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# Behind the glamour:

## *Factors of financial performance of the French luxury leather manufacturers*

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ABSTRACT

French luxury brands are renowned for their resilience amid ecological and macroeconomic challenges, but their suppliers often face significant disruptions. This study examines the financial performance of 31 French luxury leather manufacturers over 16 years (2006–2021), focusing on return on assets (ROA) and return on sales (ROS). A comprehensive overview of the French leather market, including statistics on the implementation of corporate sustainability practices is provided. Using panel linear regression models with fixed effects, the analysis incorporates macroeconomic, market, and ecological variables, alongside a binary variable distinguishing four Hermès manufacturers as part of a big luxury conglomerate. The results demonstrate the overall resilience of the luxury leather sector. The findings reveal that Hermès manufacturers, operating within a big luxury conglomerate, are more influenced by interest rate fluctuations, which reflects their dependence on borrowing costs. Additionally, Hermès manufacturers show lower profitability and greater vulnerability to external factors such as drought conditions, fluctuations in meat production, and meat prices compared to other luxury firms in the sample. These results challenge the perception that large-scale luxury corporations inherently enhance resilience and efficiency within the luxury manufacturing sector. This study contributes to understanding the complex interplay between economic, market, and ecological factors in the financial performance of luxury leather manufacturers, offering insights for stakeholders aiming to strengthen resilience and profitability in this sector.

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## 1. Introduction

France has leadership in the global luxury goods market through the prominence of its major luxury conglomerates. According to Deloitte's report [1], French companies accounted for approximately 32.3% of the total sales among the top 100 luxury goods sales worldwide in 2022. LVMH Moët Hennessy Louis Vuitton, headquartered in Paris, is recognized as the world's largest luxury goods company. France is home to other leading luxury brands, such as Kering and Hermès, which consistently rank among the top luxury companies worldwide.

Luxury brands succeed in showing a stable growth despite the pandemic, climate change issues, and macroeconomic fluctuations, as the STOXX Europe Luxury 10 Index reflects [2]. The index is more than 50 percent composed of French companies. By the end of July 2024, the index had a free-float market capitalization of $9,394.1 billion. This is over 6.5 times larger than the capitalization of the STOXX Europe 600 Consumer Discretionary sector [3], highlighting the significant weight of the luxury sector in comparison to the broader consumer market.

Despite the resilience, luxury brands have long been criticized for their lack of sustainability and ethical practices, particularly for prioritizing the indulgence of a privileged few at the expense of significant resources, animal welfare, and labor conditions [4,5]. However, this dynamic is changing as younger generations increasingly prioritize sustainability in their purchasing decisions, even in the luxury market. For instance, a survey of U.S. consumer attitudes on sustainable shopping found that three-quarters of Gen Z prefer buying sustainably over choosing brand names [6]. Similarly, research [7] reveals that millennials are more attuned to the sustainability of luxury products compared to previous generations.

This generational shift carries considerable weight for the market. Bain & Company estimated that millennials will represent 40% of the global personal luxury goods market consumption by 2025, with their preferences influencing older generations [8]. As a result, the luxury sector has had to adapt to align with these values. In recent years, many luxury brands have begun to place sustainability at the core of their strategies. By 2023, key industry reports highlighted sustainability as a priority, with brands focusing on improved transparency, reducing environmental impacts, and creating more adaptable supply chains [1,9,10].

Applying sustainability practices at every step of production is crucial, but it must be balanced with the financial viability of the brand's suppliers. Ensuring a company's survival is essential for sustainability managers to secure the long-term impact of their initiatives, as market forces could undermine their efforts otherwise [11]. By narrowing the luxury scope to one industry, this paper aims to concert the resilience of industry players influenced by external factors, like climate change and rising

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energy prices, as well as internal factors, like the implementation of sustainability practices.

One of the most renowned French luxury industries is leather goods. It holds a prominent position, steadily ranking second in value-added production in the leather goods sector among all European Union countries (Figure 1). In 2022, it accounted for 67% of French leather product exports, with handbags making up 69% of that total [12]. The Fashion & Leather Goods segment is a key pillar of LVMH's business, contributing €42.2 billion or 49% of the group's total revenue in 2023, driven by brands like Louis Vuitton, Christian Dior, and Fendi [13].

