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Análisis comparativo de la competitividad de Petróleos Mexicanos y Equinor[1]

Comparative Analysis of the Competitiveness of Petróleos Mexicanos and Equinor

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Resumen
Este estudio realiza un análisis comparativo de la competitividad entre las empresas Petróleos Mexicanos y Equinor, considerando como principales indicadores de competitividad los ratios financieros de liquidez, actividad, endeudamiento y rentabilidad, obtenidos a partir de los estados financieros consolidados de ambas empresas desde 2008 hasta 2019 Metodológicamente, la investigación aplica un análisis de tendencia lineal para cada indicador, basado en modelos de regresión que permiten identificar patrones. Este enfoque permite una comprensión más profunda de la competitividad en el sector energético mundial, proporcionando información valiosa para las partes interesadas y los responsables políticos.

Palabras clave: Pemex, Equinor, sector energético, competitividad.

Abstract

This study carries out a comparative analysis of the competitiveness between the companies Petróleos Mexicanos and Equinor, considering as main indicators of competitiveness the financial ratios of liquidity, activity, indebtedness, and profitability, obtained from the consolidated financial statements of both companies from 2008 to 2019 Methodologically, the research applies a linear trend analysis for each indicator, based on regression models that allow the identification of patterns. This approach enables a deeper understanding of competitiveness in the global energy sector, providing valuable insights for stakeholders and policy makers.

Keywords: Pemex, Equinor, energy sector, competitiveness.

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1. Introduction

In the dynamic global economic context, the oil industry plays a crucial role. Understanding the competitiveness of companies in this sector is essential to grasp market dynamics and business strategies. This study focuses on Petróleos Mexicanos (PEMEX) and Equinor, two giants of the oil industry which, despite operating in different national contexts and historical trajectories, are significant models within the energy sector. PEMEX, a key player in the Mexican economy, and Equinor, known for its focus on efficiency and sustainability, present unique comparative cases in terms of business competitiveness (Petróleos Mexicanos, 2019; Public Finance Studies Center, 2014; Romo, Pérez, and Jiménez, 2013).

The objective of this analysis is to evaluate and compare the trends in key financial indicators of PEMEX and Equinor from 2008 to 2019. This study will delve into vital aspects such as liquidity, activity, indebtedness, and profitability, essential for understanding the financial health and competitiveness of these companies in a challenging global market. The analysis aims to identify factors influencing stability and growth in the energy sector, noted for its volatility and the constant evolution of market dynamics.

This study seeks to understand how PEMEX and Equinor, as major producers in the oil industry, have adapted and thrived in an uncertain global economic climate. The results will particularly interest investors, policymakers, and other stakeholders in the oil sector. An exploration of the similarities and differences between these companies yields valuable insights into the effects of national conditions and corporate policies on business competitiveness.

In the historical context of significant shifts in the global economy, from the financial crisis to contemporary challenges, understanding the strategies enabling oil companies to stay relevant and effective is crucial. The concept of competitiveness has been examined from various perspectives in the oil sector, emphasizing the importance of efficient financial management and the ability to adapt to changing market conditions (Acosta and Medina, 1999; Sánchez, 2009; Sánchez, Peña and Millán, 2016).

PEMEX, as a state-owned entity in Mexico,

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and Equinor, epitomizing the Norwegian approach, embody two distinct yet critically important strategies within the global oil industry. This study aims to enrich the understanding of management and business strategies in the energy sector, underscoring the challenges and opportunities that these entities encounter in the dynamic global marketplace.

The study examines liquidity, activity, debt, and profitability indicators to illuminate the strategies enabling PEMEX and Equinor to sustain their competitive edge. This method lays a robust groundwork for grasping not just the singular financial health of these corporations but also for discerning broader trends and practices prevalent in the international oil market.

2. Methodology

Following the methodology proposed by Acosta (1999), this research concentrates on the impact that fundamental financial management decisions have on company competitiveness. It investigates the influence of investment and financing decisions in creating competitive advantages for PEMEX and Equinor. The importance of adopting suitable financial strategies in the oil industry is emphasized, aligning with the theory that competitive companies typically demonstrate a higher level of investment and sharper financial management.

Incorporating key findings from the likes of Acosta (1999), Cardona et al. (2015), and Labarca (2007), the analysis selected four fundamental financial indicators: liquidity, activity, debt, and profitability. These indicators are pivotal in evaluating the financial viability and gauging the competitive stance of firms in the petroleum industry.

2.1. Formulas for Calculating Financial Ratios

In this study, four key financial ratios are analyzed: liquidity, activity, debt and profitability. These financial ratios are relevant to evaluate the competitiveness of companies in general, and in particular, the oil companies of Mexico and Norway, the object of this study. According to various authors, including Acosta and Medina (1999), Gitman and Zutter (2012), Cardona, Martínez, Velásquez and López (2015), and Van Horne et al. (2010), these reasons have

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an important relationship with business competitiveness.

