάσεις οι οποίες είναι αναγκαίες για τη χάραξη στρατηγικών, ειδικά σε έναν κλάδο που χαρακτηρίζεται από υψηλή μεταβλητότητα και σημαντικές επενδύσεις κεφαλαίου.

Η διατριβή ξεκινά με μια ιστορική αναδρομή στο πετρέλαιο και μια παρουσίαση του κλάδου και των εταιρειών. Στη συνέχεια παρουσιάζεται η οικονομική ανάλυση και η θεωρία των αριθμητικών δεικτών που θα χρησιμοποιηθούν. Στο πρακτικό μέρος, η ανάλυση χρησιμοποιεί οικονομικά στοιχεία από τις δύο μεγαλύτερες εισηγμένες ελληνικές εταιρείες διύλισης πετρελαίου. Μέσα από τη μελέτη των αριθμητικών δεικτών αξιολογείται η χρηματοοικονομική απόδοση, η ρευστότητα και η συνολική εταιρική υγεία των δύο εταιρειών. Οι τεχνικές συγκριτικής αξιολόγησης χρησιμοποιούνται για τη συγκριτική αξιολόγηση των δυνατών σημείων και των περιοχών βελτίωσης των πρακτικών διαχείρισης αποθεμάτων κάθε εταιρείας. Επιπλέον, η μελέτη διερευνά την

επίδραση εξωτερικών παραγόντων, όπως οι τρέχουσες οικονομικές συνθήκες κάθε έτους, στην αποτελεσματικότητα των επιχειρήσεων.

Τα ευρήματα αποκαλύπτουν ορισμένες σημαντικές διαφορές στην αποτελεσματικότητα, τη ρευστότητα και τη μόχλευση μεταξύ των εταιρειών που συμμετείχαν στην έρευνα, με ορισμένες να επιδεικνύουν ανώτερες πρακτικές που σχετίζονται με αυξημένη κερδοφορία και μειωμένους λειτουργικούς κινδύνους. Τέλος, γίνεται στατιστικός έλεγχος για τη διαφορά μεταξύ των μέσων των δεικτών και στη συνέχεια παρουσιάζονται όλα τα συμπεράσματα της έρευνας.

Συμπερασματικά, η παρούσα έρευνα αναδεικνύει τη σημασία της ανάλυσης αναλογιών για τη διατήρηση της χρηματοπιστωτικής σταθερότητας και του ανταγωνιστικού πλεονεκτήματος στον κλάδο των διυλιστηρίων πετρελαίου της Ελλάδας. Οι γνώσεις που αποκτήθηκαν από αυτήν τη συγκριτική αξιολόγηση προσφέρουν πολύτιμη καθοδήγηση για τους ενδιαφερόμενους του κλάδου για τη βελτίωση των στρατηγικών διαχείρισης και τη βελτίωση των συνολικών οικονομικών αποτελεσμάτων.

Λέξεις – Κλειδιά

Χρηματοοικονομική Ανάλυση, KPIs, διαχείριση αποθεμάτων, πετρέλαιο, ελληνικά διυλιστήρια.

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1. Introduction

The crisis that we experienced both in the Greek and in the world economy, combined with the war in Ukraine and in the Middle East, greatly affected oil prices and the refining industry in Greece as a whole and caused significant changes in the environment in which the Greek refineries operate. Thus, Greek refineries should be able to cope with the ever-increasing and quite strong competitive pressures they face, in order to remain viable in the years to come. Oil, as a major energy resource, plays a critical role in economic growth and stability worldwide. The price of oil is affected by a multitude of factors, including geopolitical tensions, economic cycles, political decisions, and technological innovations, which makes the analysis of its economic indicators particularly important (Parra, 2003).

This thesis presents a comprehensive financial analysis and comparative study of inventory management within Greek listed companies operating in the oil refinery sector, a critical component of Greece's industrial framework and economic output. The oil refinery industry is notably capital-intensive and highly sensitive to fluctuations in global oil prices, making effective inventory management pivotal for maintaining profitability and operational resilience (Manifavas, 2016).

Given the strategic importance of this sector to the national economy, this study aims to dissect and compare the financial health and inventory strategies of major players within the Greek market. For this reason, two of the largest Greek companies, Motoroil Hellas and Hellenic Oils (HELPE), were chosen for this thesis. By analyzing financial records, inventory data, and management approaches, the thesis seeks to identify best practices and potential areas for optimization. This research will not only provide a clearer understanding of how these companies manage the complexities associated with large-scale oil production and refining processes but will also offer insights into how they navigate the challenges posed by economic shifts and regulatory changes.

Through this analysis, the thesis endeavors to contribute valuable insights to the fields of financial management and supply chain optimization, offering recommendations that could guide policy-making and strategic decision-making within the sector.

2. Literature Review

2.1 Historical Retrospect of Oil

Oil has played a pivotal role in shaping the modern world, influencing global politics, economic development, and technological advancements. Its history spans thousands of years, evolving from simple uses in ancient civilizations to becoming the lifeblood of industrial society.

The earliest known uses of oil date back to ancient Mesopotamia around 4500 B.C., where bitumen (a natural form of petroleum) was used in construction and waterproofing. Ancient Egyptians also utilized it for mummification and as a medicinal ointment. In the classical era, oil seeps were exploited in the Middle East, and by the medieval period, the surface collection of oil was common in regions such as the Carpathian Mountains and parts of the Middle East.

The modern petroleum industry began in the mid-19th century. In 1859, Edwin Drake drilled the first successful oil well in Titusville, Pennsylvania, ushering in a new era for energy. This breakthrough led to the rapid development of the oil industry, with the establishment of refineries and the expansion of oil drilling to new regions (Parra , 2003).

The advent of the internal combustion engine dramatically increased the demand for petroleum, particularly gasoline. The automobile industry, led by figures like Henry Ford, catalyzed a massive increase in oil consumption, making it an integral part of the 20th-century industrial landscape. The strategic importance of oil was underscored during the World Wars, where it became a crucial resource for military operations and a target in conflicts (Bla, 2020).

The post-war era marked a significant expansion in global oil consumption, facilitated by economic growth and the rise of consumer culture. This period also saw the formation of the Organization of Petroleum Exporting Countries (OPEC) in 1960, which aimed to regulate the supply of oil and stabilize the market. OPEC's influence became particularly evident during the 1973 oil crisis, when its embargo caused prices to quadruple, leading to economic turmoil in oil-importing nations (Buell, 2012).

As the environmental impacts of fossil fuel consumption became apparent, the latter part of the 20th century and the early 21st century have seen a growing push towards renewable energy. The oil crises of the 1970s spurred advancements in energy efficiency and the exploration of alternative energy sources like solar and wind power. Despite these shifts, oil remains a critical global resource, central to the economies of many nations, particularly those in the Middle East.

Today, the oil industry is at a crossroads, with the dual challenges of climate change and technological innovation in energy production prompting a gradual shift towards more sustainable and renewable energy sources. This transition is supported by international agreements like the Paris Climate Accord and increased investment in green technologies. However, oil's role in the global economy continues to be significant, highlighting its complex legacy as both a driver of progress and a source of geopolitical tension and environmental issues (Wang, 2010).

As the world looks towards a more sustainable future, the historical importance of oil serves as a reminder of its impact on human development and the ongoing need to balance energy needs with environmental and social responsibilities. The story of oil is not just about energy; it's about the evolution of human society and the continuous quest for advancement and sustainability.

2.2 Oil Refining

Oil refining is a crucial industrial process that transforms crude oil into useful products like gasoline, diesel, jet fuel, heating oil, and petrochemicals used in the production of plastics and other vital materials. The refining process begins with the distillation of crude oil in a large furnace, where it is heated at high temperatures. This causes the oil to vaporize and ascend through a distillation column. As the vapor rises, it cools and condenses into liquids at different heights based on the boiling points of the various components (Aitani, 2004).

After distillation, further processing and chemical treatments are applied to enhance the quality and characteristics of the distilled products. This includes cracking, which breaks larger hydrocarbon molecules into smaller ones, and reforming, which rearranges molecular structures to improve fuel efficiency. Additional processes like treating and

blending are used to remove impurities and ensure the final products meet specific standards and properties required for various uses.

Overall, oil refining is a complex and vital process that ensures crude oil is effectively converted into an array of essential products that support modern society's energy needs and industrial activities.

2.3 World Oil Market, Imports/Exports

The global oil market operates within a complex and intricate system of international trade, governed by fluctuating economic conditions, geopolitical influences, and evolving regulatory environments. As one of the most crucial commodities in the world, oil plays a central role in shaping economic landscapes and influencing international relations (Winegard, 2016).

Major Producers and Exporters: Countries with rich oil reserves dominate the export landscape, significantly influencing global oil prices and supply stability. The Organization of the Petroleum Exporting Countries (OPEC), which includes major oil-producing nations like Saudi Arabia, Iraq, Iran, and Venezuela, has historically played a pivotal role in managing oil supply to optimize prices and meet global demand effectively. Non-OPEC countries such as the United States, Russia, and Canada also contribute substantially to global oil exports, with the U.S. seeing a dramatic increase in export volumes due to advances in extraction technologies like fracking.

Major Importers: On the demand side, industrialized and developing nations with limited domestic oil resources rely heavily on imports to fuel their economies. China, the United States (despite being a major producer), and India are the largest oil importers. Their demand for oil is driven by rapid industrialization, increased transportation needs, and population growth. These nations' energy policies and economic health significantly influence global oil demand and import strategies.

The world oil market is characterized by its volatility (Arezki, 2017). Prices can fluctuate wildly based on several factors:

- Supply and Demand Imbalances: Economic downturns, technological advancements, and shifts towards renewable energy sources can all decrease demand, whereas economic booms and industrial activities can increase it.
- Geopolitical Events: Wars, political instability, and diplomatic relations among oil-producing countries can lead to significant disruptions in oil supplies, thereby affecting global markets.
- Regulatory Changes: Environmental policies, trade tariffs, and international agreements can also impact oil trading patterns and pricing. The global push towards sustainability is prompting a shift to alternative energy sources, which could diminish the oil market's size over the long term.

2.4 Greek Refineries and Oil Market in Greece

The Greek oil industry, which focuses mainly on refining and distribution, is a critical part of its energy sector. The country's oil sector is primarily affected by global oil prices and geopolitical events, which can lead to fluctuations in energy costs for both consumers and businesses. Despite the country's lack of significant domestic oil production (it relies mainly on imports to meet its demand), its strategic location and established infrastructure play a vital role in the wider Mediterranean and European oil markets (Fafaliou & Polemis, 2012). There are two major companies in the Greek market, which are the leaders in the oil sector.

- **Hellenic Petroleum (HELPE)**: This is Greece's largest oil refining company, operating three of the country's main refineries located in Aspropyrgos, Elefsina, and Thessaloniki. These refineries have a significant capacity to process crude oil into a variety of petroleum products, including gasoline, diesel, jet fuel, and heating oil. Hellenic Petroleum is also involved in petrochemical production and has extensive retail operations with a large network of service stations across Greece.
- **Motor Oil Hellas**: Located in Corinth, this refinery is one of the largest and most modern in the Eastern Mediterranean. It boasts sophisticated units capable of processing a wide range of crude oils and producing a high percentage of light and middle distillates, such as gasoline and diesel. Motor Oil Hellas also exports

products to various countries in the region, contributing significantly to Greece's export statistics.

Due to its limited oil reserves, Greece imports almost all of its crude oil for its refineries from countries such as Russia, Kazakhstan, Iraq and Saudi Arabia. Greece has developed a strong infrastructure for the storage and transportation of oil, including facilities at major ports and a network of pipelines connecting refineries to distribution points and export terminals. The retail sector of the Greek oil industry is competitive, with many service stations operated by various companies, including international oil companies and local operators (Danchev & Maniatis, 2014).

The Greek government regulates the oil market through various policies and tariffs, often influenced by broader European Union energy policies. These regulations aim to ensure a stable supply of oil, manage prices, and reduce environmental impact. Additionally, Greece is subject to EU regulations concerning energy conservation and the transition to renewable energy sources. As part of broader EU commitments, Greece is looking to decrease its dependency on fossil fuels and transition towards more renewable energy sources. This transition poses both challenges and opportunities for the oil sector, particularly in how it will adapt to changing energy landscapes (Manifavas, 2016).

Fluctuations in oil prices can have a significant impact on Greece's economy. High oil prices can increase transportation and production costs, leading to higher prices for goods and services throughout the economy. Conversely, lower oil prices can reduce these costs but may also affect the revenues of Greek oil companies involved in processing and selling oil products. The Greek oil industry often faces challenges due to economic instability in the region, which can affect investment and operations. The fluctuating global oil prices also impact profitability and planning (Zafeiriou & Sariannidis, 2012).

The Greek oil market is thus intricately linked to international markets, heavily impacted by global oil dynamics while also being influenced by regional geopolitical and economic factors. future will likely involve balancing traditional operations with innovative approaches to meet new environmental and economic standards.

2.5 Structure of The Energy Market in Greece

The energy market in Greece is composed of several key sectors: electricity, natural gas, renewable energy, and oil. Each of these sectors plays a crucial role in the national energy

landscape, and the market structure is designed to manage the production, distribution, and sale of these energy forms efficiently. The Greek energy market is in a state of transition, moving towards a more diversified, competitive, and sustainable framework. This transformation aligns with both national goals and EU-wide energy and climate objectives.

Electricity in Greece is generated from various sources including lignite (although its usage is diminishing in favor of cleaner energy sources), natural gas, hydroelectric, wind, solar, and biomass. The national transmission system is operated by the Independent Power Transmission Operator (ADMIE), which is responsible for transporting electricity from generation facilities to distribution networks across the country. The Hellenic Electricity Distribution Network Operator (ΔΕΔΔΗΕ) is in charge of the distribution network that delivers electricity to consumers. Also, Greece has a liberalized electricity market, meaning that consumers can choose their electricity suppliers. The market includes various players, from large-scale suppliers such as the Public Power Corporation (PPC), which was formerly state-owned and still holds a significant market share, to numerous smaller private entities. However, Greece is increasingly investing in renewable energy sources such as solar, wind, and hydroelectric power. These efforts are part of a broader strategy to move away from lignite and increase the share of renewables in the energy mix. The development of renewable energy is supported by both government incentives and EU directives, aiming to enhance sustainability and reduce carbon emissions (Hatzoglou, 2016).

Natural gas in Greece is primarily imported via pipelines and liquefied natural gas (LNG) terminals. Some exploration and production also occur, mainly in offshore areas. The Natural Gas Transmission System Operator (DESFA) manages the high-pressure pipeline system that transports natural gas across the country. In addition, local distribution companies (distribution system operators) are responsible for the final delivery of natural gas to consumers in urban areas. Similar to the electricity sector, the natural gas market is liberalized, allowing consumers to choose their providers among various competing companies.

Greece's energy policies are influenced by EU regulations and directives, aimed at market liberalization, environmental sustainability and energy security. The responsible body for the regulation of energy operations, the assurance and compliance with laws and standards, the promotion of competition and the protection of consumer rights is the

energy regulatory authority (RAE). Greece faces several challenges in its energy sector, including the need for infrastructure upgrades, the reduction of carbon emissions, and the management of energy resources. Recent developments include increasing interconnections with neighboring countries' electricity grids, enhancing natural gas storage capacities, and expanding renewable energy installations. Overall, the Greek energy market is in a state of transition, moving towards a more diversified, competitive, and sustainable framework. This transformation aligns with both national goals and EU-wide energy and climate objectives.