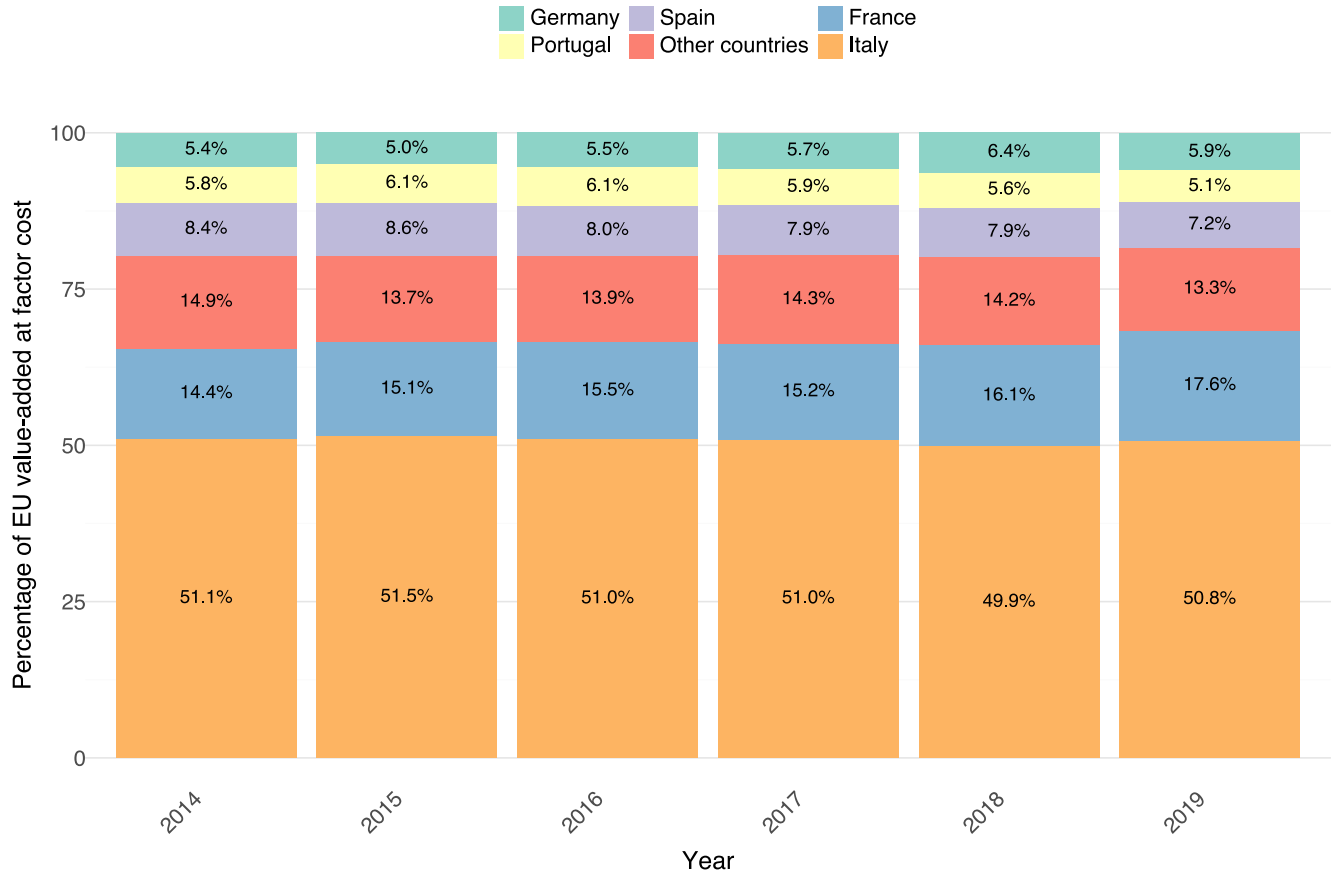


**Figure 1.** Country value added in leather goods production as a percentage of total EU value added [14].

The success of the French luxury leather branch is deeply rooted in the craftsmanship of numerous manufacturers and artisans. These entities, rich in heritage, uphold the high standards that define French luxury. Many groups maintain their manufacturing facilities both within French territory and abroad to ensure quality and control over production. There are also family-owned leather manufacturers who operate as subcontractors or under their labels, they focus on niche markets and many of them maintain traditional artisanal methods, passed down through generations.