The formulas for calculating financial ratios conform to the proposals of Gitman and Zutter (2012) and Van Horne et al. (2010). They are defined as follows:

1. Liquidity Ratio (Current Liquidity):
   - Formula: $\frac{Current\ Assets}{Current\ Liabilities}$
   - This ratio measures the company's ability to cover its short-term obligations with its current assets.
2. Activity Ratio (Asset Turnover):
   - Formula: $\frac{Cost\ of\ sales}{Merchandise\ Inventory}$
   - This ratio indicates the efficiency with which the company uses its assets to generate sales.
3. Debt Ratio:
   - Formula: $\frac{Total\ Liabilities}{Total\ Assets}$
   - This ratio shows the proportion of the company's assets that are financed by debt.
4. Profitability Ratio (Net Margin):
   - Formula: $\frac{Gross\ Profit}{Sales}$
   - This ratio evaluates how much net profit is generated for each unit of sale.

2.2. Data Collection and Application

For PEMEX and Equinor, data was collected from their annual financial reports for the period 2008 to 2019. This data was used to calculate the financial ratios mentioned above. Analysis of these indicators provides a detailed view of the financial health and operational efficiency of both companies over time.

2.3. Linear Trend Analysis

After collecting annual financial data from PEMEX and Equinor for the period 2008-2019, the linear trends of the four key indicators were analyzed: liquidity, activity, debt and profitability. The purpose of this analysis is to identify patterns and trends in the financial performance of both companies over time, providing a basis for future interpretations and projections.

First, an exploratory analysis of the data was performed, including reviewing consistency and preparing the data for statistical analysis. This step was crucial to ensure the quality and reliability of the data before proceeding with more advanced analysis methods (Gujarati & Porter, 2009).

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Subsequently, a linear regression model was applied to each time series corresponding to the financial indicators. Linear regression, a statistical method widely recognized for its effectiveness in identifying relationships and trends in historical data, was used to model and quantify the trends observed in each indicator (Bowerman, O'Connell, & Koehler, 2007). This technique allows the slope and intercept to be calculated for each indicator, providing a clear measure of the direction and magnitude of trends over time.

The quality of fit of the linear regression models was evaluated using the coefficient of determination and a residual analysis. These evaluations help verify the accuracy of the models and their suitability to represent trends in the data (Gujarati & Porter, 2009).

The results obtained from this linear trend analysis will lay the foundation for the next section of the study, where these trends will be interpreted in the context of the competitiveness and operational efficiency of PEMEX and Equinor.

The methodology implemented in this study, which includes the calculation of essential financial ratios and the analysis of linear trends, has established a solid foundation for a detailed and comparative evaluation of the financial performance of PEMEX and Equinor. The subsequent section, "Analysis and Results", will be dedicated to the interpretation of these trends, examining their influence on the competitiveness and operational efficiency of the two companies within the scope of the international energy market.

3. Analysis and Results

The central objective of this section of the study is to present and examine in detail the results obtained from the analysis of linear trends of the financial indicators of PEMEX and Equinor. It focuses on four key indicators: liquidity, activity, debt and profitability, each reflecting vital aspects of the performance and financial position of these companies in the international energy sector during the period between 2008 and 2019.

The analysis begins with an individual evaluation of each financial indicator. For each of them, the data will be presented, the temporal trends illustrated through graphs will be analyzed and their meaning will be interpreted in terms of financial health and operational efficiency. This part of the study

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not only highlights the financial history of each company, but also provides a basis for understanding their management and strategies in response to energy market dynamics.

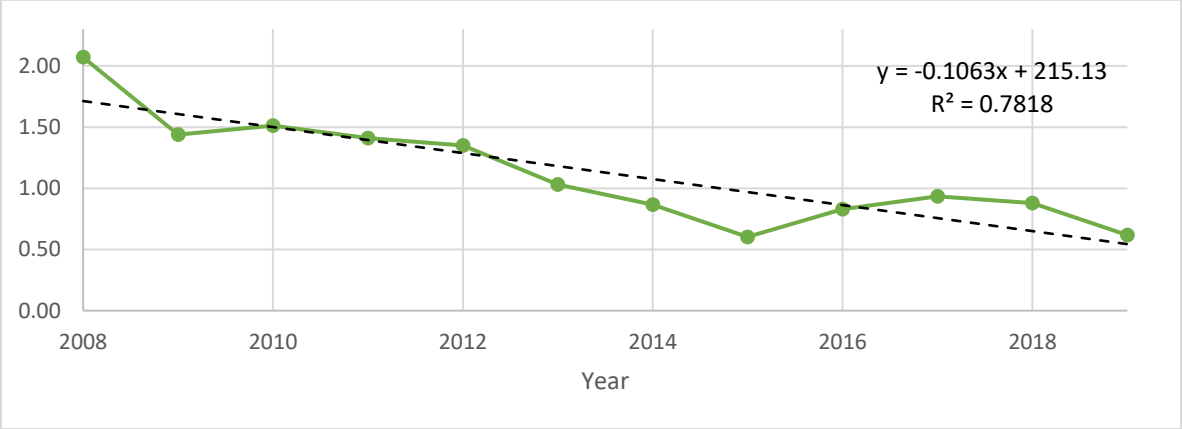
Subsequently, an analytical comparison will be made between PEMEX and Equinor. This comparison aims to identify the differences and similarities in the financial patterns of both companies, offering a comparative view that highlights their respective strengths and weaknesses in the context of the global oil industry.