3. Presentation of The Companies

3.1 Hellenic Petroleum Company (HELPE)

3.1.1 Historical Retrospective of The Company

Hellenic Petroleum Company, also known as HEL.PE., has an important history in the energy sector in Greece. The history of the company is part of the larger history of the evolution of energy policy and industrial development in the country. The company HEL.PE. was founded in 1958 (since 1955 by the decision of the government of Greece, the coincidence was signed that marked the construction of the first refinery in Aspropyrgos, which was completed in 1958, and named «Greek refineries of Aspropyrgos SA” or “EL.D.A.”) and was the result of the merger of three smaller companies active in the oil refining sector in GREECE.

Later, in 1966, Tom Pappas, of Greek origin, inaugurated the new refinery in Thessaloniki (ESSO PAPPAS), while in 1971 the group of Ioannis Latsis inaugurated the third refinery in Elefsina (PETROLA HELLAS). In 1975, the Public Oil Company (POE or DEP) was established and the Greek government acquired the refineries of Aspropyrgos. Thus the public had under its control all the refining, distribution and trade of all petroleum products. From 1981-1982 the Greek public sector acquired several of the activities from ESSO, which were renamed EKO. Since 1985, the Greek public sector has been active in the exploration and exploitation of hydrocarbons. Then, in 1988, the public gas supply company (DEPA) was established, while in 1991 the oil market was liberalized. In the following years, research also begins in other regions of countries such as Western Greece. In 1998 all the subsidiaries of the DEP group were merged and Hellenic Petroleum SA was founded. the group's shares are listed on the Athens and London Stock Exchanges. In the following years, there is intense activity of the group in countries such as North Macedonia, Albania, Bulgaria, Serbia and Cyprus.

Since 2003 the group begins to be active in the electrical energy sector, while in 2007 in cooperation with the Italian company EDISON SPA, the company ELPEDISON is founded.

In the period 2008-2012, the group made the largest private industrial investment in the country, upgrading the refineries of Elefsina and Thessaloniki, while in 2009 in particular,

it acquired all the activities of BP in the country, thus strengthening its domestic presence in the Greek fuel market. The cooperation and operation of the three refineries significantly improved the competitiveness of the company and allowed it to be active in exports, a fact that allowed exports to make up 50% of its sales. In 2013, the issuance of a Eurobond of 500 million euros was completed, while in the following years the group became the largest Greek bond issuer in the international capital markets with bonds that exceeded 1 billion euros. At the same time, its profitability and its sales were significantly strengthened with a view to sustainability.

In 2019-2020 was a transitional year for the group and the global economy due to the covid pandemic. The group managed to cope and face all the challenges that were presented and especially with the strategic plan of "vision 2025", the entire group is turning its operations towards a more sustainable development, with investments (a typical investment is the photovoltaic park at the height of 135 million) but also development of its portfolio in the field of "green development" and renewable energy sources. Today, and after its renaming, the company is called "Hellenic Energy".

3.1.2 Useful Economic Quantities and Investments

It would be useful to outline some financial figures of the company (refer to 2023) before the financial analysis, such as:

- business cycle 2023=12.803 billion euros
- profit EBITDA=1.237 billion euros
- profit after taxes=606 million euros
- dividend per share=0.90 euros
- installed capacity of renewable energy sources 356 MW
- 54% exports of the total production of the refineries
- 6 countries of operation (Greece, Cyprus, Serbia, Montenegro, Bulgaria, North Macedonia)
- about 2000 gas stations in Greece and abroad, of which more than 200 have charging points
- total investments of 50 million euros in digital transformation projects

- investment plan of 4 billion euros until 2030, 50% of which will be invested in activities with a lower environmental footprint.
- photovoltaic park in Kozani, an investment of 135 million euros

3.2 Motor Oil Hellas

3.2.1 Historical Retrospective of The Company

The company was founded on May 7, 1970 and began its operation with the inauguration of the refinery in Corinth on November 11, 1970. Already from the first years of its operation, the company began to invest and grow, and specifically in 1975 an atmospheric distillation complex was built and large capacity tanks while in 1978 a catalytic reforming unit was built for the production of gasoline. Additionally, in 1980 a catalytic cracking unit was installed for fuel oil processing which marked the beginning of commercialization of high value added products. 4 years later, in 1984, an electrical energy production unit was built that uses gas as a raw material. Since 1993 the company has been certified with an ISO 9002 quality assurance system for all its activities and in 1996 50% of the company was purchased by the Saudi Arabian Oil Company (Saudi Aramco). In that year, its headquarters and headquarters were moved to Maroussi, Athens. In 2000 new units were built and the naphtha reformer was converted to a 103 octane continuous regeneration unit to produce EU fuel, while a distributed control system was installed. In the same year, the company was also certified with ISO 14001, a certification concerning the environmental management system. An important year was 2002, when 100% of the oil trading company AVIN OIL was acquired, while in 2005, the percentage held by Saudi ARAMCO was reacquired. Also, the operation of the hydrogen splitting unit started, which gives the possibility of producing clean fuels. In addition, in 2006 the company's chemistry was certified with ISO 17025, while in 2008 the company was certified with OHSAS 18001 regarding health and safety management. In 2009, it increases its participation in the company OFC aviation fuel services SA and reaches approximately 92%. 2010 was an important year as the new crude oil distillation unit with a refining capacity of 60000 barrels/day started operation, SHELL HELLAS was acquired and 49% of the jet fuel business was acquired. In 2014 the company CYCLON was also acquired, while in 2017 the company was recertified with ISO 9001 regarding quality

management and was certified with ISO 14001 regarding environmental management, with ISO 50001 regarding the energy management of its refinery and with ISO18788 regarding the security.

Since 2018, the company has acquired 90% of the electricity supply company NRG TRADING HOUSE ENERGY SA of AVINOIL, while entering the retail market of petroleum products in Serbia through its subsidiary CORAL. In 2019, the group enters the field of renewable energy sources and installs a large photovoltaic park at the refinery. In addition, in 2021, in cooperation with the TERNIA group, I will start the construction of a Gas Turbine Station with natural gas fuel in Komotini. Also in 2021 it enters the Croatian retail market of petroleum products with the acquisition of APIOS D.O.O. and in the North Macedonian market through the subsidiary CORAL FUELS DOOEL SKOPJE. Finally, a milestone year is 2022, when the group signs a memorandum of understanding with PPC for the implementation of projects in the field of green hydrogen, acquires approximately 30% of the ELLAKTOR group and becomes one of the largest producers of energy from renewable energy sources. In addition, MOTOR OIL REWEWABLE ENERGY has a project portfolio of more than 2.2 GW with investments in alternative fuels, circular economy products and research on sustainable micro-mobility.

3.2.2 Useful Economic Quantities and Investments

It would be useful to outline some financial figures of the company (refer to 2023) before the financial analysis, such as:

- business cycle 2023=13,316 billion euros
- profit EBITDA=1.383 billion euros
- profit after taxes=806 million euros
- exports and shipping sales are about 75% of the turnover
- dividend per share=1,80 euros
- MORE's project portfolio will be more than 2.2 GW
- investment expenditure of 207 million euros and planning for investment expenditure, which would concern 2024, amounting to 210 million euros
- exports to over 75 countries and has branches in 8 countries
- more than 1500 gas stations in Greece and abroad

- processing capacity of 200000 barrels of crude per day
- has one of the most modern refineries in Europe with a degree of complexity of 12.61 (Nelson Complexity Index)
- It has tanks with a capacity of 2,800,000 cubic meters – 1,000,000 cubic meters for crude oil and 1,800,000 cubic meters for intermediate and finished products.

4. Financial Analysis and Key Performance Indicators (KPIs) - Definition, Methodology and Theory

4.1 Financial Analysis

Financial analysis is the process of evaluating financial data to assess a company's performance, stability, and profitability. It involves the examination of financial statements, such as the income statement, balance sheet, and cash flow statement, to understand the company's financial health and make informed business decisions. The main objectives of financial analysis include evaluating a company's financial performance and financial health by understanding the company's liquidity, solvency and profitability and helping to making serious corporate decisions. In addition, it informs strategic planning, investment decisions and operational improvements. Furthermore, it predicts the existence of financial risks and helps to managing their mitigation (Xanthakis & Alexakis, 2006).

Types of financial analysis include horizontal analysis (which compares financial data across multiple periods to identify trends and patterns of growth), vertical analysis (which breaks down financial statements by expressing each line item as a percentage of a base number, usually total sales or total assets), and ratio analysis (which uses various financial ratios to assess aspects such as liquidity, profitability, leverage, activity and investments) (Gkikas, 2002).

The persons using the information resulting from the analysis may be for example the executives of the business, its management, its creditors, the potential investors or its suppliers (Robinson, 2020). More specifically:

- The management of the company is the first to analyze the financial data of the resulting statements, and identifies the current financial position of the unit, as well as its ability to respond to its obligations. It also tries to achieve the right combination of short-term and long-term liabilities and equity so that generates profits.
- The main interest of investors is to learn the general financial condition of the business and its ability to achieves profits. Investors look at the analysis of the common sizes of financial data of the past years and the compare with those of its

current financial situation. With this way the future outlook of an investment is calculated.

- Basic examples of lenders are banks and others credit institutions, which they are interested directly for the financial statements and analyzes of the business. They study the data of the companies to determine the returns and the extent to which the companies can meet their obligations so that they can be granted loans.
- Suppliers are interested in the financial status of cooperating companies, i.e. for the ability to cover them their obligations to them so that they can have collections themselves. Even the suppliers provide credits for long periods of time and for that's why they have to study the situations in order to decide on the cost of funds that can be managed. Thus, the result of the analysis in the specific category affects factors such as credit time and credit amount.

4.2 Key Performance Indicators (KPIs)

Key performance indicators (KPIs) in financial management are measurable metrics used to evaluate an organization's financial performance. They help monitor progress toward financial goals, evaluate the effectiveness of financial strategies, and make informed decisions. Financial performance indicators are rooted in both economic theory and practical application, offering information on various dimensions of an organization's financial health. The theoretical basis of financial KPIs lies in the principles of financial management and accounting (Nelson & Perli, 2007). These principles include efficient resource allocation, cost management, revenue optimization and profitability analysis. KPIs are aligned with broader financial objectives such as maximizing shareholder value, ensuring liquidity and maintaining solvency.

The financial indicators are divided into 5 large categories, which are the following (Vassiliou & Ireiotis, 2008):

- Profitability ratios: These KPIs focus on a company's ability to generate profits relative to its revenues, assets, or equity. Commonly used profitability KPIs include gross profit margin, net profit margin, operating profit margin, return on assets (ROA) and return on equity (ROE).

- Liquidity ratios: Liquidity KPIs assess an organization's ability to meet its short-term obligations. Key liquidity performance ratios include general liquidity ratio, immediate liquidity ratio and net working capital.
- Leverage ratios: These KPIs measure the extent to which a company uses debt to finance its operations. The main ratios are the debt ratio, the debt-to-equity ratio, the capital leverage ratio, the long-term debt-to-total long-term capital ratio and the interest coverage ratio.
- Performance ratios (or activity ratios): Performance KPIs assess how well a company is using its assets and managing its operations. The main ratios are the inventory turnover ratio, the average inventory holding period ratio, the average receivables collection period ratio, the asset turnover ratio, the fixed assets turnover ratio and the average payment velocity of accounts payable.
- Investment ratios: These KPIs reflect the market's perception of the company's value. The most frequently used ratios are price to earnings per share (P/E), dividend yield, earnings per share, P.E.G. ratio, capitalization to sales ratio and P/BV ratio.

Like all analyses, so too in financial analysis there are several advantages but there are also disadvantages. To begin with, financial KPIs help align organizational activities with strategic goals. By monitoring KPIs, companies can ensure that their operations are focused on achieving key financial goals, which enhances strategic coherence. In addition, KPIs provide a clear and objective measure of financial performance. This helps assess whether financial strategies are effective and whether financial goals are being met. Among all the information they provide, financial KPIs provide critical data that supports decision-making processes. They provide an evidence-based basis for making informed choices about resource allocation, investment opportunities and cost management. KPIs allow companies to assess their performance against industry standards or competitors. This helps identify areas of strength and weakness, facilitating continuous improvement.

Accountability and transparency: Regular monitoring and reporting of KPIs promotes transparency within the organization. They ensure that managers and employees are aware of financial goals and performance expectations. On the other hand, financial KPIs often focus on quantitative measures, potentially overlooking qualitative factors such as employee satisfaction, brand strength or market conditions, which can also affect financial

performance. Also, the emphasis on achieving specific KPI targets can sometimes lead to a short-term focus, where managers prioritize immediate results over long-term sustainability and growth. Also, poor data quality can lead to misleading conclusions and inappropriate business decisions. Too often, organizations may track too many KPIs, leading to information overload and complexity. This can make it difficult to focus on the most critical financial metrics and can reduce the effectiveness of performance measurement. Finally, there is a risk that managers will manipulate financial data to achieve KPI targets, especially if these targets are linked to performance incentives. This can undermine the integrity of financial reporting and performance evaluation.

Financial performance indicators are essential tools in financial management, based on strong theoretical principles. They offer significant advantages in terms of strategic alignment, performance measurement, and decision support, but they also come with potential disadvantages, such as an overemphasis on quantitative metrics and the risk of short-termism. Effective use of financial KPIs requires a balanced approach, ensuring that they complement other qualitative assessments and long-term strategic planning.

4.2.1 Liquidity Ratios

Liquidity ratios are financial ratios used to assess a company's ability to meet its short-term obligations using its most liquid assets. These ratios are vital in assessing the financial health and operational efficiency of a business. They provide information about whether a company can quickly convert its assets into cash to pay off its current liabilities. Here are the main liquidity ratios, along with their definitions, calculation formulas, advantages and disadvantages (Vasileiou & Eriotis, 2008).

Current Ratio

The general liquidity ratio expresses the ability of a business to convert its current assets into cash to satisfy its short-term obligations. It is calculated by dividing current assets by current liabilities (Pazarskis et al., 2019).

The Current Ratio can be calculated using the following formula:

$$\text{Current ratio} = \text{Current Assets} / \text{Current Liabilities}$$

A current ratio greater than 1 indicates that the company has more current assets than current liabilities, indicating good short-term financial health. A ratio below 1 indicates potential liquidity issues. More generally, as the higher the value of the index, the better liquidity the company has thus a greater margin of safety for short-term creditors.

Factors affecting the current ratio:

- Inventory levels: High inventory can inflate current assets but may not be easily converted into cash.
- Accounts Receivable: High accounts receivable can also increase current assets, but may indicate slow collection practices.
- Accounts Payable: Effective management can keep current liabilities low.
- Cash Reserves: Higher cash reserves directly improve the current ratio.

The acceptable current ratio can vary significantly by industry. A high current ratio does not necessarily mean a company is in good financial health if current assets are not easily liquidated. Also, comparing current ratios across different industries can be misleading due to varying business models. Overall, while the current ratio is a useful indicator of a company's short-term financial health, it should be considered alongside other financial metrics and industry context for a comprehensive analysis.

Quick Ratio (Acid-Test Ratio)

The quick ratio, also known as the acid-test ratio, is a more stringent measure of a company's short-term liquidity compared to the current ratio. It excludes inventory from current assets, focusing on assets that can be quickly converted to cash. This ratio provides insight into a company's ability to meet its short-term liabilities without relying on the sale of inventory (Pazarskis et al., 2019).

The Quick Ratio can be calculated using the following formula:

$$\text{Quick Ratio} = (\text{Current Assets} - \text{Inventory}) / \text{Current Liabilities}$$

A quick ratio greater than 1 indicates that the company can meet its short-term obligations without selling inventory, indicating strong liquidity. Quick Ratio equal to 1 suggests that the company's liquid assets are exactly equal to its short-term liabilities and Quick Ratio

lower than 1 implies that the company may struggle to meet its short-term obligations without selling inventory.