According to Alliance France Cuir [15], French leather manufacturers have been progressively adopting corporate sustainable responsibilities (CSR) practices in areas such as energy efficiency, waste management, and ethical sourcing of raw materials. Many have integrated sustainability into their production processes and business models, reflecting a commitment to reducing their environmental footprint while meeting the growing consumer demand for ethically produced goods. This paper explores the impact of various factors on the financial performance of luxury leather manufacturers, with a particular focus on ecological aspects. The study examines both internal company variables and external influences, including macroeconomic, market, and climatic factors. It also evaluates the role of the implementation of CSR practices by companies to achieve Sustainable Development Goals. Additionally, the paper provides insights into the integration of "corporate sustainability" [16] within the French leather industry.

## 2. Literature review

### *2.1. Stylized facts about luxury*

Due to their exclusivity, status, and exceptional quality, luxury goods hold a unique position in both economic and social spheres. These types of products reflect deeper cultural and symbolic meanings. Understanding the distinguishing factors and management strategies of luxury

brands provides insights into what sets them apart from non-luxury goods.

One of the key characteristics of luxury goods is the price and income elasticity of demand. Luxury products typically exhibit price inelasticity, meaning that price changes have minimal impact on demand. Consumers purchasing luxury goods are often less sensitive to price changes because first of all, they value prestige and exclusivity of these products. Additionally, luxury goods are marked by high-income elasticity, where demand rises significantly as consumer incomes increase. This strong sensitivity to income fluctuations makes the luxury market particularly susceptible to economic downturns but also enables substantial growth during times of economic prosperity.

Another fundamental difference between luxury and non-luxury goods lies in their perceived value and exclusivity. Luxury goods create a perception of uniqueness and desirability and foster a sense of belonging among consumers [17]. In addition, luxury goods are often distinguished by their symbolic and status significance. Ownership of luxury items serves as a social signal, conveying wealth, taste, and social positioning [18]. The symbolic value is a key driver for consumers who seek to express their identity and status through their possessions. This behavior aligns with Thorstein Veblen's theory [19] of conspicuous consumption, where individuals purchase expensive items to signal wealth and social status.

Authors of the article [20] elucidate the unique characteristics of luxury brand management, emphasizing that traditional marketing principles are often inverted in the luxury sector. They underline that luxury brands eschew conventional mass-marketing strategies, instead focusing on maintaining exclusivity, caring about brand heritage, and delivering exceptional craftsmanship. In addition, in the realm of luxury brands, the concept of competition diverges from traditional market dynamics, as aggressive competition could undermine the very essence of luxury.

Luxury goods production differs from non-luxury goods production in several key aspects. Luxury manufacturing emphasizes exceptional craftsmanship, often involving meticulous handcrafting techniques [21]. This artisanal approach contrasts with the mass production methods typical of non-luxury goods, which prioritize efficiency and cost-effectiveness. Additionally, luxury production frequently incorporates rare and high-quality materials. Moreover, luxury manufacturers increasingly adopting eco-friendly practices to align with consumer expectations and regulatory standards [22]. In contrast, non-luxury production may not consistently prioritize such sustainable practices.

### *2.2. Financial performance*

The ability to generate profit is a primary indicator of a company's success. This study focuses on assessing efficiency from the perspective of production capacity rather than analyzing capital structure from a managerial or investor standpoint. Thus, common metrics evaluating profitability across firms as Return on Assets (ROA) [23–25], Return on Sales (ROS) [26,27] are considered.

ROA measures how effectively a company utilizes its assets to generate profit, making it a valuable tool for comparing performance across firms. While there are slightly different ways to calculate ROA, this paper uses the approach of dividing net income by total assets. In contrast, ROS evaluates how efficiently a company manages costs and controls expenses during the sales process. For this study, ROS is calculated by dividing operating profit (EBITDA - Earnings Before Interest, Taxes, Depreciation, and Amortization) by net sales, offering insights into operational efficiency.