3.1. Circulating Ratio

3.1.1. PEMEX Current Ratio

The analysis of liquidity, reflected through the Current Ratio, reveals a worrying trend for PEMEX. As seen in graph 1 (below), the Current Ratio has decreased consistently during the analyzed period. The negative slope of the trend line, calculated using linear regression, indicates an average annual reduction of 0.11 points in the Current Ratio, suggesting a decrease in PEMEX's liquidity. This decline could be indicative of a declining ability to settle current liabilities with available current assets.

Graph1. PEMEX Current Ratio



Source: Own elaboration with data from PEMEX.

The determination coefficient R^2 of 0.7818 implies that approximately 78% of the variability observed in PEMEX's Current Ratio can be explained by time, which

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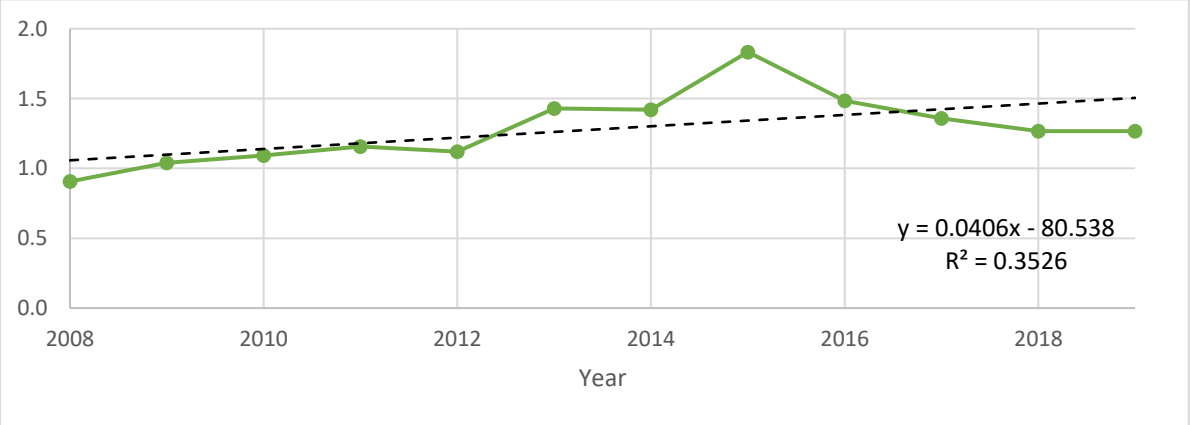
denotes a significant relationship between the passage of years and the decrease in liquidity. The persistence of this trend may have significant implications for the financial health of the company, potentially indicating challenges in managing working capital and possible difficulties in maintaining short-term solvency.

This decreasing pattern in PEMEX's liquidity requires attention and could be a starting point for further investigation into the company's asset and liability management policies. Additionally, it would be advisable for the company to consider strategies to improve its liquidity, such as optimizing inventory management, renegotiating payment terms with suppliers, or reviewing its credit policies for customers, in order to ensure greater financial flexibility.

3.1.2. Equinor Current Ratio

The analysis of Equinor's Current Ratio indicates a general upward trend in its liquidity, a positive aspect that suggests an improvement in the company's ability to meet its short-term obligations. The increasing trend, represented by the positive slope of the regression line, denotes an annual increase of 0.04 points on average, which is adjusted to 0.06 points when applying a moving average. This increase is a sign of financial strength and could be interpreted as the result of efficient management of current assets and liabilities. As seen in graph 2 (below).

Graph2. Equinor Current Ratio



Source: Own elaboration with data from Equinor.

The variability explained by the linear regression model, with a value of 0.3526, was considered low, which could indicate that other factors, in addition to time, influence the Equinor Circulating Ratio.

This sustained growth in Current Ratio is encouraging, especially in a sector where the volatility of oil prices and market fluctuations can significantly impact companies' liquidity. Equinor's ability to improve its liquidity in the face of such challenges is a sign of its resilience and financial adaptability.

3.1.3. Comparison of the Current Ratio between PEMEX and Equinor

PEMEX's Current Ratio has shown a decreasing trend, with a negative slope in the linear regression, indicating an average annual reduction of 0.11 points. This sustained pattern suggests that PEMEX's ability to cover its short-term liabilities with liquid assets has weakened over time. The determination coefficient of 0.7818 indicates that the majority of the variability of the Current Ratio can be attributed to temporary factors, which could reflect structural challenges in the company's liquidity management.

On the other hand, Equinor has experienced an upward trend in its Current Ratio, with an average annual increase of 0.04 points.