Factors Affecting the Quick Ratio:

- Cash Reserves: Higher cash and cash equivalents directly improve the quick ratio.
- Marketable Securities: Easily liquidated securities can boost the quick ratio.
- Accounts Receivable: A high level of accounts receivable can improve the quick ratio, but collection efficiency is crucial.

Industries with rapid inventory turnover might comfortably operate with lower quick ratios. On the other hand, service-based industries, with fewer inventories, might have naturally higher quick ratios. A high quick ratio may be misleading if accounts receivable are not promptly collectible. The quick ratio should be compared within the same industry for meaningful analysis. The quick ratio is a valuable tool for assessing a company's immediate liquidity by focusing on the most liquid assets. It complements the current ratio by providing a more conservative view of a company's ability to meet short-term obligations without depending on inventory sales.

Net Working Capital (NWC)

Net working capital (NWC) is a financial metric that represents the difference between a company's current assets and current liabilities. It is an important measure of a company's short-term liquidity and operational efficiency, indicating the funds available to meet its short-term obligations and support day-to-day operations (Kiochos & Panagou, 2015).

The Net Working Capital can be calculated using the following formula:

$$\text{Net Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

Positive NWC: Indicates that the company has more current assets than current liabilities, suggesting good short-term financial health and the ability to cover its short-term obligations. An adequate NWC ensures that a company can meet its short-term obligations and avoid liquidity crises. Positive NWC allows a company to invest in its operations, take advantage of growth opportunities and improve overall performance. NWC is a key indicator of a company's financial health and its ability to sustain operations without relying on additional financing.

Negative NWC: Implies that the company has more current liabilities than current assets, which could be a sign of potential liquidity issues and financial distress.

Factors Affecting Net Working Capital:

- **Inventory Management:** Efficient inventory management can reduce excess inventory and improve NWC.
- **Accounts Receivable:** Effective collection practices can accelerate cash inflows and enhance NWC.
- **Accounts Payable:** Managing payment terms with suppliers can optimize cash outflows and support better NWC.
- **Short-term Financing:** The use of short-term debt can impact NWC, as it increases current liabilities.

Net working capital is a crucial measure of a company's short-term financial health and operational efficiency. By maintaining positive NWC, a company can ensure it has the necessary funds to meet its short-term obligations, invest in its operations, and pursue growth opportunities. However, it is important to consider industry standards and seasonal variations when analyzing NWC.

4.2.2 Performance Ratios (or Activity Ratios)

Activity ratios, also known as efficiency or turnover ratios, are financial metrics used to evaluate how effectively a company utilizes its assets to generate revenue. These ratios provide critical insights into a company's operational performance, revealing how well management is using resources to drive sales and maximize profitability. By focusing on different aspects of asset management, activity ratios help identify areas where a company excels or needs improvement (Pazarskis et al., 2022).

Inventory Turnover

The Inventory Turnover Ratio is a key financial metric that measures how frequently a company sells and replaces its inventory over a specific period. This ratio is crucial for assessing the efficiency of inventory management and understanding the relationship between inventory levels and sales performance (Anand & Grover, 2015).

The Inventory Turnover Ratio can be calculated using the following formula:

$$\text{Inventory Turnover Ratio} = \text{Cost of Goods Sold (COGS)} / \text{Average Inventory}$$

or

$$\text{Inventory Turnover Ratio} = \text{Sales} / \text{Inventory}$$

A high inventory turnover ratio indicates that a company is effectively managing its inventory by quickly selling and replenishing it. This often reflects strong sales performance, efficient inventory management, and effective demand forecasting. Companies with a high ratio are typically more responsive to market changes and customer needs, minimizing holding costs and the risk of obsolescence. Conversely, a low inventory turnover ratio may suggest overstocking, slow-moving or obsolete inventory, and potential issues with sales or marketing strategies. This can lead to increased holding costs, higher risks of inventory depreciation, and tied-up capital that could otherwise be used more productively.

It's important to note that the optimal inventory turnover ratio can vary significantly between industries. For example, industries with perishable goods, such as food and beverages, typically have higher turnover ratios due to the short shelf life of their products. In contrast, industries dealing with durable goods, like furniture or automobiles, might have lower turnover ratios due to the longer sales cycle of their products.

Companies often compare their inventory turnover ratios with industry averages or direct competitors to gauge their performance. Also, by monitoring this ratio, businesses can make informed decisions about purchasing, production, and sales strategies to optimize inventory levels. Investors and analysts use the inventory turnover ratio to assess a company's operational efficiency and financial health, as it reflects the company's ability to convert inventory into sales effectively. The inventory turnover ratio is a vital metric for businesses, providing insights into inventory management efficiency and overall operational performance. By maintaining an appropriate balance, companies can enhance profitability, reduce costs, and improve cash flow management.

Average Storage Period Ratio

The Average Storage Period Ratio, also known as the Days Inventory Outstanding (DIO) or Days Sales of Inventory (DSI), measures the average number of days that inventory is

held before it is sold. This ratio is an important indicator of inventory management efficiency and helps in assessing how long it takes for a company to turn its inventory into sales (Anand & Grover, 2015).

The Average Storage Period Ratio can be calculated using the following formula:

$$\text{Average Storage Period (DIO/DSI)} = 360 / \text{inventory turnover rate}$$

where, inventory turnover rate = sales / average inventory

and average inventory = (beginning inventory + ending inventory) / 2

or

$$\text{Average Storage Period (DIO/DSI)} = [\text{Average Inventory} / \text{Cost of Goods Sold}] \times 360$$

The result of this calculation indicates the average number of days inventory is held before being sold. A lower DIO/DSI suggests that a company is selling its inventory quickly, which usually indicates efficient inventory management, strong sales performance, and good demand forecasting. Conversely, a higher DIO/DSI means inventory is held for a longer period before being sold, which could signal overstocking, slow-moving inventory, or potential issues in the sales process.

Businesses can use the average storage period ratio to optimize inventory levels, reducing holding costs and minimizing the risk of obsolescence. This ratio helps companies identify inefficiencies in their supply chain and inventory management processes. Investors and analysts use the DIO/DSI ratio to assess a company's operational performance and inventory management capabilities. The Average Storage Period Ratio is a vital metric for understanding how efficiently a company manages its inventory. By monitoring and optimizing this ratio, businesses can improve their inventory turnover, reduce holding costs, and enhance overall profitability.

Average Receivables Collection Period

The Average Receivables Collection Period, also known as the Days Sales Outstanding (DSO), is a financial metric that measures the average number of days it takes a company to collect payments from its credit sales. This ratio is crucial for assessing the efficiency of a company's credit policies and cash flow management (Smith, 2011).

The Average Receivables Collection Period can be calculated using the following formula:

Average Receivables Collection Period (DSO) = Average Accounts Receivable / (sales / 360)

The result of this calculation indicates the average number of days it takes for a company to collect payments after a sale has been made. A lower DSO suggests that a company is efficient at collecting receivables, which implies good credit management practices and a healthy cash flow. Conversely, a higher DSO indicates that it takes longer for the company to collect its receivables, which could signal potential issues with credit policies, customer creditworthiness, or collection processes.

By monitoring DSO, businesses can assess the effectiveness of their credit policies and make necessary adjustments to improve collections. Understanding the collection period helps companies manage their cash flow more effectively, ensuring they have sufficient liquidity to meet their obligations. DSO can also provide insights into the creditworthiness of a company's customer base. A rising DSO might indicate that customers are taking longer to pay, potentially signaling financial difficulties. The Average Receivables Collection Period (DSO) is an essential metric for evaluating a company's efficiency in managing its receivables. By keeping track of this ratio, businesses can identify and address issues in their credit and collection processes, ultimately improving cash flow and financial stability.

Total Assets Turnover Ratio

The Assets Turnover Ratio is a key financial metric that measures how efficiently a company uses its assets to generate sales. This ratio is critical for assessing a company's operational efficiency and effectiveness in utilizing its asset base (Smith, 2011).

The Assets Turnover Ratio is calculated using the following formula:

$$\text{Assets Turnover Ratio} = \text{Net Sales} / \text{Total Assets}$$

A higher Assets Turnover Ratio indicates that a company is using its assets more efficiently to generate sales. This means that the company is able to generate more revenue per dollar of assets, which often reflects effective management and utilization of resources. Conversely, a lower ratio suggests that the company may not be using its assets as effectively, potentially indicating inefficiencies or underutilization.

Companies use this ratio to compare their performance against industry averages or direct competitors, helping to identify strengths and weaknesses in asset utilization. By

monitoring this ratio, businesses can also assess the efficiency of their operations and identify areas where asset use can be improved. Investors and analysts use the Assets Turnover Ratio to evaluate a company's operational efficiency and overall financial health, which can influence investment decisions. Generally, the Assets Turnover Ratio is a vital indicator of how well a company is using its assets to generate sales. It provides insights into operational efficiency, resource management, and overall business performance. By striving to improve this ratio, companies can enhance their profitability and competitiveness in the marketplace.

Current Assets Turnover

The Current Assets Turnover Ratio is a financial metric that measures how efficiently a company uses its current assets to generate sales. This ratio helps in assessing the effectiveness of a company's asset management practices, particularly in terms of short-term assets like cash, accounts receivable, and inventory (Ye & Ge, 2019).

The Current Assets Turnover Ratio is calculated using the following formula:

$$\text{Current Assets Turnover Ratio} = \text{sales} / \text{current assets}$$

A higher Current Assets Turnover Ratio indicates that a company is using its current assets efficiently to generate sales. This implies effective management of short-term assets and strong operational performance. Conversely, a lower ratio may suggest inefficiencies in asset utilization, possibly due to excess inventory, high receivables, or suboptimal cash management.

Monitoring this ratio helps businesses evaluate the efficiency of their short-term asset management and make necessary adjustments to improve sales generation. A high turnover ratio often correlates with strong liquidity and financial health, indicating that the company can quickly convert assets into cash. Companies can use this ratio to compare their performance against industry averages or competitors, identifying strengths and areas for improvement in asset management. The Current Assets Turnover Ratio is a crucial metric for evaluating how well a company utilizes its current assets to generate sales. By understanding and optimizing this ratio, businesses can enhance their operational efficiency, improve liquidity, and achieve better financial performance.

4.2.3 Leverage Ratios

Leverage ratios are financial metrics that assess the level of debt a company has relative to its equity or assets. These ratios are important for understanding a company's financial structure and its ability to meet financial obligations (Vasileiou & Eriotis, 2008).

Debt to Equity Ratio

The Debt to Equity Ratio is a financial metric that measures the relative proportion of a company's debt to its shareholders' equity. It is used to evaluate a company's financial leverage and risk (Pazarskis et al., 2022).

The Debt to Equity Ratio is calculated using the following formula:

$$\text{Debt to Equity} = \text{Total Liabilities} / \text{shareholders Equity}$$

A lower debt to equity ratio (less than 1) indicates that a company is primarily financed through equity, which may imply lower financial risk but also lower potential returns due to less leverage. A higher debt to equity ratio (greater than 1) suggests that a company is heavily financed through debt, indicating higher financial risk but also the potential for higher returns if the company performs well.

This ratio is used to assess the financial risk and leverage of a company. It helps in determining whether a company is over-leveraged or maintaining a healthy balance between debt and equity. A high debt to equity ratio might indicate higher risk, which could affect lending terms. Managers use the ratio to make strategic decisions about financing. Balancing debt and equity is crucial for optimizing growth and ensuring long-term financial stability. Generally, the Debt to Equity Ratio is a vital indicator of a company's financial leverage and stability. It helps stakeholders understand the extent to which a company is relying on debt financing versus equity financing. Maintaining an optimal debt to equity ratio is essential for minimizing financial risk and maximizing shareholder value.

Debt Ratio

The Debt Ratio is a financial metric that indicates the proportion of a company's assets that are financed through debt. It is a measure of financial leverage and provides insights into the risk associated with the company's financial structure (Vasileiou & Eriotis, 2008).

The Debt Ratio is calculated using the following formula:

$$\text{Debt Ratio} = \text{Total Liabilities} / \text{Total Assets}$$

A lower debt ratio (less than 50%) indicates that a smaller portion of the company's assets are financed by debt, suggesting lower financial risk and greater financial stability. A higher debt ratio (more than 50%) indicates that a larger portion of the company's assets are financed by debt, suggesting higher financial risk and potential difficulties in meeting debt obligations if the company faces financial challenges.

The Debt Ratio is an essential indicator of a company's financial leverage and overall risk. It provides insights into how much of the company's assets are financed through debt, helping stakeholders make informed decisions about investment, lending, and financial management. Maintaining an optimal debt ratio is key to ensuring financial stability and achieving long-term business objectives.

Debt to Capital Ratio

The debt to capital ratio is a financial metric that measures the proportion of a company's debt to its total capital. This ratio is used to evaluate a company's financial leverage and risk (Tsiouni et al., 2022). It is calculated using the following formula:

$$\text{Debt To Capital} = \text{Total Liabilities} / [\text{Total Liabilities} + \text{Shareholders Equity}]$$

A higher ratio indicates more leverage and potentially higher financial risk. A lower ratio suggests less leverage and potentially lower financial risk. Investors and analysts use the debt to capital ratio to assess a company's financial health and compare it with other companies in the same industry. It helps in understanding how a company is financing its operations and growth - whether through debt or equity.

Interest Coverage

The interest coverage ratio is a financial metric that measures a company's ability to meet its interest payment obligations on outstanding debt. It is an indicator of financial health, showing how easily a company can pay interest on its debt with its earnings before interest and taxes (EBIT). It is calculated using the following formula:

$$\text{Interest Coverage Ratio} = \text{EBIT} / \text{Interest Expense}$$

A higher ratio (greater than 1) indicates that the company is generating sufficient earnings to cover its interest expenses comfortably. A lower ratio (less than 1) indicates that the company may struggle to meet its interest obligations, which could signal financial distress.

The interest coverage ratio is used to assess a company's ability to pay interest on its debt, which is critical to understanding its financial stability. Various creditors and lenders look at this ratio to assess the risk of lending to the company. Also, managers use it to make decisions about taking on additional debt or managing existing debt. Generally, the interest coverage ratio is an essential tool for assessing a company's financial health and risk profile.

4.2.4 Profitability Ratios

Profitability ratios are financial metrics used to evaluate a company's ability to generate profit relative to revenue, assets, equity, and other financial metrics. These ratios help investors and analysts assess how efficiently a company can generate profit from its operations (Noulas, 2015).

Net Profit Margin

The net profit margin is a key profitability ratio that measures the percentage of revenue that remains as profit after all expenses, including operating expenses, interest, taxes, and other costs, have been deducted. It is a crucial indicator of a company's overall profitability (Tsiouni et al., 2022). It is calculated using the following formula:

$$\text{Net Profit Margin} = \text{Net Income} / \text{sales}$$

A higher net profit margin indicates greater profitability and efficiency in controlling costs relative to revenue. It suggests that the company is good at converting revenue into actual profit. A lower net profit margin indicates lower profitability, which might suggest higher costs or lower pricing power.

Net profit margin shows the profitability of a business and is used by investors to compare profitability between companies and industries, by management of companies to assess overall efficiency and identify areas for cost reduction or revenue growth and by creditors, who look at this ratio to assess a company's ability to generate sufficient profits to cover its debts.

Gross Margin

Gross margin is a key profitability ratio that measures the percentage of revenue that exceeds the cost of goods sold (COGS). It indicates how efficiently a company produces

its goods or services and controls its production costs. The gross margin provides insight into the core profitability of a company's operations before accounting for overhead, administrative, and other expenses (Noulas, 2015) . It is calculated using the following formula:

$$\text{Gross Margin} = (\text{Sales} - \text{COGS}) / \text{Sales}$$

Or

$$\text{Gross Margin} = \text{Gross Income} / \text{Sales}$$

A higher gross margin indicates that a company is efficient in managing its production costs relative to its revenue. This suggests better profitability and pricing power. A lower gross margin might indicate higher production costs or lower pricing power, which can impact overall profitability.