Previous financial performance is recognized as an important variable for assessing performance persistence [28,29]. Many research papers highlight significant correlations between financial performance and factors such as firm age and size [30,31]. Furthermore, evidence suggests that highly leveraged small and medium-sized enterprises (SMEs) tend to experience weaker financial performance [32,33].

### *2.3. Macroeconomic factors*

Incorporating business cycles may be relevant to reflect how economic fluctuations impact companies. It may be useful to consider GDP growth [26,32], inflation rate [32], interest rate [24,32] and unemployment rate [33] to differentiate between performance changes stemming from macroeconomic trends and those resulting from firm-specific factors.

Fluctuating raw material prices, particularly in meat production, may impact leather manufacturers. Livestock is primarily raised for meat consumption [34], with leather being a by-product that contributes only 3–4% to an animal's overall value. Notably, 69% of leather originates from cattle [35].

Recent developments in the meat industry have added to the strain. For example, in 2023, surging meat prices led 8% [36] of French consumers to stop eating meat due to financial constraints [37]. Additionally, the growing popularity of flexitarianism (According to The French ministry of Agriculture and Food, flexitarianism is a variable and reduced consumption of meat and meat products, without excluding them completely: reduced portions of meat or more meals without meat) is expected to further reduce the availability of raw leather, exacerbating supply shortages for smaller manufacturers

The luxury leather industry is not only grappling with resource shortages but also facing significant challenges from global economic disruptions, particularly rising energy costs (Figure 2).

The Ukrainian conflict has exacerbated this issue, leading to a sharp increase in energy prices, which heavily affects

energy-intensive processes within the leather production and tannery sectors [37].