The comparison between PEMEX and Equinor reveals two different financial trajectories. While PEMEX has faced a progressive decline in its liquidity, which could lead to potential financial difficulties, Equinor has improved its liquidity position, suggesting more robust financial management and a greater ability to meet immediate obligations. This difference in liquidity trends could be indicative of differentiated working capital management strategies and each company's ability to respond to financial pressures.

3.2. Activity Ratio

3.2.1. The Reason for PEMEX Activity

The Inventory Turnover Index or Activity Ratio is an indicator of operational efficiency, especially in an oil company where inventory management significantly influences profitability. Chart 3 (below) for PEMEX indicates a general upward trend in inventory turnover, which implies that the company has been improving its efficiency.

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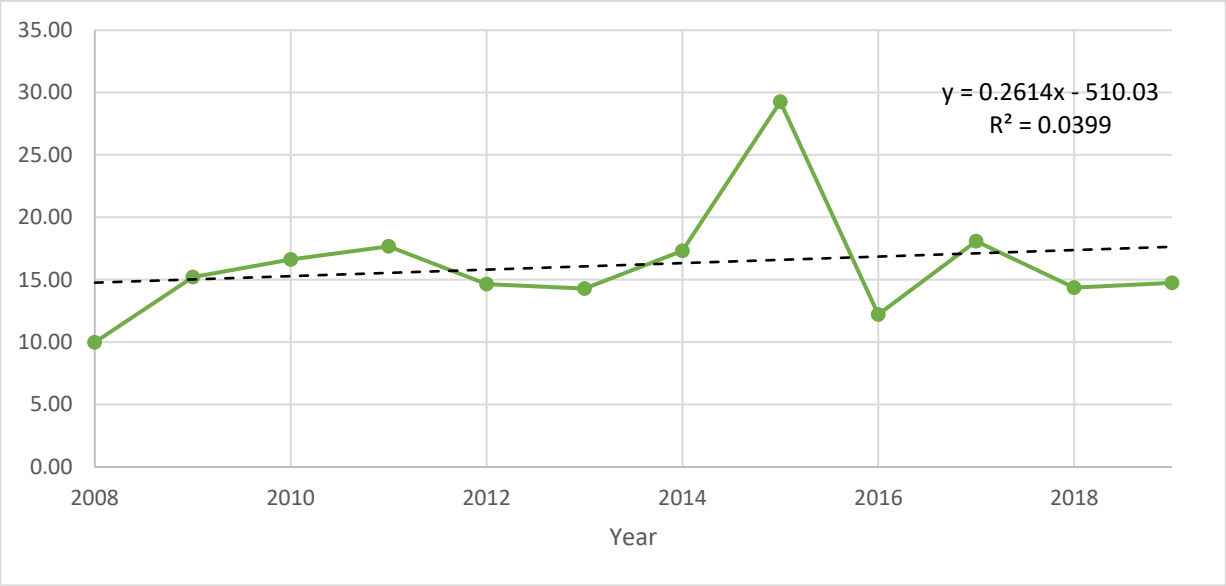
Graph3. PEMEX Activity Ratio and its tendency



Source: Own elaboration with data from PEMEX.

Although the coefficient was low, suggesting significant variability not explained by the model, the upward trend indicated by the regression equation in inventory turnover should not be discarded. This result implies the possibility of underlying factors not captured by the model.R^2

An increasing ratio means that PEMEX has been using its inventories more effectively to generate sales, which is essential in a context where storage costs and the risk of obsolescence can significantly impact liquidity and financial results.

This increase in inventory turnover is positive for PEMEX, as it indicates a potential reduction in inventory holding costs and a faster response to changing market conditions.

3.2.2. Equinor's Reason for Activity

Equinor's inventory management efficiency, represented by its Activity Ratio, has been trending upward, indicating more efficient use of inventories to generate sales. The increasing trend, suggested by the linear regression with a value of 0.5043, in inventory turnover is particularly notable in Figure 4 (below), as it indicates an improved ability of the company to manage its