Gross margin is used to compare profitability across companies and industries. It helps in evaluating the effectiveness of a company's core business. It also provides information on production cost control and pricing strategies. Gross margin can vary widely between industries due to different cost structures and pricing strategies. Therefore, it is most useful when compared to industry peers or historical performance of the same company.

Operating Margin

Operating margin is a key profitability ratio that measures the percentage of revenue that remains after deducting operating expenses. This ratio provides insight into a company's operational efficiency and its ability to manage its operating costs relative to its revenue. It helps stakeholders understand how well a company is performing in its core operations relative to its competitors (Noulas, 2015) . It is calculated using the following formula:

$$\text{Operating Margin} = \text{Operating Income} / \text{Sales}$$

A higher operating margin indicates better operational efficiency and a greater ability to control operating costs. It suggests that the company is making more profit from its core business activities. A lower operating margin might indicate higher operating costs relative to revenue, which can affect overall profitability.

Operating margin is used to evaluate a company's effectiveness in managing its operating expenses and its profitability from core operations. This indicator is also monitored to improve operational efficiency, cost control and pricing strategies.

Return On Assets (ROA)

Return on assets (ROA) is a financial metric that measures a company's ability to generate profit from its assets. It shows how efficiently a company uses its assets to generate profits. ROA is particularly useful for comparing the performance of companies in the same industry and is one of the most important indicators in financial analysis (Noulas, A. 2015). It is calculated using the following formula:

$$\text{ROA} = \text{Net Income} / \text{Total Assets}$$

A higher ROA indicates that the company is more efficient in using its assets to generate profit. It suggests better management and utilization of resources. A lower ROA might indicate inefficiencies in asset use or lower profitability.

ROA is used to compare the efficiency of the use of assets of a company and also between companies, especially in the same industry. This comparison helps stakeholders understand how well a company is performing in managing and utilizing its assets relative to its competitors. Moreover, it is seriously considered before making decisions about investments and operational improvements.

Return On Equity (ROE)

Return on Equity (ROE) is a financial metric that measures a company's ability to generate profit from its shareholders' equity. It indicates how effectively the company is using the money invested by its shareholders to generate earnings. ROE is particularly valuable for investors as it provides insight into the profitability and efficiency of a company relative to shareholder investment and is one of the most important indicators in financial analysis. This comparison helps stakeholders understand how well a company is performing in generating returns on equity relative to its competitors (Noulas, 2015) . It is calculated using the following formula:

$$\text{ROE} = \text{Net Income} / \text{Equity}$$

A higher ROE indicates that the company is more effective at generating profit from its equity base. It suggests strong management performance and profitability. A lower ROE might indicate less efficient use of shareholders' equity or lower profitability.

The ROE indicator measures the profitability of companies in the same industry. It helps assess how well a company is generating returns on investment from its shareholders.

Management uses it to evaluate performance and make strategic decisions about financing and investments, among creditors look at ROE to assess the company's ability to generate profits and sustain operations, which indirectly affects its creditworthiness.

ROE is also used to estimate a company's sustainable growth rate (SGR), which is the rate at which a company can grow its earnings without having to increase equity or debt financing. It is also used in Dupont Analysis, where The Dupont formula breaks down ROE into three components (profit margin, asset turnover, and financial leverage) to provide deeper insight into the factors driving ROE.

Overall, ROE is a crucial metric for evaluating a company's financial performance and efficiency in using shareholders' equity to generate profits.

4.2.5 Market and Growth Ratios

Market and growth ratios are essential tools for investors, analysts, and business managers to evaluate a company's financial health, performance, and potential for future growth. These ratios can provide insights into the company's market position, efficiency, and profitability (Subramanyam, 2014).

Earnings Per Share (EPS)

The EPS (Earnings Per Share) ratio is a financial metric used to measure a company's profitability on a per-share basis. It is calculated by dividing the company's net income (or earnings) by the number of outstanding shares of its common stock. The formula for EPS is:

$$\text{EPS} = \text{Earnings available to Shareholders} / \text{Number of Shares on the Market}$$

EPS provides a direct indication of how profitable a company is on a per-share basis, making it a valuable metric for investors. Investors use EPS to compare the profitability of companies within the same industry or sector. EPS is often used in valuation metrics like the Price/Earnings (P/E) ratio, where the stock price is divided by EPS to assess whether a stock is over or undervalued. A higher EPS indicates greater profitability on a per-share basis, which is generally positive.

Price to Earnings Ratio (P/E)

The Price-to-Earnings (P/E) ratio is a widely used financial metric that helps investors evaluate the valuation of a company's stock relative to its earnings. It is calculated by dividing the current market price of the stock by its earnings per share (EPS). The formula is:

$$\text{Price To Earnings} = \text{Market Price Per Share} / \text{Earnings Per Share}$$

A high P/E ratio may indicate that the stock is overvalued or that investors are expecting high growth rates in the future. High growth companies, especially in technology or emerging sectors, often have high P/E ratios. A low P/E ratio might suggest that the stock is undervalued or that the company is facing challenges. Value investors often look for low P/E ratios as potential investment opportunities (Schwarzbichler et al., 2018).

In conclusion, the P/E ratio is a valuable tool for assessing stock valuation, but it should be used in conjunction with other metrics and a comprehensive analysis of the company's fundamentals and market conditions.

Dividend Yield

Dividend yield is a financial ratio that indicates how much a company pays out in dividends each year relative to its stock price. It is expressed as a percentage and provides a measure of the income generated by an investment in a company's stock. The formula for calculating dividend yield is:

$$\text{Dividend Yield} = \text{Annual Cash Dividend Per Share} / \text{Stock Price Per Share}$$

A higher Ratio is Typically attractive to income-focused investors. However, an unusually high dividend yield could be a red flag indicating potential issues with the company, such as declining stock prices or unsustainable dividend payouts.

A Lower Dividend Yield is Common for growth companies that reinvest earnings into the business rather than paying dividends. This can still be attractive to investors seeking capital appreciation rather than immediate income.

While dividend yield focuses on the income aspect, total return considers both income (dividends) and capital gains (price appreciation). Investors should consider both metrics when evaluating the performance and attractiveness of an investment to get a comprehensive view of the investment's potential.

Price/Earnings-to-Growth Ratio (PEG)

The PEG ratio, or Price/Earnings to Growth ratio, is a valuation metric used to assess whether a stock is fairly valued based on its earnings growth. It's an extension of the Price-to-Earnings (P/E) ratio, taking into account a company's earnings growth rate. The formula for the PEG ratio is:

$$\text{PEG} = (\text{Price} / \text{EPS}) / \text{EPS Growth}$$

PEG Ratio Lower than 1 indicates that the stock is undervalued relative to its earnings growth. A PEG ratio below 1 suggests that the stock's price is not keeping up with its earnings growth potential, making it potentially attractive to investors. PEG Ratio equal to 1, implies that the stock is fairly valued in relation to its earnings growth. This suggests that the market has priced the stock in line with its expected growth rate. PEG Ratio higher than 1 indicates that the stock may be overvalued relative to its earnings growth. A PEG ratio above 1 suggests that the stock's price is outpacing its earnings growth, which could mean that the stock is overpriced or that investors have high expectations for future growth.

The PEG ratio provides investors with a way to assess the relationship between a stock's price, its earnings, and its growth potential. While it can be a useful tool for valuation, it should be used alongside other financial metrics and qualitative analysis to make well-informed investment decisions.

5. KPIs Analysis for The Companies “Hellenic Petroleum” (HELPE) and “Motor Oil Hellas”(MOH)

5.1 Liquidity Ratios / KPIs

5.1.1 Current Ratio

This specific indicator shows the company's ability to cover its short-term obligations using only its current assets. When the ratio is greater than one, it means that the company can cover all its short-term obligations only with its current assets. In general, the general liquidity ratio is considered satisfactory when it receives values greater than 2, while an excessively large ratio shows that the company is not using its capital efficiently. In the cases of the two companies, the MOH ratio moves in more efficient frameworks, as in ten years it is greater than the first one, and in the period 2015-2018 it exceeds 2. On the contrary, the HELPE ratio moves in lower values as only in the 2018-2020 is greater than one but still lower than that of MOH. In general, we would say that MOE has a greater ability to meet its short-term obligations through its current assets.

year	Current Ratio									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,777	0,806	0,815	0,978	0,852	1,184	1,192	1,097	0,940	0,950
MOTOROIL	1,004	1,189	2,042	2,282	2,027	2,331	1,845	1,693	1,575	1,522

Table 1

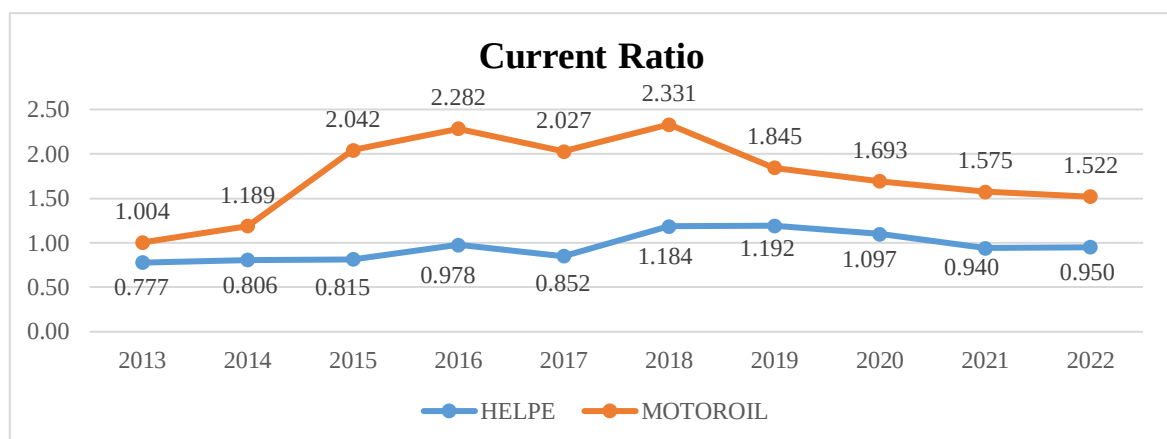


Figure 1

5.1.2 Quick Ratio

This ratio differs from the previous one as reserves are subtracted from the total assets, as they are elements that are more difficult to liquidate. This is how the liquidity of the business is examined in an emergency, and it is seen whether the liquid assets can cover the short-term obligations. A good indication of the ratio is a value close to 1.5. The higher this indicator is, the higher the company's liquidity. In cases where the index is below 1, and the smaller it is, the greater the risk that the business will not be able to satisfy an emergency that will arise. In the case of the two companies, the MOH shows better indications, as since 2015 the index is close to 1-1.5 and no year except 2013-2014 has fallen below 1. On the contrary, the indicator for HELPE is consistently below one throughout the decade at values ranging from 0.5 to 0.791 at the highest. Therefore, it may have faced some kind of liquidity problem during these years, while MOH does not seem to be facing a liquidity problem.

year	Acid-test or Quick Ratio									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,502	0,662	0,676	0,683	0,556	0,784	0,791	0,788	0,560	0,470
MOTOROIL	0,450	0,660	1,445	1,532	1,300	1,554	1,314	1,098	1,100	1,060

Table 2

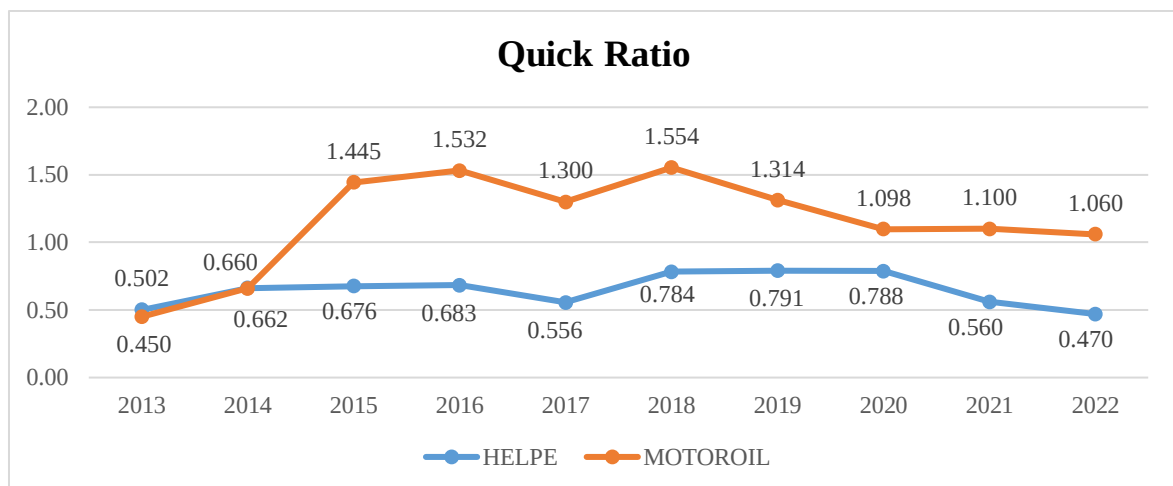


Figure 2

5.1.3 Net Working Capital

Net working capital generally measures the total liquidity. It is the surplus of a business's turnover figures in relation to its short-term liabilities. It is, in short, one indicator of the financial sufficiency of the business so that the business can carry out its operations and can face difficulties without the risk of being driven in financial impasse. In the cases of the 2 companies, the net working capital of MOH is governed by a stability in the years we are examining, having a positive sign. On the contrary, the net working capital of HELPE shows several fluctuations, starting with a negative sign, which means that at some point the company faced a liquidity problem and could not meet its short-term obligations. From 2017 and up to 2019 is observed to recover achieving positive values, while in the next year, i.e. 2020 there is a decrease but not to a large extent, which means that there is starting to be a stability in the company.

year	Net Working Capital									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-556699	-1595213	-1670799	-202097	68087	349430	267184	-298326	103199	920320
MOTOROIL	267666	158885	302320	278974	309311	275414	161968	146700	224584	765656

Table 3

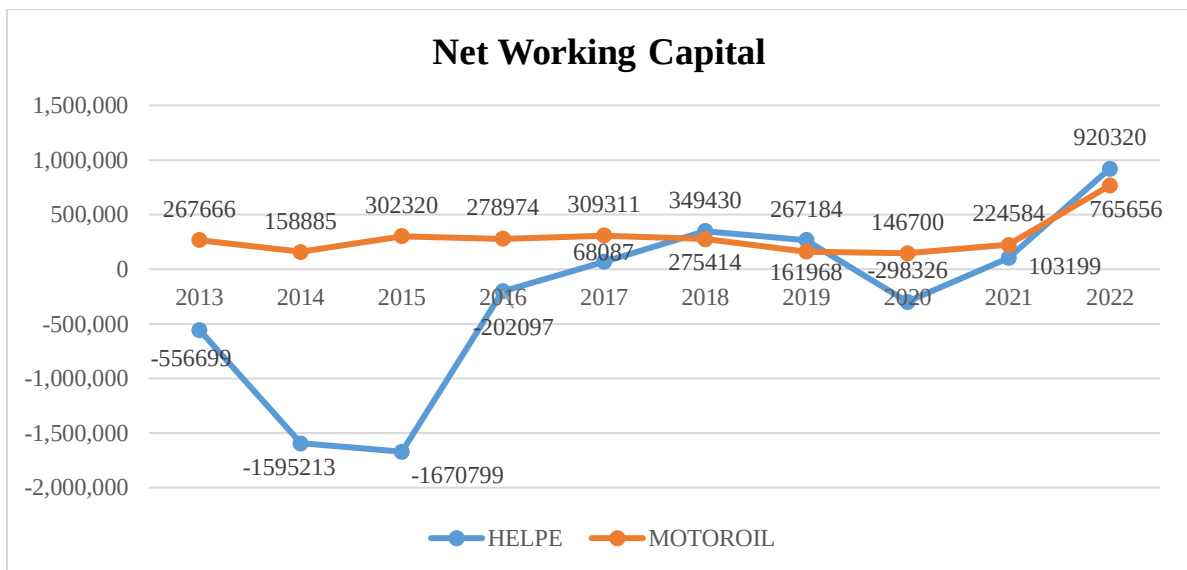


Figure 3

5.2 Activity Ratios / KPIs

5.2.1 Inventory Turnover

This indicator shows us how many times inventory is converted into sales over the course of a year. The higher this ratio is, the better inventory management is done by the companies. In the case of HELPE, the indicator fluctuates on average around 9 times per year, with the lowest value at 6.304 (2016) and the highest at 16.318 (2014). In MOH, this ratio is at higher values on average about 14 times per year with a lower value of 8.826 (2016) and a higher value of 18.494 (2014). It was observed during the study that both companies recorded the lowest and the highest price in the same years. In general, however, the MOH presents better indications of the ratio.