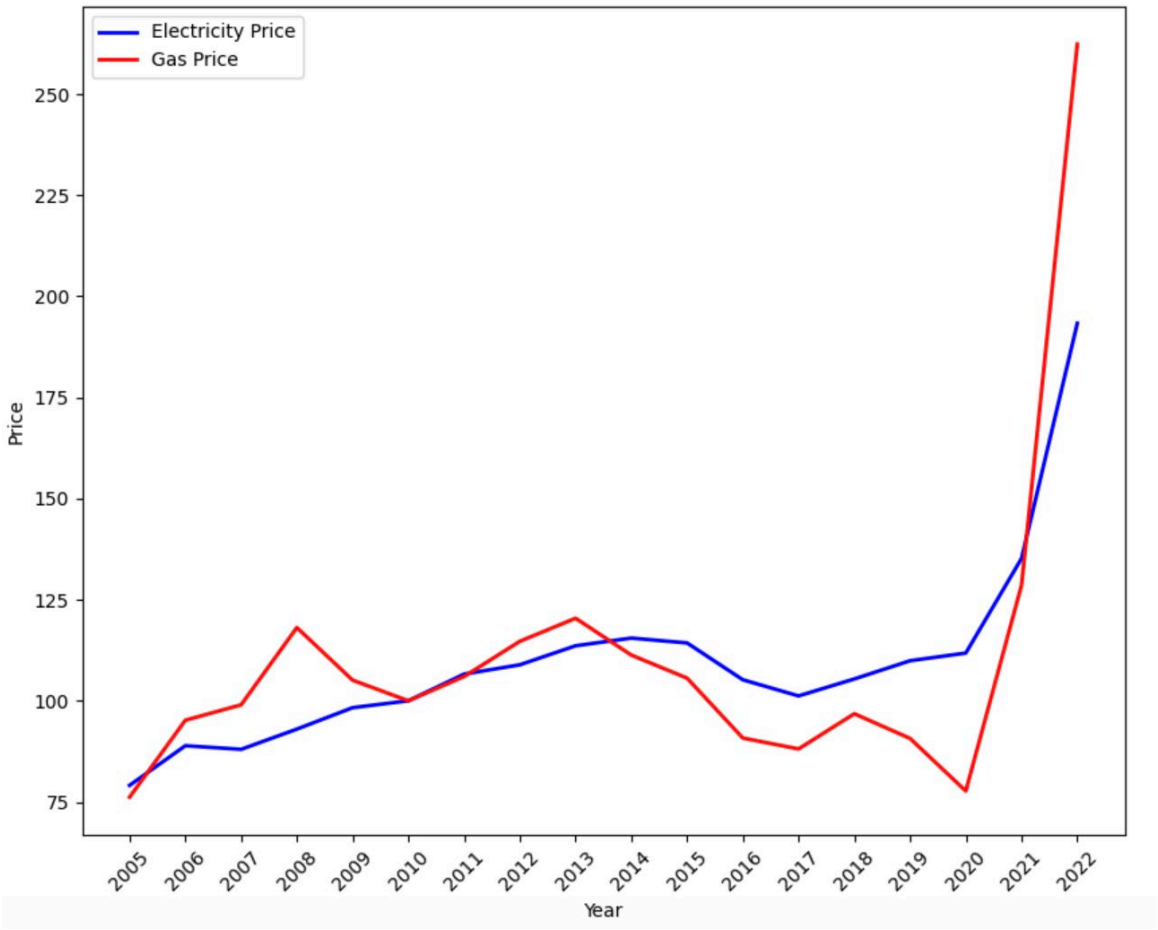


**Figure 2.** Evolution of unit energy prices (base year is 2010) [38].

These challenges could delay the production process, making it increasingly problematic to ensure that final products are ready on time. Hermès, despite achieving exceptional growth at the end of 2021, saw a decline in leather goods sales due to stock shortages, illustrating the broader impact these issues are having on the industry [37].

### *2.4. Climate change indicators*

Originating from and exacerbated by climate change, drought is among the most destructive types of extreme weather events [39]. The findings of [40] show that the key macroeconomic variables, namely, real GDP, industry output, employment, trade balance, and household consumption are negatively affected by the drought shock. The study [41] conducted for the UK underlined, that the manufacturing sector faces some of the largest direct losses due to the shortage of the water supply.

In France, prefectural authorities often impose temporary restrictions or suspensions on water abstraction during dry periods to prioritize essential uses. These measures, most commonly enforced in July and August (Figures 3 and 4), have become increasingly frequent, with a sharp rise observed in 2022 and 2023. Such restrictions can disrupt production processes, especially for smaller manufacturers.

Water plays a crucial role throughout the leather production process, used for soaking and rinsing raw hides to remove dirt and salt, softening fibers before tanning, and cleaning machinery and tools. Reliable access to water is essential for treating wastewater to remove pollutants before it is discharged. A review [42] highlights that tanning 1 kg of leather can use up to 250 liters of water. Beyond production, droughts can also affect the upstream supply chain by disrupting cattle farming [43,44] that can drive up the cost of hides.

Physical water scarcity is typically categorized into three types: meteorological, agricultural, and hydrological [45]. Meteorological drought refers to prolonged periods of below-average precipitation, leading to reduced rainfall and dry conditions. Agricultural drought occurs when there is insufficient soil moisture to meet the needs of crops, often resulting from meteorological drought. Hydrological drought involves deficiencies in surface and subsurface water supplies, such as reduced streamflow, reservoir levels, and groundwater. For this paper,

meteorological drought is particularly relevant as it addresses fluctuations in precipitation, which is the initial driver of water scarcity. Focusing on meteorological drought can provide insights into how precipitation trends impact industry operations and long-term resilience. To assess and quantify drought conditions, specific indices have been developed, including the Standardized Precipitation Index (SPI) [46] and the Standardized Precipitation Evapotranspiration Index (SPEI) [47]. By considering both moisture supply and atmospheric demand, the SPEI offers a more holistic view of drought conditions [48].

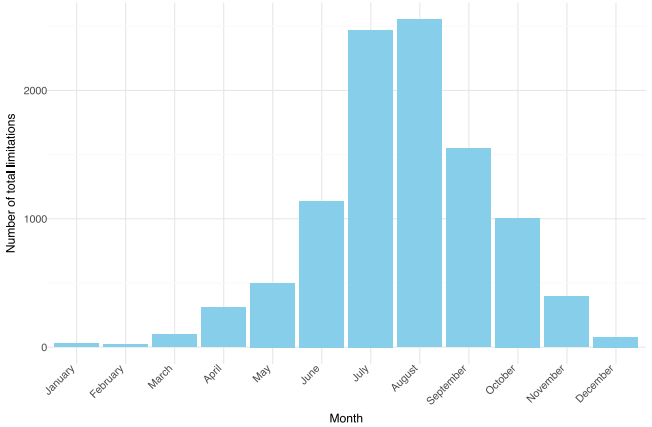


**Figure 3.** Information about temporary limitation and suspension measures for water abstraction in France [49] - Number of limitations by month for the period from 2007 to 2022.