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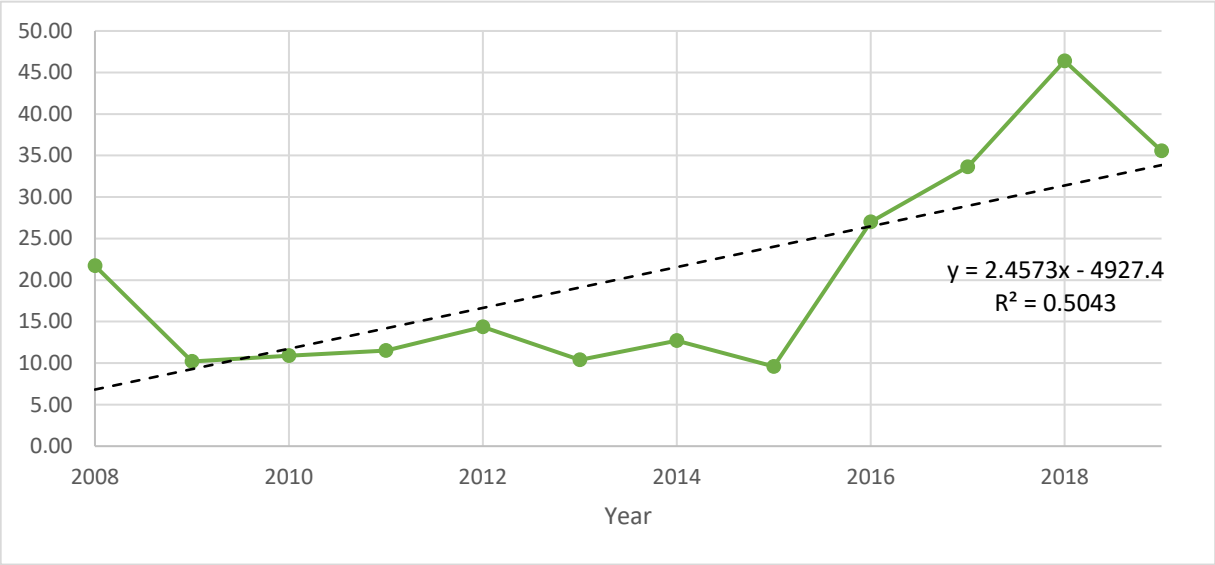
resources. This may be due to a number of strategic factors, such as optimizing the supply chain, implementing more efficient inventory management systems, or quickly responding to changes in market demand.

Graph4. Equinor Activity Ratio and its trend



Source: Own elaboration with data from Equinor.

Equinor's ability to continually improve its inventory turns is a positive indicator of its ability to adapt to market conditions and effectively manage its resources.

3.2.3. Comparison of the Activity Ratio between PEMEX and Equinor

By examining the Inventory Turnover Index between PEMEX and Equinor, different approaches to inventory management are identified that reflect variations in operational efficiency. PEMEX has recorded a slight but steady improvement in inventory turnover, suggesting progressive efforts toward more effective management. In contrast, Equinor exhibits a more substantial increase in its Inventory Turnover Index, which points to a more dynamic and adaptive management of its resources.

This marked difference between PEMEX and Equinor highlights the importance of investing in advanced management technologies and efficient supply chain

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strategies. While PEMEX needs to consolidate its focus on operational innovation to continue its improvement trajectory, Equinor is already reaping the benefits of a strategy that allows it to respond agilely to market demands.

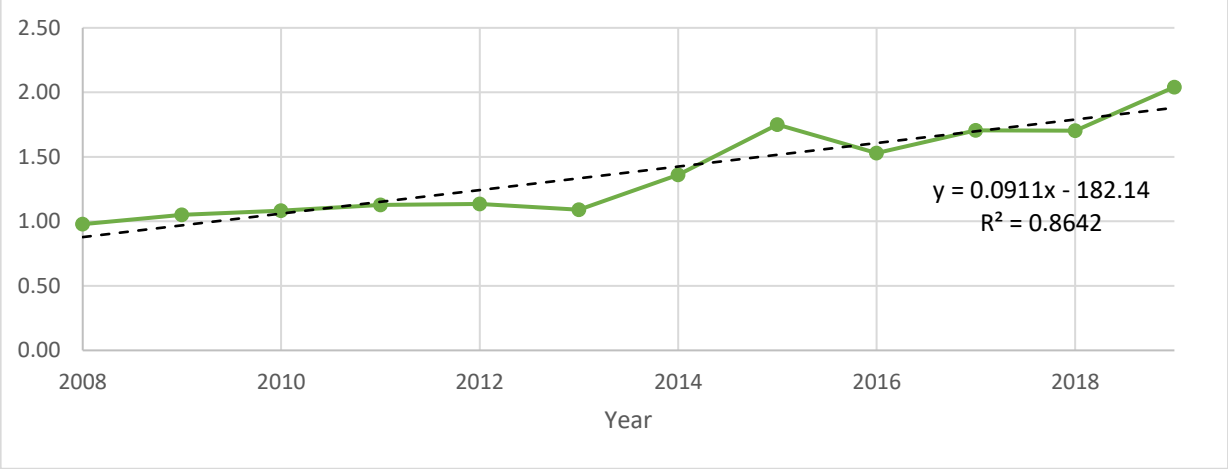
Finally, efficient inventory management emerges as a critical differentiator for profitability and liquidity. Equinor is projected to be better equipped to meet the challenges of a volatile environment, while PEMEX must strive to achieve and maintain the operational efficiency that Equinor has demonstrated.

3.3. Debt Ratio

3.3.1. PEMEX's Debt Ratio

PEMEX's capital structure, reflected in its Debt Ratio, shows a trajectory of sustained increase. The linear regression that models this trend presents an equation with a positive slope and a coefficient of determination of 0.8642. This high indicates that the increasing trend in debt is not random, but rather responds to a constant financial dynamic over time, with an average increase of 0.09 points per year. Chart 5 (below) shows the graphical representation of this trend, offering an image of the progression of PEMEX's indebtedness over the years.

Graph5. PEMEX Debt Index and its trend



Source: Own elaboration with data from PEMEX.