year	Inventory Turnover									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	10,079	16,318	10,680	6,304	6,719	9,272	8,406	9,035	6,710	7,970
MOTOROIL	16,076	18,494	14,905	8,826	10,408	16,093	17,592	10,081	15,020	16,740

Table 4

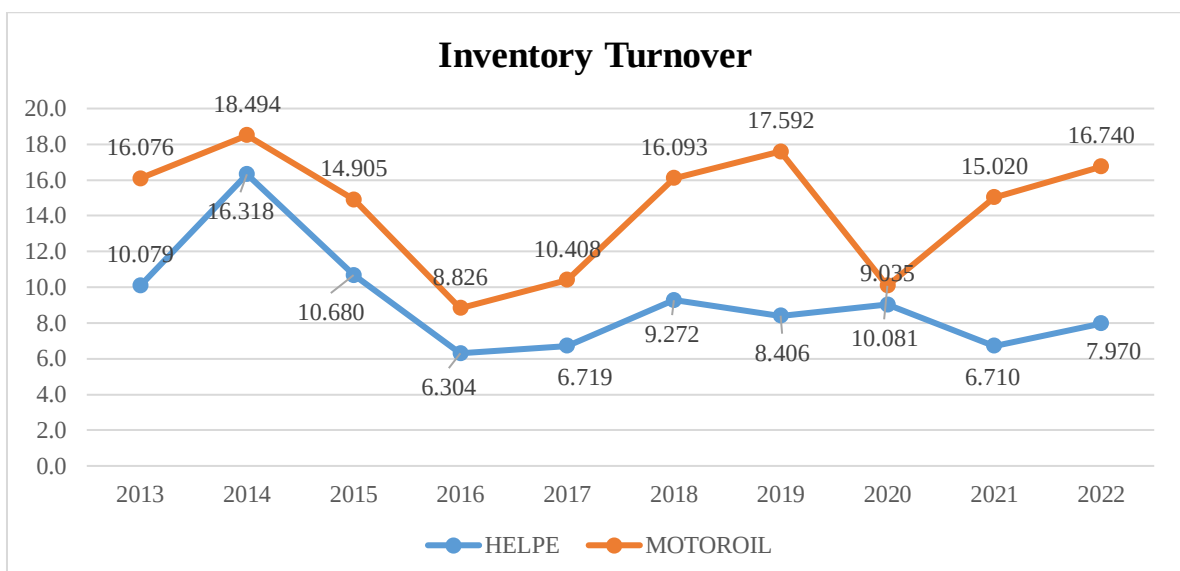


Figure 4

5.2.2 Average Storage Period

This indicator shows the time period that must wait business for the sale of its goods. The smaller is this indicator, the better is the performance of the business in the management of reserves with the result of having greater liquidity and profitability, since a longer average storage period carries both financial risks and risks related to the quality of the reserves. And in this indicator, MOH presents better indications as it has an average storage period of around 26 days, with a lower indicator recorded in 2014 with approximately 19 days, while HELPE has an average storage period of around 42 days, also with a lower indicator to be marked in 2014 on 22 days.

year	Average Storage Period									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	38,599	22,370	31,740	57,103	53,579	38,827	42,828	39,847	53,837	45,316
MOTOROIL	22,159	19,450	22,290	40,787	34,588	22,370	20,464	35,710	23,981	20,863

Table 5

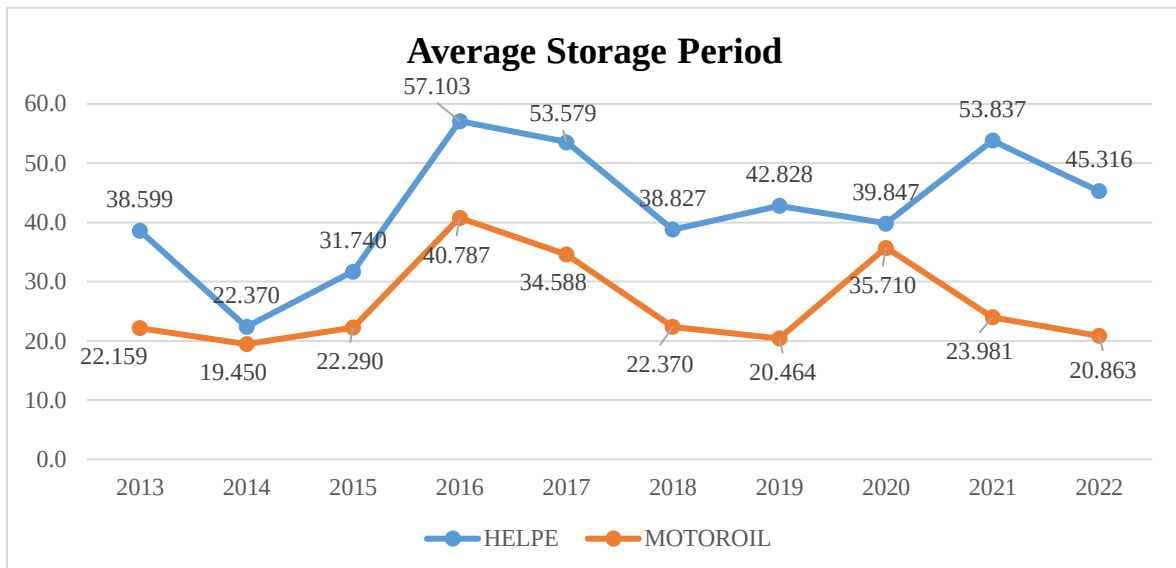


Figure 5

5.2.3 Average Receivable Collection Period

This indicator shows the average number of days the company needs to collect its receivables. The smaller the ratio, the better profitability and liquidity of a business. As we can see from table 6, the MOH ratio shows consistently lower values than that of HELPE, with an average of around 15 days while that of HELPE is around 38 days. As observed from the study, in the year 2021 MOH recorded its highest number with only 21 days, while the lowest number of HELPE is in 2022 with 27 days, 6 days past the highest MOH. One can therefore conclude that MOH scores better values in this ratio, which is a sign of better liquidity.

year	Average Receivable Collection Period									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	34,830	36,989	54,774	62,264	49,265	27,312	35,502	34,487	27,115	21,491
MOTOROIL	13,304	10,491	15,154	19,754	15,795	10,530	14,273	19,659	21,457	15,204

Table 6

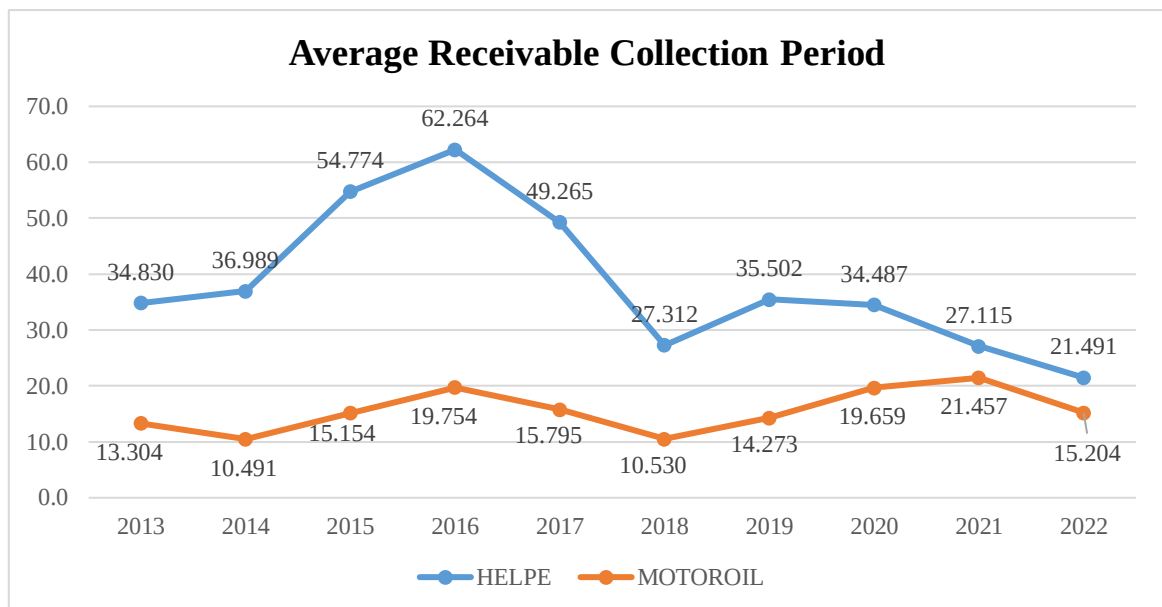


Figure 6

5.2.4 Total/Net Assets Turnover

The specific index, according to business efficiency. The higher the value of the ratio, the better the company uses its assets to make its sales. The opposite exactly happens with a lower ratio value. From the comparison of the indicators, between the two companies, it appears that MOH makes better use of its assets with the aim of making sales, as its ratio fluctuates at an average of about 2.6, even marking 4.2 in its first years analysis, while HELPE moves to an average of 1.2 for this ratio, with a higher value in 2022 at 1.694. Practically, it means that every euro of investment from MOH brought 2.6 sales, while for HELPE every euro of investment brought 1.2 sales.

year	Total/Net Assets Turnover									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	1,460	1,288	0,933	0,961	1,167	1,406	1,240	0,847	1,177	1,694
MOTOROIL	4,227	4,007	2,622	1,984	2,532	3,303	2,908	1,657	1,480	1,701

Table 7

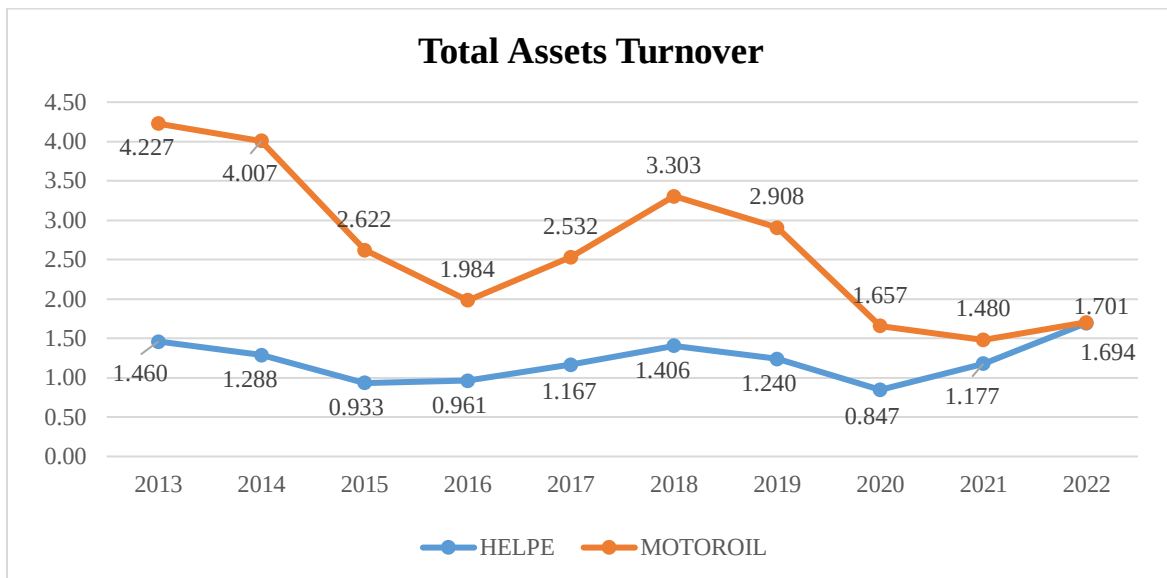


Figure 7

5.2.5 Current Assets Turnover

This ratio, like the previous one, shows the degree to which a business is efficient using its assets to generate sales. So the higher the ratio is, the greater the efficiency. Here the MOH presents an even greater difference, as the average level of the indicators at a ten-year level varies at 5.9, while the HELPE at 2.1. Practically, it means that MOH for every euro of investment has made sales equal to 5.9, while HELPE only 2.1. This is also explained on a theoretical level, as it was mentioned above in the chapter with the presentation of the companies, MOH has invested significant capital in the modernization and upgrading of its refinery in recent years, and has managed to make this refinery one of the most complex and efficiency of Europe.

year	Current Assets Turnover									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	2,460	2,329	1,812	1,734	2,116	2,404	2,110	1,306	2,093	2,931
MOTOROIL	7,998	7,808	5,890	5,128	6,540	7,924	6,400	3,102	3,628	4,808

Table 8

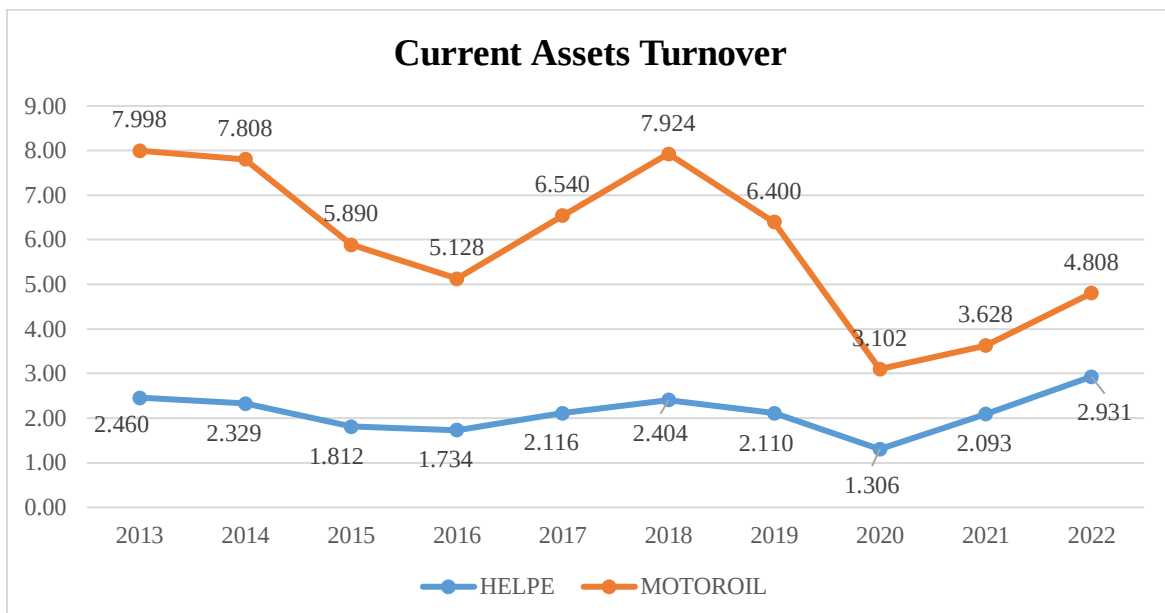


Figure 8

5.3 Leverage Ratios / KPIs

5.3.1 Debt-to-Equity Ratio

This ratio expresses the relationship between funds that they came from the lenders and mostly take the form of liabilities, and from the company's shareholders. A ratio value greater than one indicates limited borrowing capacity and high financial leverage risk, while a value of a ratio less than one generally indicates better borrowing and leverage capacity. Observing the data in table 9, but also diagram 9, we notice that the 2 businesses follow a common path with slightly lower prices in the MOH. Both have average ratio values above 2, especially in the first years of this analysis the indications were higher. That period was the period of height in Greece with the memorials, therefore the indicators are also higher. It is positive for the 2 businesses that gradually and until 2022, which we are looking at, the index shows lower values in relation to 2013, especially MOH has managed in 2022 to keep this index below one.