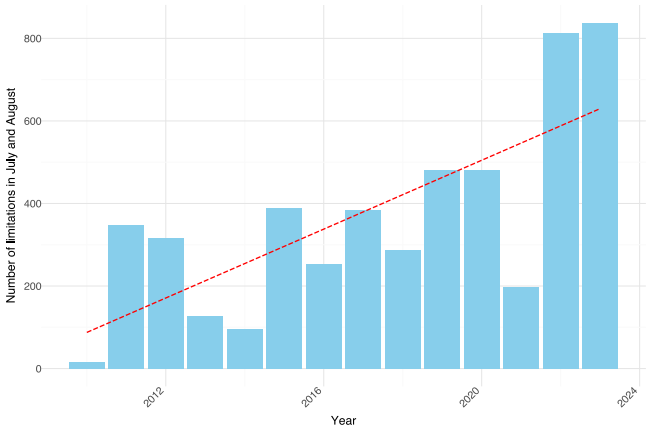


**Figure 4.** Information about temporary limitation and suspension measures for water abstraction in France [49] - Number of limitations in July and August in total in France by year.

### *2.5. CSR practices*

Through CSR initiatives, businesses can directly contribute to achieving the Sustainable Development Goals (SDGs) by aligning their operations, strategies, and community investments with global priorities such as climate action, gender equality, and responsible consumption. The United Nations has outlined 17 SDGs to address various global challenges, but not all of them are directly applicable to leather manufactories. Seven of them (5-9, 12-13) are aligned with the scope of the current study [50].

There is a complex landscape regarding the implementation of CSR initiatives. Some papers claim that smaller enterprises encounter significant challenges due to limited financial resources, making it difficult to invest in sustainable practices and adapt to global shifts. They are particularly vulnerable to economic pressures such as fluctuating raw material prices and rising energy costs, which can disrupt production and strain financial stability [37].

Conversely, some articles signal that the organizational structure of small and medium-sized enterprises (SMEs) can facilitate the integration of CSR initiatives [51]. Their close-knit nature allows for direct communication and swift decision-making, enabling them to adapt quickly to stakeholder expectations and societal demands.

Recent research indicates that CSR engagement in luxury contexts can have mixed effects financial performance [52]. If not carefully implemented, CSR initiatives may lead to decreased customer loyalty and financial performance. Luxury companies can mitigate these pitfalls by focusing on internal CSR efforts, such as employee-focused initiatives, and framing their brands as sustainable rather than exclusive.

The French Indicator of Professional Equality (Egapro) is directly linked to Goals 5 and 8 of the 2030 Agenda for Sustainable Development, specifically Target 5.5 and Target 8.5. It is a regulatory tool introduced by the French government in 2018 to address gender disparities in the workplace, focusing on remuneration and career progression. Mandatory for private enterprises with over 50 employees, the Index requires annual calculation and publication of gender equality scores based on specific indicators, including wage differentials, disparities in salary increases, promotion rates, salary adjustments post-maternity leave, and gender representation among top earners. Each indicator is assigned a weighted score, cumulatively totaling up to 100 points. A score below 75 necessitates the implementation of corrective measures within a three-year timeframe to mitigate identified inequalities.

Target 5.5: Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life.

Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

According to the French Ministry of Labor, the average Index score has increased by 3.6 points since 2019, and the proportion of companies scoring below 75 has halved, indicating gradual improvements in workplace gender equality [53]. Furthermore, the European Institute for Gender Equality's 2022 report places France fifth in the EU with a score of 75.1 out of 100, reflecting

advancements in gender equality metrics over the past decade [54].