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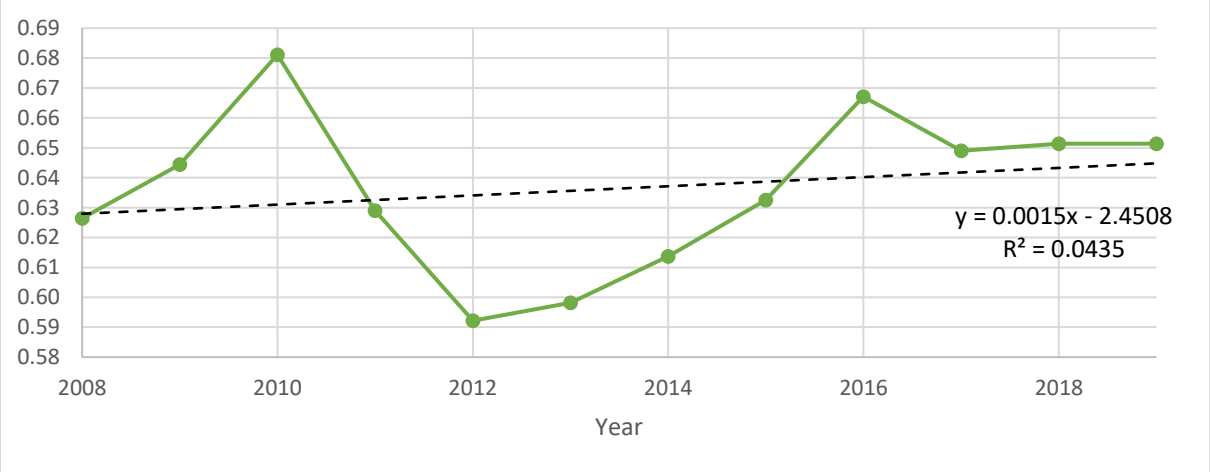
This growth in the index could suggest a financial strategy that has tended towards the acquisition of debt as a means to boost investments and finance the company's operations. While leverage can be a strategic tool for growth and expansion, the upward pattern requires careful analysis to ensure that the level of debt remains within manageable limits and does not compromise the long-term financial stability of the company.

PEMEX's ability to manage its debt will be crucial in its future trajectory, especially in a sector such as energy, where price volatility can significantly impact the company's ability to generate stable cash flows. The trend identified in the debt ratio analysis underscores the importance of strategic financial planning and prudent risk management to ensure PEMEX's financial sustainability in the future.

3.3.2. Equinor's Debt Ratio

Equinor's Debt Ratio reflects the company's financing practices and capital strategy over time. Graph 6 (below) presents an overview of the evolution of indebtedness and the general trend that has been observed.

Graph6. Equinor Debt Ratio



Source: Own elaboration with data from Equinor.

The linear regression model for Equinor shows a slight increase in the debt ratio year after year. However, the low indicates that the linear trend alone does not fully explain the

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variability of the index. This increasing trend, although modest, suggests that Equinor has been gradually increasing its financial leverage.

3.3.3. Comparison of the Debt Ratio between PEMEX and Equinor

When comparing the Debt Ratio between PEMEX and Equinor, we find two different financial panoramas. PEMEX has shown an increasing trend sustained in its indebtedness, which is represented by a linear regression with a positive slope and a remarkably high coefficient of determination. This indicates that PEMEX's financing strategy has relied heavily on the acquisition of debt over time, reflecting a possible pursuit of growth and expansion through financial leverage.

On the other hand, Equinor presents a much more modest trend in its debt ratio, with a lower. This suggests that Equinor has maintained a prudent financing policy, increasing its debt more gradually. Equinor's conservative management may reflect a deliberate strategy to maintain financial stability and avoid excessive risks associated with high levels of debt.

The PEMEX graph clearly illustrates the upward trend in its debt, which should be interpreted as an indicator of a possible aggressive growth strategy. In contrast, Equinor's graph shows a much more stable debt profile, with an eye toward financial stability and long-term sustainability.

3.4.1. The Profitability Ratio

3.4. The Profitability Ratio of PEMEX

The Gross Profit Margin Index or Profitability Ratio is essential to evaluate PEMEX's ability to convert its sales into gross profits, a direct reflection of operational efficiency and cost management. Graph 7 (below) shows a decreasing trend in this index for PEMEX, which shows challenges in preserving profit margins against income.