year	Debt-to-Equity ratio									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	2,816	4,773	4,760	2,921	2,425	1,970	1,891	2,319	2,679	2,139
MOTOROIL	3,208	4,713	2,940	2,219	1,571	1,277	1,352	1,917	1,270	0,880

Table 9

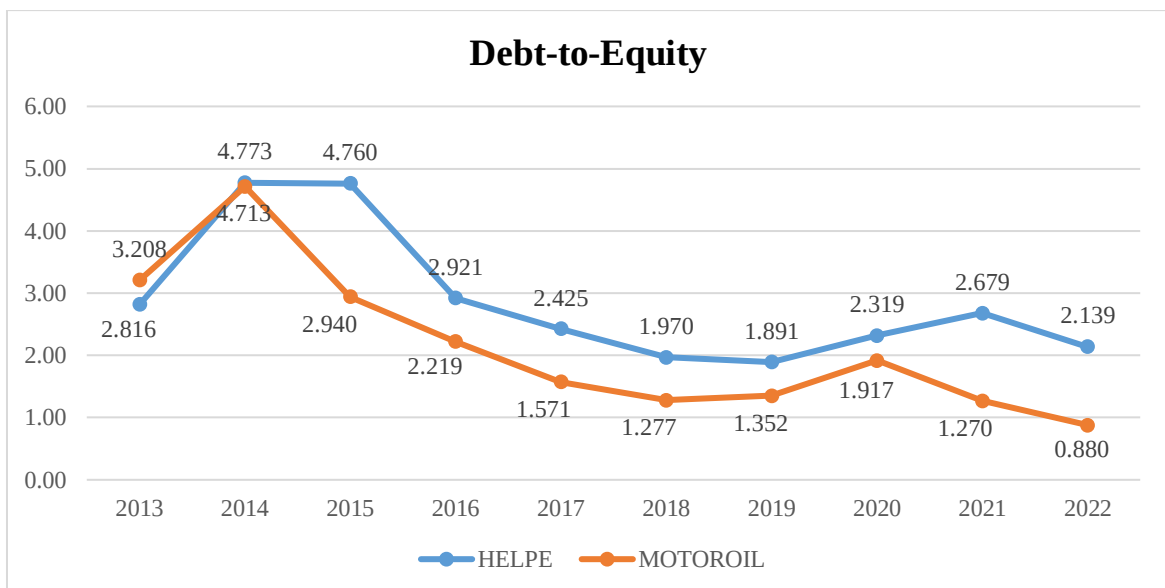


Figure 9

5.3.2 Debt Ratio

According to the theory, the specific ratio measures all of its obligations business as a percentage of its total assets. The higher this ratio is, the higher the financial leverage and the risk for the company are. A ratio value is considered satisfactory when it is less than or equal to 0.5. From the data in table 10 and also from diagram 10, it appears that the two companies show very small differences in the values of this ratio, while following a similar path. This is also confirmed by the average ratio of the 2 companies in the 10-year period we are examining, as HELPE has an average ratio of 0.727 while MOH has 0.688. In general, both companies have unsatisfactory indicators for the particular decade, as there is no value less than 0.5, a fact that indicates limited borrowing capacity and increased risk of leverage.

year	Debt-ratio									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,738	0,827	0,826	0,745	0,708	0,663	0,654	0,699	0,728	0,682
MOTOROIL	0,762	0,825	0,746	0,689	0,611	0,561	0,575	0,657	0,754	0,703

Table 10

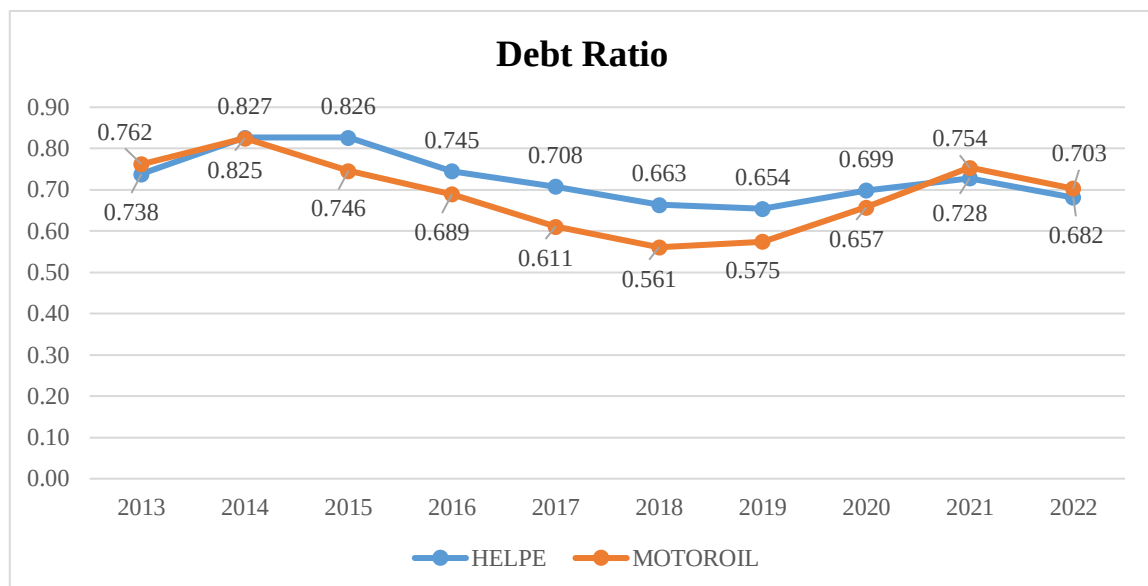


Figure 10

5.3.3 Debt-to-Capital Ratio

This indicator measures total borrowing as a percentage of the total of funds. The higher this index is, the higher the financial leverage. From the data in table 11 but also from diagram 11, it appears that the two companies show very small differences in the values of this index as well, while following a similar course. This is also confirmed by the average ratio of the 2 companies in the 10-year period we are examining, as HELPE has an average ratio of 0.628 while MOH has 0.532. We also notice that the indices of both companies are higher in the period until 2015, then they decrease until 2019, and from 2020 they rise again. The explanation has more to do with the general financial environment in which they operate, as in the period up to 2015 there was an intense recession throughout the European Union, while from 2019 and after there was also the period of the pandemic. Thus we understand that they have been greatly affected by these events.

year	Debt-to-Capital									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,596	0,702	0,707	0,622	0,591	0,545	0,526	0,584	0,728	0,682
MOTOROIL	0,624	0,725	0,666	0,548	0,431	0,389	0,366	0,543	0,560	0,468

Table 11

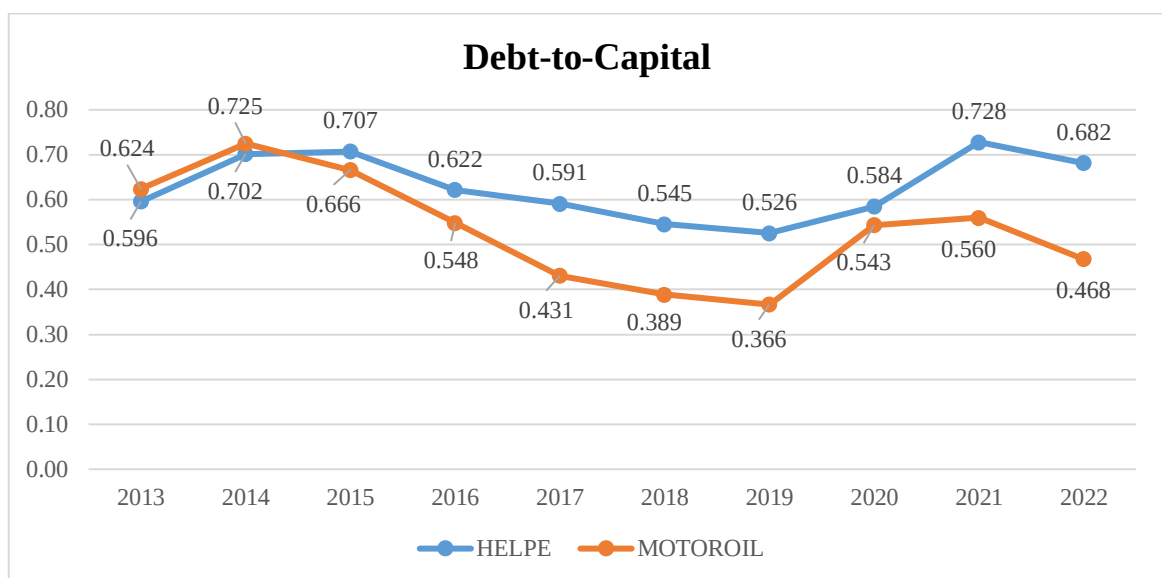


Figure 11

5.3.4 Interest Coverage

This ratio expresses the ability of the business to pay the interest. Its ability to meet its interest repayments increases as the ratio gets larger. As we can see in table 12 and diagram 12, MOH presents better values in this indicator, as it has an average value twice that of HELPE (7.324 against 3.702). In fact, this indicator has soared during the last period we are studying, due to the very high profits that MOH recorded in that particular year. It is worth noting that both companies in the initial years of the study had a very low values, until they scored negative, which means that they could not repay their interest.

year	Interest Coverage									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-1,183	-1,463	1,136	3,657	4,560	6,264	3,957	5,196	3,570	11,330
MOTOROIL	1,389	-1,151	5,520	7,893	8,870	12,283	12,863	1,299	4,030	20,250

Table 12

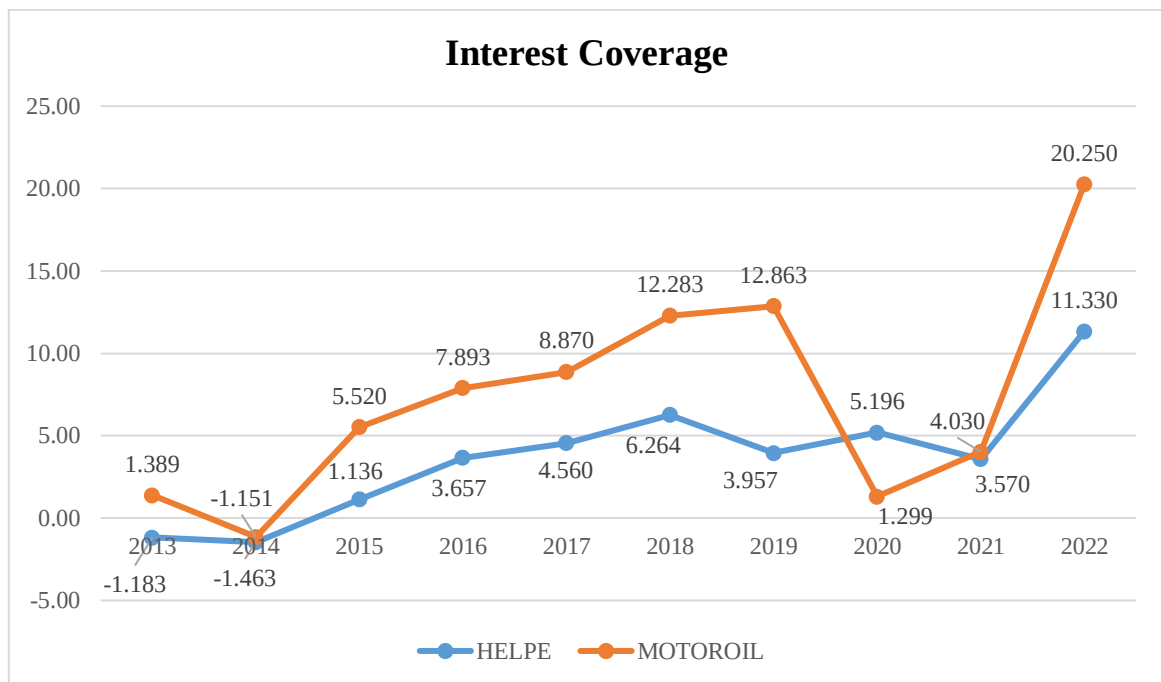


Figure 12

5.4 Profitability Ratios / KPIs

5.4.1 Net Profit Margin

This ratio gives net profit as a percentage of sales. The higher is this indicator, the more profitable the business. As we can see in table 13 and diagram 13, the two companies in 10-year we studied do not differ much in terms of their indicators, as HELPE presents an average ratio of 0.030 while MOH 0.032. Until 2017, MOH presented better values in the ratio, while in 2018 and then HELPE presented higher values.

year	Net Profit Margin									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-0,033	-0,036	0,004	0,056	0,048	0,058	0,039	0,066	0,034	0,064
MOTOROIL	0,001	-0,012	0,038	0,069	0,052	0,032	0,030	0,029	0,026	0,060

Table 13

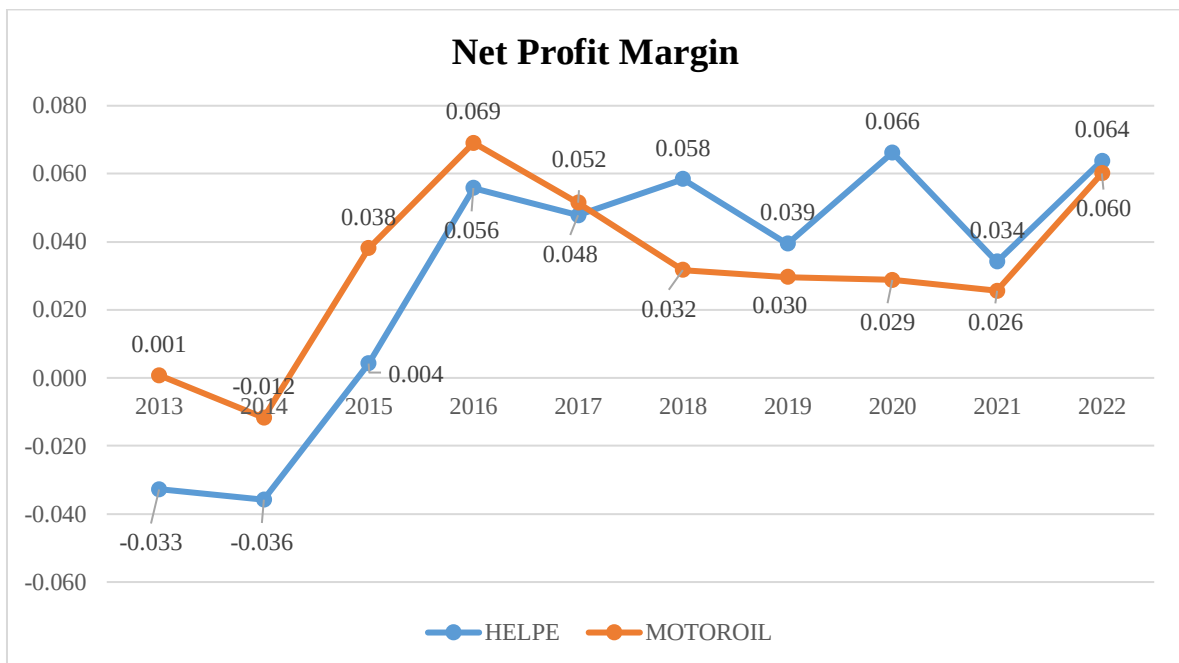


Figure 13

5.4.2 Gross Margin

This indicator shows the percentage of revenue remaining in the company after deducting the cost of goods sold. The higher this ratio is, the more efficient and profitable the business is. As we can see from table 14 and diagram 14, the indicators of the companies are very close for this ratio as well (an average of about 6% for both), and from the diagram it appears that in the same years they have low indices. As mentioned above, in the period 2013-2014 and 2020, the indicators are still negative or very low for both companies due to the economic crisis and the pandemic. The positive fact for both companies is that in 2022 they presented the highest indicator, having increased profits. They can rely on this and continue their good course in the future hoping for future profits.