Despite its comprehensive framework, evaluations of the Index's effectiveness have yielded mixed results. Studies indicate that while the Index has heightened awareness and prompted some organizational changes, its impact on reducing gender wage gaps remains limited, partly due to methodological constraints and varying levels of compliance among enterprises [55].

## 3. Data and methods

### *3.1. Luxury leather market overview*

Accurately measuring the share of the luxury leather market within the broader leather goods industry is challenging. By the end of 2023, a total of 392 leather companies (both luxury and non-luxury) with more than 5 persons were operating, with 62,5% of them employing fewer than 10 people [56]. Based on the assumption that long-life luxury leather manufacturers tend to be larger to meet demand, this leaves approximately 147 companies as potential candidates. To identify luxury leather companies and their locations, this study utilized the Kompass [57] database. Several filters were applied to refine the selection: the company must be located in France, classified under the NACE [58] code "Manufacture of travel goods, leather goods, and saddlery" [59] employ more than 9 workers, and provide workforce size information. This process resulted in a list of 190 companies.

After manually reviewing websites and news sources for each manufacturer, which identified several head offices, leather decoration firms, and companies involved not only in leather production but also in manufacturing items like metallic details. These cases are excluded, retaining only leather-focused manufacturers. This narrowed the list to 155 companies, aligning closely with the approximation derived from industry reports. 124 of 155 companies specialize in luxury leather goods.

Several luxury companies do not publicly disclose their specific activities, stating only that they collaborate with luxury brands. Their approach aligns with the credo "Vivons heureux, vivons cachés" ("Live happily, live hidden"), aiming to protect production secrets and prevent the early disclosure of new collections. For visualization purposes, these companies have been categorized as "Versatile", along with other companies that explicitly disclose their activities as "Versatile". Figure 5 illustrates that the majority of luxury companies focus on creating bags and versatile products, whereas non-luxury manufacturers predominantly specialize in baggage production.

Figure 6 highlights that luxury manufacturers often employ more than 50 workers, although a significant proportion operate within the 20 to 49-employee range. Conversely, the majority of non-luxury companies employ fewer than 50 workers.

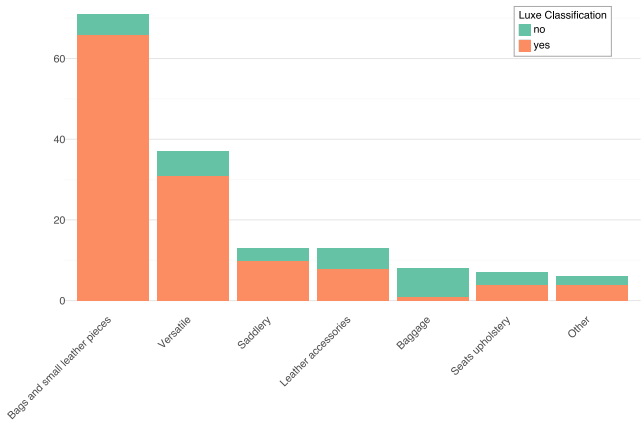


**Figure 5.** Overview of statistics for selected manufactures - Distribution of activity types by luxury classification.

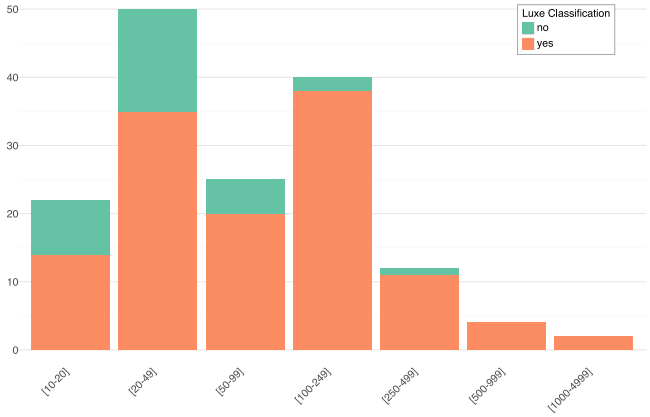


**Figure 6.** Overview of statistics for selected manufactures - Distribution of companies by employee size intervals and luxury classification.