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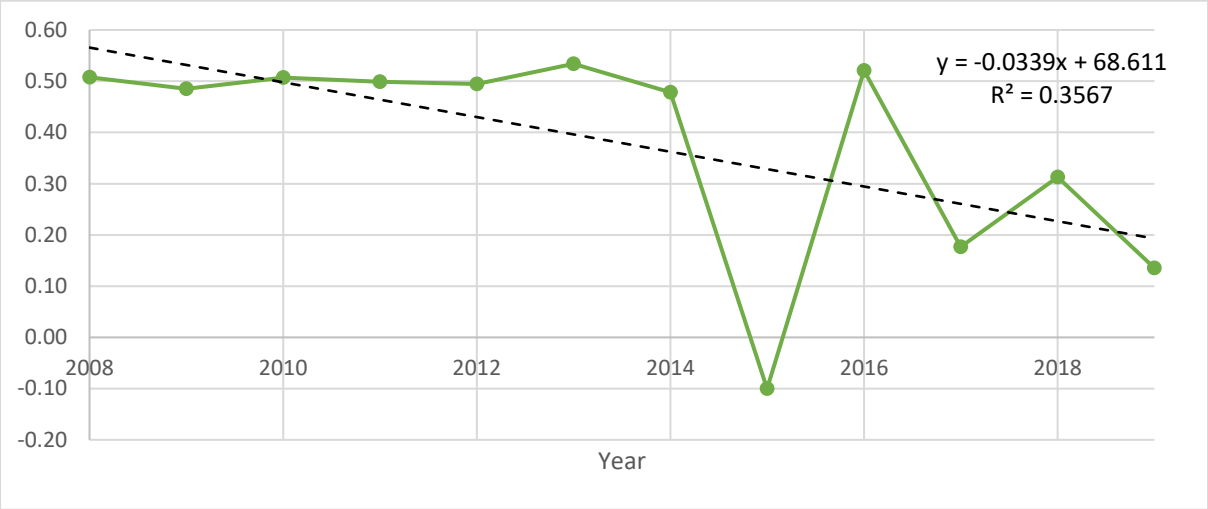
Graph7. PEMEX Profitability Index and its trend



Source: Own elaboration with data from PEMEX.

The negative trend in profitability, indicated by a downward slope in the trend line and an initial coefficient of determination of 0.3567, reveals that additional factors over time affect PEMEX's profitability.

A decrease in gross margin indicates that PEMEX could be facing an increase in costs of goods sold or a decrease in operational efficiency. This trend underscores the need for a more effective strategy for cost management and evaluation of operations to improve profitability.

3.4.2. Equinor's Profitability Ratio

Analysis of Equinor's Profitability Ratio reveals an incremental trend in profitability, suggesting a gradual improvement in the effectiveness with which the company converts sales into gross profits. The graphic representation of this evolution, as can be seen in graph 8 (below), shows a positive progression throughout the period studied.

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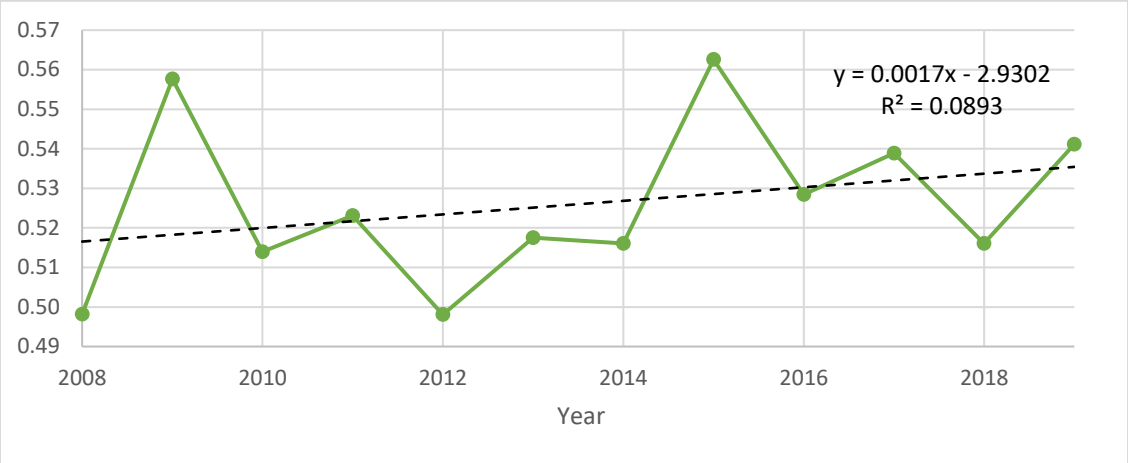
Graph8. Equinor Profitability Index and its trend



Source: Own elaboration with data from Equinor.

Despite an upward trend, the low coefficient of determination of 0.0893 suggests that factors other than time could be affecting this index.

This increasing trend in gross profit margin is indicative of effective cost management and an operating strategy that enables revenue generation in excess of incremental costs. The sustained increase in gross margin is an encouraging sign of Equinor's ability to maximize its profits, positioning it favorably in the energy industry, where cost optimization and operational efficiency are critical to long-term success.

3.4.3. Comparison of the Profitability Ratio between PEMEX and Equinor

The comparison between the profitability ratios of PEMEX and Equinor reveals significant contrasts in their financial dynamics, with profound implications for their positioning and strategies within the global energy market.

The PEMEX Gross Profit Margin Index presents a decreasing trend. This trend suggests increasing pressure on PEMEX's profit margins, possibly due to an increase in costs of goods sold or challenges in efficiently managing selling prices.