year	Gross Profit Margin									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,062	-0,014	0,058	0,117	0,105	0,076	0,057	-0,059	0,095	0,134
MOTOROIL	0,011	0,006	0,077	0,103	0,096	0,052	0,049	0,005	0,058	0,128

Table 14

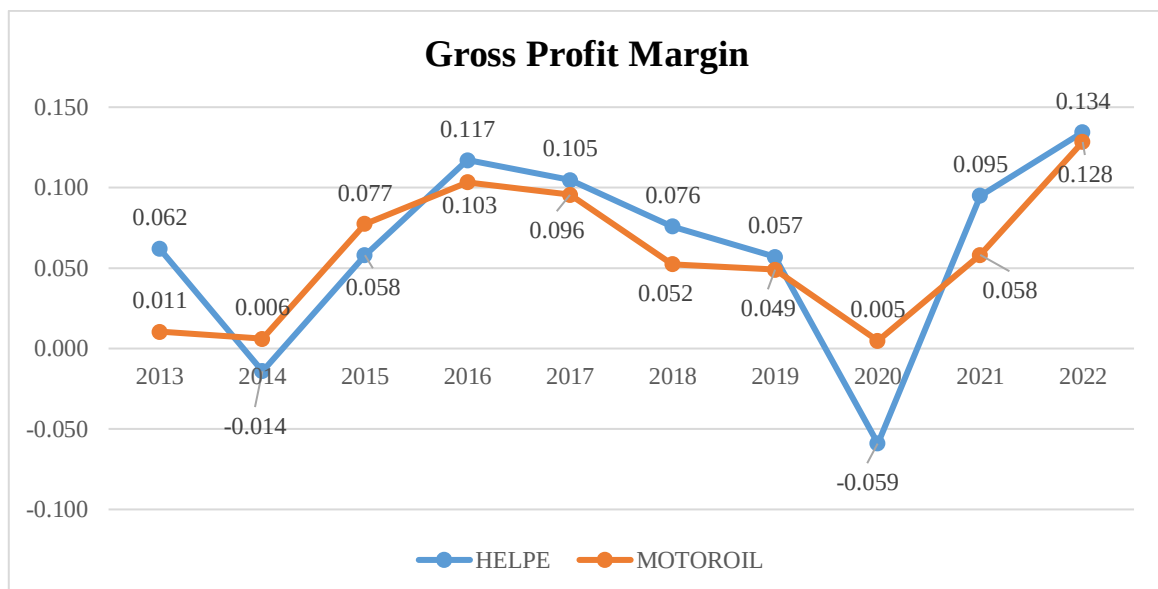


Figure 14

5.4.3 Operating Margin

This specific indicator shows the operational efficiency of a business, giving the rate of profit from each euro of sales made and after all expenses have been paid except interest and taxation. As can be seen in table 15, but also in diagram 15, the companies record almost the same indices over a ten-year period, as they have an average rate close to 5% and 2, and the same fluctuations in the values of the index apart from one year. In 2020, HELPE presented a very high ratio in relation to the MOH. Maybe that year HELPE did a better management of expenses and costs and these results are presented. In general, the two companies present almost the same indications.

year	Operating Profit Margin									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-0,022	-0,029	0,029	0,107	0,088	0,089	0,057	0,104	0,043	0,097
MOTOROIL	0,010	-0,008	0,068	0,100	0,083	0,048	0,042	0,022	0,044	0,113

Table 15

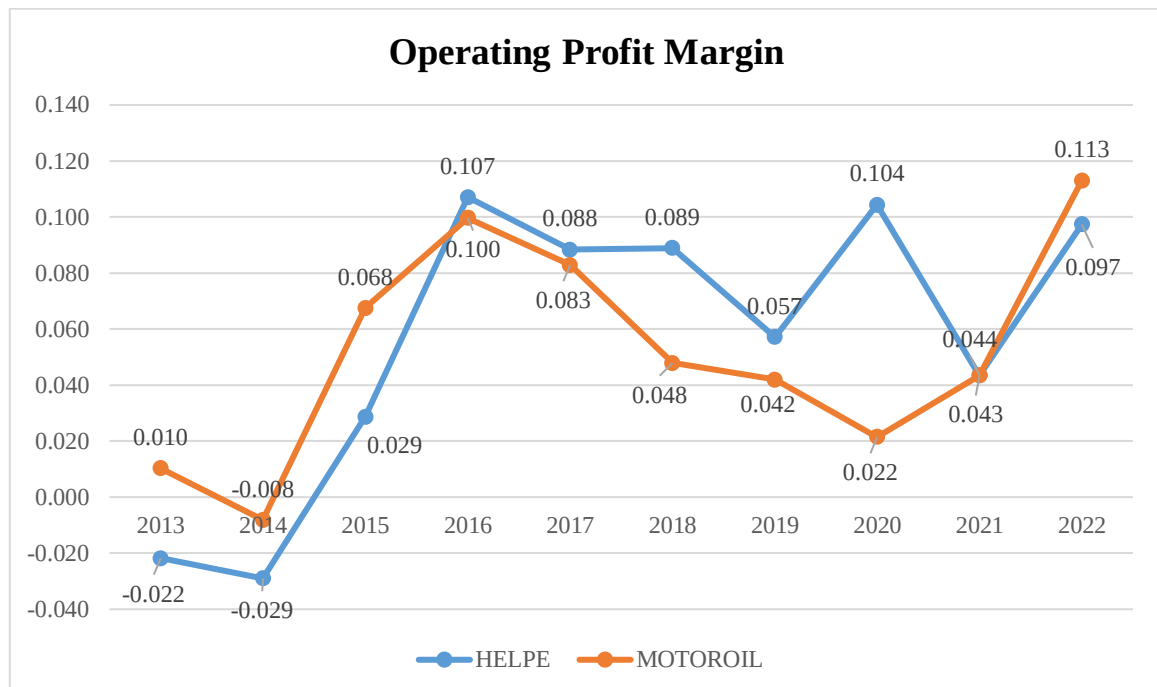


Figure 15

5.4.4 Return On Assets (ROA)

This specific indicator is one of the most important indicators in financial management as it shows how efficiently a business manages its resources with the aim of making profits. The higher this ratio is, the better and more efficiently the company is managed, as it allows for greater profits to be made. As can be seen in table 16, but also in diagram 16, MOH records better indicators of the ratio, as it records twice the ten-year average of HELPE (0.077 against 0.035). This means that it makes better use of its resources than HELPE. This can also be seen in the diagram, where the MOH is consistently higher in relation to the HELPE. As mentioned above, the continuous investments and modernization of its refinery give it the results it wants as it exploits its investments and assets to the fullest.

year	ROA									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-0,048	-0,046	0,004	0,054	0,056	0,082	0,049	0,056	0,040	0,108
MOTOROIL	0,003	-0,048	0,100	0,121	0,130	0,105	0,086	0,048	0,056	0,168

Table 16

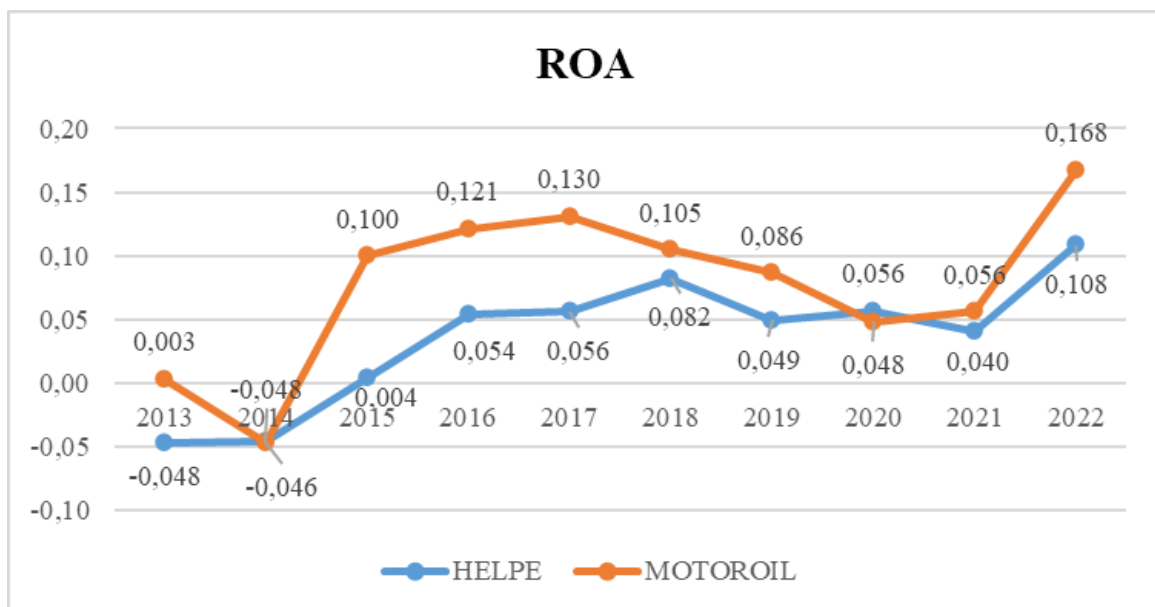


Figure 16

5.4.5 Return On Equity (ROE)

This ratio is also very important as it measures the return on equity. The higher it is in relation to other businesses, the more the company's ability to raise new capital increases. As can be seen in table 17, but also in diagram 17, the MOH records better indications of the ratio in the period 2013-2017 but also in 2022 in relation to HELPE. In all other years, the companies present approximately the same results. In general, MOH registers approximately twice the average ratio in relation to HELPE (0.2 against 0.1), which means that MOH has a better return on Equity and has a greater ability to draw capital from the capital market.

year	ROE									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-0,183	-0,267	0,023	0,210	0,191	0,244	0,141	0,186	0,153	0,348
MOTOROIL	0,013	-0,268	0,397	0,389	0,335	0,238	0,203	0,139	0,186	0,458

Table 17

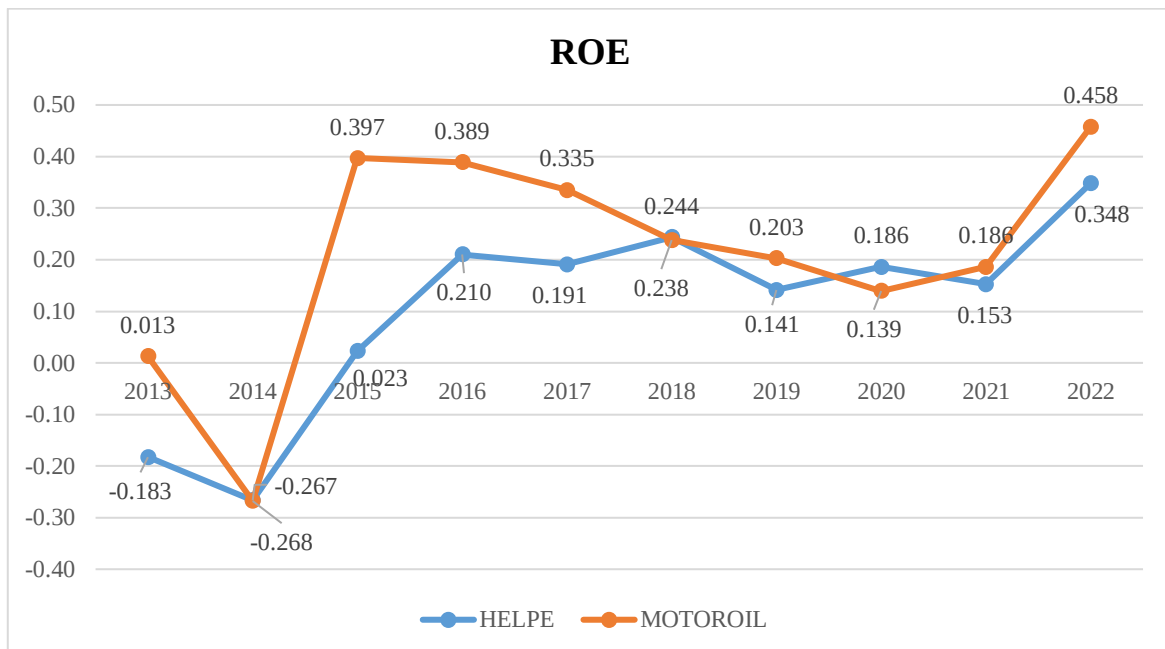


Figure 17

5.5 Market and Growth Ratios / KPIs

5.5.1 Earnings Per Share (EPS)

In general, the higher this ratio, the better the company is at branch of As we can see in table 18 and diagram 18, the share of MOH records more profit than that of HELPE almost throughout the ten-year period. The highest earnings per share in the 10-year period were recorded in 2022. On average, MOH had about twice the average earnings per share of HELPE over the decade (2.29 vs. 1.050).

year	EPS									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-0,880	1,200	0,090	1,094	1,132	1,713	1,035	1,108	1,100	2,910
MOTOROIL	0,920	0,780	1,820	2,479	2,669	2,059	1,855	1,016	1,040	8,350

Table 18

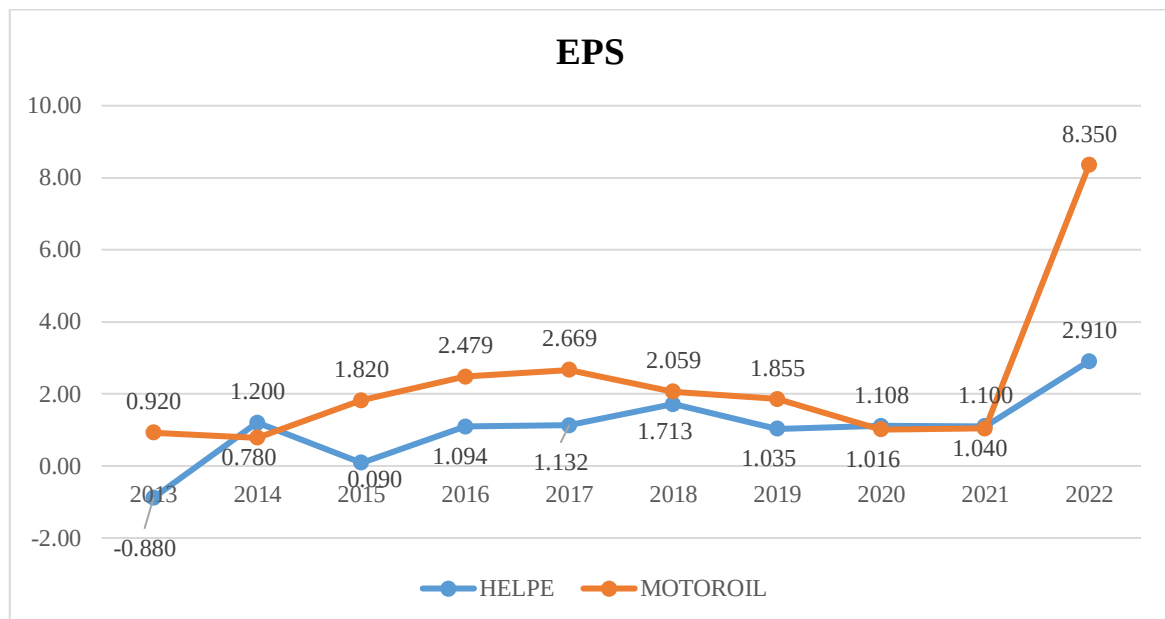


Figure 18

5.5.2 Price-to-Earnings Ratio (P/E)

The ratio was calculated with the current share price as the last price closing of each year. The pointer value shows how many times it is investors are willing to pay the earnings corresponding to each share, so that they buy the stock. A business with good management, high performance, good growth prospects and a relatively low degree of risk, it usually has high P/E ratio. A lower P/E ratio, combined with high earnings and a low share price is an indication that the stock is undervalued. On the other hand, a company with a high market value and low earnings is overvalued and its price should decline. More generally, if the P/E ratio of the stock of a company is high relative to the P/E ratio of the industry, then in this case the business is considered to be one of the best in the industry and is preferred by investors or the company is overvalued and that's because investors overvalued them its capabilities. On the other hand, a low P/E ratio of a company's stock indicates, either that the business is not preferred by investors, or that it is undervalued. In this investment ratio, MOH registers higher values in relation to HELPE. The average of the two companies finds MOH at approximately three times the price of HELPE (7.9 versus 2.5). This happens because the price of the share is much more expensive than that of HELPE. Consequently, HELPE seems not to be preferred by investors and to be undervalued.

year	P/E ratio									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	-8,773	-3,175	0,049	4,055	6,735	4,316	8,433	4,865	5,545	2,574
MOTOROIL	9,184	7,692	5,467	5,282	7,034	10,194	11,086	11,569	8,290	3,270

Table 19

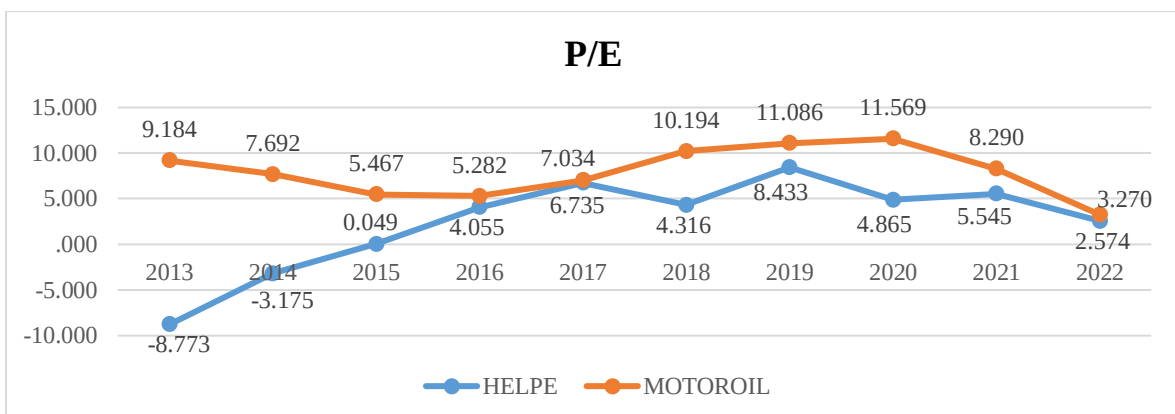


Figure 19

5.5.3 Dividend Yield

A company with a high dividend yield may be considered more attractive to one investor and to prefer this stock as an investment for his portfolio. As can be seen from table 20 and from diagram 20, the performance of MOH is greater than that of HELPE, and it is probably an important indicator for investors as a better investment. The highest prices in the MOH share were recorded in the years 2016-2017 with 0.069 and in the year 2022 with 0.073. Accordingly, the highest values of HELPE were recorded in the years 2019 with 0.057 and 2022 with 0.053. It is also observed in the share of HELPE a zero dividend yield in the years 2014 and 2015, where no dividend was given by the company.

year	Dividend Yield									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	0,019	0,000	0,000	0,045	0,020	0,034	0,057	0,019	0,016	0,053
MOTOROIL	0,047	0,033	0,015	0,069	0,069	0,062	0,056	0,000	0,066	0,073

Table 20

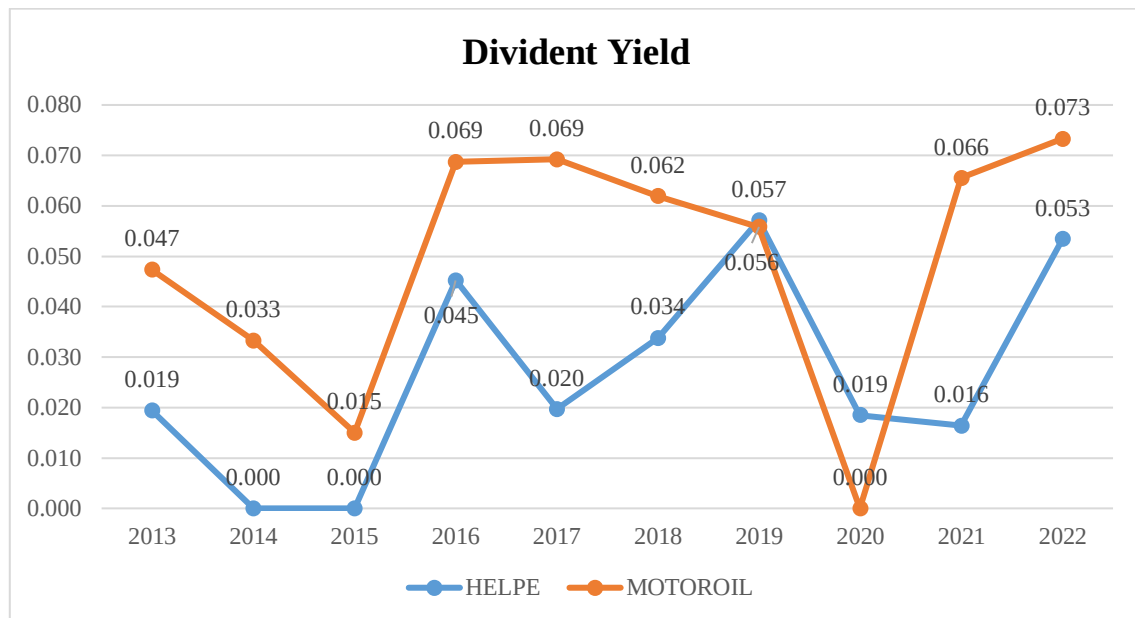


Figure 20

5.5.4 Price/Earnings-to-Growth Ratio (P.E.G.)

As the current share price, the last price was used to calculate the index closing of each year. The PEG ratio is perhaps less well known than the P/E (Price per Earnings) ratio, but it can give more and more useful information about the value of a stock and its prospects. With the PEG ratio, the value of a share can be estimated as is done with the P/E ratio, but with the difference that the calculations also take into account the company's expected profits. As with the P/E ratio, you consider a company to be one of the best if the P/E ratio of its share is high in relation to with that of the industry and will be preferred by investors. On the other hand, the high ratio it can also mean an overpriced business. Conversely, a low ratio indicates that the company is not preferred by investors or that it is undervalued. In this investment ratio, MOH registers higher values than HELPE. The average of the two companies rates MOH higher than HELPE (8.85 vs. 5.19). Consequently, ELPE appears to be unloved by investors and undervalued. However, their difference is not as great as that shown by the P/E index. In the period 2013-2015, the index could not be calculated due to missing data.

year	P.E.G.									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
HELPE	n.a	n.a	n.a	4,042	6,712	4,302	8,405	4,849	5,523	2,543
MOTOROIL	n.a	n.a	n.a	6,601	8,790	12,740	3,854	14,458	9,932	5,571

Table 21

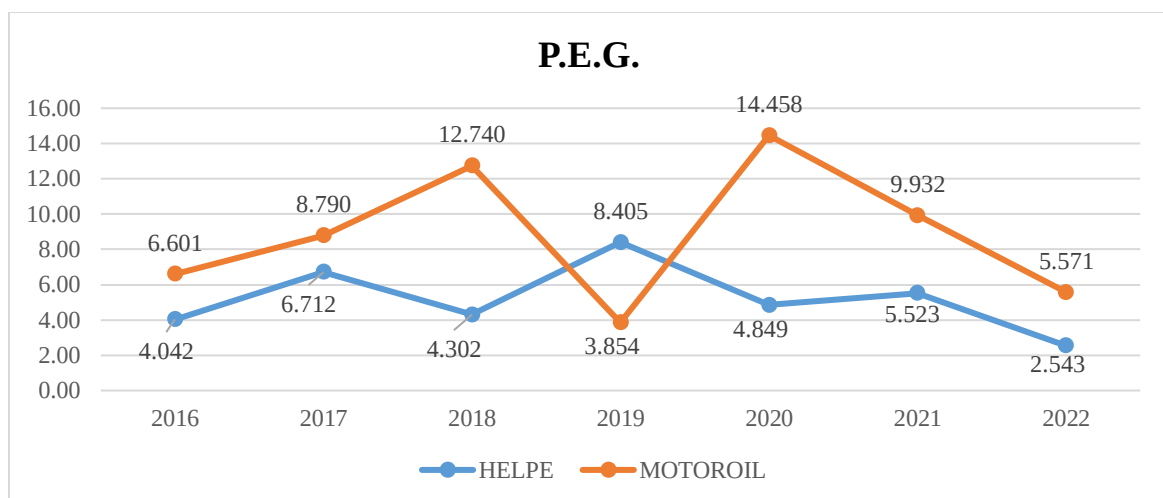


Figure 21

6. Statistical Tests

6.1 Comparing Every Mean of KPIs Between HELPE and MOH

For the statistical test between the means of each KPI between HELPE and MOH, an F-test was performed to find if the samples have equal variances or not. Then, according to the sizes of each independent sample, a T-test was performed to find out if the difference in the means of each indicator is statistically significant or not. The results for each indicator are listed below:

Liquidity Ratios

- Current ratio : From the F-test, it emerged that H_0 cannot be rejected, therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- Quick Ratio : From the F-test, it emerged that H_0 cannot be rejected, therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- Net Working Capital : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.

Activity Ratios

- Inventory Turnover : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- Average Storage Period : From the F-test, it emerged that H_0 cannot be rejected, therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t > t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.

- Average Receivable Collection Period : From the F-test, it emerged that we accept H1, therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t > t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.
- Total/Net Assets Turnover : From the F-test, it emerged that H_0 cannot be rejected, therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.
- Current Assets Turnover : From the F-test, it emerged that H_0 cannot be rejected, therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.

Debt Ratios

- Debt-to-Equity ratio : From the F-test, it emerged that we accept H1, therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.
- Debt ratio : From the F-test, it emerged that we accept H1, therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.
- Debt-to-Capital ratio : From the F-test, it emerged that we accept H1, therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.
- Interest Coverage : From the F-test, it emerged that we accept H1, therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H1, that there is a statistically significant difference between the means.

Profitability Ratios

- Net Profit Margin : From the F-test, it emerged that we cannot reject H_0 , therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} > \alpha$, therefore we cannot reject H_0 , that there is not a statistically significant difference between the means.
- Gross Profit Margin : From the F-test, it emerged that we cannot reject H_0 , therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} > \alpha$, therefore we cannot reject H_0 , that there is not a statistically significant difference between the means.
- Operating Profit Margin : From the F-test, it emerged that we cannot reject H_0 , therefore the variances are equal. A t-test of equal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} > \alpha$, therefore we cannot reject H_0 , that there is not a statistically significant difference between the means.
- ROA : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- ROE : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.

Market and Growth Ratio

- EPS : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- P/E ratio : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t_{\text{test}}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.
- Dividend Yield: From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged

that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.

- P.E.G : From the F-test, it emerged that we accept H_1 , therefore the variances are unequal. A t-test of unequal variances was performed and it emerged that $t < t\text{-test}$, and $P\text{value} < \alpha$, therefore we accept H_1 , that there is a statistically significant difference between the means.

Summarizing, we observe that there is a statistically significant difference in all the indicators used except gross profit margin, net profit margin and operating profit margin. This happens because the average values of the two companies show very small differences in the ten-year period under study. The table below (table 22) summarizes the mean values of the 3 indicators mentioned above.

	HELPE	MOH
Gross profit margin	0.063	0.059
Net profit margin	0.030	0.032
Operating profit margin	0.056	0.052

Table 22

6.2 Comparing Every Mean of KPIs Between Petroleum Industry and Electrical Energy Industry

An attempt was made to compare the figures between the oil industry and the electricity supply industry. As before, for each indicator, the mean value of each branch was found, between the two companies studied in this work and two other large companies active in the electrical energy sector. For all indicators an F-test was performed to establish the inequality of variances. Subsequently, a T-test was performed, from which it emerged that in all indicators, the differences between the means are statistically significant. The main

reason is the comparison of different branches. In each branch the figures differ as they move to different levels of profits, debt and activities. In addition, few large companies are active in the energy sector in Greece today. As mentioned above, even the two companies examined in the work are active in the electricity sector, in the sector of renewable energy sources and others. So we understand how complex and difficult it is to isolate specific activities of a business and a branch, to compare them, and to draw general conclusions for an entire branch.

7. Conclusions

After completing the financial analysis of 21 indicators of the companies "Hellenic Petroleum" and "Motor Oil of Greece", and the statistical control that was attempted, and taking into account the conditions that prevailed in the domestic and global economy in the period 2013-2022, we conclude that the general image presented by these two companies, for most of the decade 2013-2022, is relatively satisfactory. MOE, compared to HELPE, managed to achieve better results in most indicators for the ten years of analysis. More specifically, and by indicator category, we have the following:

- According to liquidity indicators, both companies had low profits in the years 2013-2014. Then it seems that they rebound until 2020 where there is also a bend, where until 2022 they also rebound. More generally, the Motor Oil achieves better prices than ELPE and does not seem to face some special liquidity problem, while ELPE although it seems to face some kind of liquidity problem, especially at the beginning of the decade under review, it seems to have returned to positive signs at the end of it.
- According to the activity indicators, it can be seen that the MOE is succeeding better values than ELPE in all the indicators analyzed, showing better efficiency than ELPE. This has to do with the higher turnover of assets, current assets and inventory that it achieves, but also because of the shorter periods of storage and collection of receivables that it has.
- With reference to the analyzed debt indicators, we note that the MOE presents lower financial leverage but also lower financial risk, as well higher degree of borrowing capacity but also prompt response to interest payment in relation to the HELPE.
- In terms of indicators profitability, the 3 indicators gross profit margin, net profit margin and operating profit margin we observe for both companies to have similar values to the average of the decade. In some years one is higher, in some years it is the other, but as it was seen in the statistical test, there are no significant differences in their mean. Finally, for return on equity but also on return on assets, we observe that MOH scored better values compared to HELPE.

- According to market and growth indicators, we observe that MOH scores higher values in earnings per share, dividend yield and price-to-earnings ratio, in relation to HELPE throughout the decade under review.

In conclusion, it is established, according to the above analysis of the thesis, that the MOE can be considered as a more suitable company in relation to HELPE, in terms of a possible investment. However, it cannot be said that HELPE is not suitable for future investments this is because even though at the beginning of the study they do not show a good image, they subsequently recover. In order to further improve the position of both companies, decisions must be made to rationalize costs in order to improve profitability and efficiency. In addition, a more effective customer and pricing policy will result in an expansion of sales abroad. Additionally, a balance between borrowing and liquidity will help to avoid future financial risks.

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