On the other hand, Equinor shows a slight but consistent improvement in its profitability

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ratio, indicative of more effective cost management and a successful business strategy. This indicator reflects Equinor's ability to increase its operational efficiency and its ability to generate revenues above incremental costs, which is a testament to the company's operational strength and strategy.

4. Discussion

The findings of this study highlight key differences in the financial and operational management of PEMEX and Equinor, suggesting that business strategies and operational contexts significantly influence financial results. The decreasing trend in PEMEX's liquidity can be interpreted as a challenge in liquidity management that could have implications for its financial stability, as has been documented in previous studies on financial volatility in the oil industry (Sánchez, 2019; Rojas 2005). On the other hand, the improvement in Equinor's liquidity reflects efficient management that has been highlighted in reports on its financial resilience (Villa and Sánchez, 2022).

Operational efficiency, measured through inventory turnover, shows an upward trend for both companies, although more marked in Equinor. These results are consistent with documented trends in inventory management in the energy industry, where operational efficiency has been identified as a key factor for competitiveness (Olivera-Pájaro, 2022).

The analysis of the debt ratio reveals a sustained increase in PEMEX's debt level, aligned with the literature that suggests a growing dependence on debt in state-owned companies (Secretaría de Hacienda y Crédito Público, 2023). In contrast, Equinor shows a more stable trend, which could reflect its conservative and prudent financing strategy, highlighted by financial analysts (Amy, 2020:17); MarketScreener, n.d.).

Profitability, a direct indicator of business success, shows a decrease for PEMEX and a slight increase for Equinor. PEMEX's decline may be related to the increase in costs of goods sold or a decrease in operational efficiency, a phenomenon previously observed in oil companies facing structural challenges (Cantero-Cora and Leyva-Cardeñosa, 2016). The improvement at Equinor, although modest, is indicative of effective cost management and a successful operational strategy, as has been recognized in its commitment to innovation and

adaptability (Equinor, 2024; Félix, 2023).

PEMEX's declining liquidity, while highlighting immediate challenges in managing working capital, also raises concerns about its agility in responding to market fluctuations. Studies such as those of Villa and Sánchez (2022); Ducuara, Niebles and Pacheco (2022); Batten, Kinateder, Szilagyi, and Wagner (2019) have emphasized that robust liquidity is essential for the survival of companies in the volatile oil and gas industry, where investment opportunities and risks must be meticulously balanced.

On the other hand, Equinor's rising liquidity can be interpreted as a competitive advantage that allows it not only to face short-term financial commitments but also to capitalize on investment opportunities quickly, a notable advantage in today's dynamic energy environment (Barrios, Acosta and Correa, 2004).

PEMEX's increasing indebtedness suggests a leveraged growth strategy, which, although it can facilitate the expansion and development of large-scale projects, also increases its vulnerability to market fluctuations and economic cycles, as demonstrated by the debt crisis. of the 1980s in state companies (Sachs, 1989; Girón, 1991; Vargas Mendoza 2013).

Equinor, by maintaining a more conservative borrowing strategy, appears to align with the practices recommended by the financial literature that associates prudent leverage with long-term sustainability and resistance to economic crises (Kraus & Litzenberger, 1973).

Regarding profitability, the declining trend at PEMEX could have significant implications for its competitiveness, since profitability is a reflection of how effectively a company generates value from its operations. Companies that fail to maintain adequate profit margins may face challenges in sustaining investments and guaranteeing returns to shareholders, which could affect their market positioning and investor confidence (Fama & French, 2002).

In contrast, Equinor's increasing profitability could be interpreted as an indication of its operational efficiency and its ability to adapt to market conditions, highlighting the importance of innovation and adaptability in business strategy, as discussed in the literature on business resilience (Sheffi, 2007).

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5. Conclusion

The comparative study of the financial ratios of PEMEX and Equinor has provided a comprehensive view of the position and strategies of these companies within the global energy sector. Through the analysis of liquidity, activity, debt and profitability indicators, specific trends have been identified that outline the financial and operational management of each company and its response to market dynamics.

PEMEX's trajectory reflects challenges in liquidity and a growing dependence on debt, which, together with decreasing profitability, indicates critical areas that require attention, so it is important for decision makers to consider strategies and challenges that support the improvement of its competitiveness and financial stability. Although an improvement in operational efficiency is observed, it is essential that PEMEX continues to implement strategies aimed at resource optimization and cost management to strengthen its position in the market.

In contrast, Equinor has demonstrated effective management of its liquidity and a conservative approach to debt. The upward trend in its profitability and operational efficiency underscores its ability to successfully adapt to changing market conditions and position itself as a leader in the energy sector.

The contrast in financial and operational management between PEMEX and Equinor reflects not only the differences in market conditions and corporate policies but also the adaptability and risk management strategies that are fundamental to sustainability in the volatile oil industry environment.

In conclusion, this study highlights the importance of adaptability, efficient management and solid strategic planning in strengthening the competitiveness of oil companies in the international arena. Lessons learned from Equinor and PEMEX offer valuable insights for the energy industry, where the ability to navigate economic uncertainty and capitalize on operational efficiency will be increasingly vital to long-term success.

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