Of the 155 companies in my dataset, 72 companies publish information on the Egapro Index, with 65 of them classified as luxury manufacturers. Luxury companies are more likely to publish Egapro information (52%) compared to non-luxury companies (23%), with an overall compliance rate of around 47%. This finding supports a suggestion made in the literature review about a stronger commitment to transparency in sustainability practices within the luxury sector.

### *3.2. Financial, market, and environmental variables*

French companies have the flexibility to choose the end date of their financial year, as long as it coincides with the end of a month [60]. During the period under consideration, some companies in my sample changed their financial year-end. Specifically, several companies issued balance sheets covering less than 12 months to align with a new reporting month, while some companies issued a balance sheet spanning more than 12 months. To address these discrepancies, the linear combination method (one of the methods to resolve this issue [61]) is applied. Linear combinations adjust the short-duration entry in proportion to a full year.

By calculating the ratio of the short-duration entry to 12 months, a weighted average of the short and full-year values is created, reflecting a full 12-month period. For instance, if a company previously reported its balance sheet in March and later switched to December, resulting in a 9-month balance sheet for the year of transition, with the calculation of the proportion of 9 months relative to 12. The remaining 3 months represent 0.25 of the year, and then a weighted average to adjust the value to reflect a full 12 months is used (Table 1).

**Table 1:** Example of linear combinations in Total Assets for a short-duration (9-month) balance sheet.

| Financial year-end | Balance sheet period | Total assets (€) | Proportion | Adjusted value |
|---|---|---|---|---|
| March 2020 | 12 months | 100,000 | 0.25 | 100,000 * 0.25 = 25,000 |
| December 2020 | 9 months | 150,000 | 0.75 | 150,000 * 0.75 = 112,500 |
| December 2020 | 12 months | | | 25,000 + 112,500 = 137,500 |

In the case of a variables of flow, as net profit and sales, the short-period full value is adjusted by adding a proportion of the full-year value, calculated based on the number of missing months (Formula 1).

$$12\ month\ value\ for\ Dec.2020 = 9\ month\ value\ for\ Dec.2020 + 12\ month\ value\ for\ Mar.2020 * 0.25 \quad (1)$$

A similar approach is applied for cases where the balance sheet covers more than 12 months. For instance, if a company issues a 21-month balance sheet for a given year (e.g., 2020), this means that the report covers the entire financial year 2020 plus a part of the previous year. In such cases, it recalculates the previous year's values by taking the 9-month part from the 21-month balance sheet as if it was for 12 months and 3 months from the previous 12-month balance sheet (Table 2).

For net profit and sales, the proportionate amount of value from the previous 12-month balance sheet with a proportionate amount from the current 21-month balance sheet is calculated (Formulas 2 and 3). In this case, it requires adjusting the value for the 21-month balance sheet, assuming that the variables are evenly distributed across all 21 months. To convert these values to reflect a 12-month period for December 2020, the proportional correction by multiplying the values by 12/21 is applied.

After making those adjustments, linear interpolation for companies is performed that had only one or two missing years to maintain the largest possible sample.

Then, this study proceeded to correct all nominal variables in the financial statements for inflation. To achieve this, the first seasonality from the CPI. This provided a seasonally adjusted CPI, which was then used to calculate the monthly inflation rate.

**Table 2:** Example of linear interpolation in Total Assets for a long-duration (21-month) balance sheet.

| Year | Balance sheet period | Total Assets (€) | Proportion | Adjusted Value |
|---|---|---|---|---|
| March 2019 | 12 months | 50,000 | 0.25 | 50,000 * 0.25 = 12,500 |
| December 2020 | 21 months | 200,000 | 0.75 | 200,000 * 0.75 = 150,000 |
| December 2019 | 12 months | | | 12,500 + 150,000 = 162,500 |

$$current\ year\ proportion = \frac{21\ month - 12\ month}{21\ month} \quad (2)$$

$$previous\ year\ proportion = 1 - \frac{21\ month - 12\ month}{12\ month} \quad (3)$$

Finally, the nominal financial variables are adjusted, using obtained inflation rates. To standardize my dataset across all firms and align it with other indicators with adjust all month-end dates to December by using linear combinations.

In line with the literature review, from the resulting database, the information about the date of creation of the enterprise, net profit, total assets, sales, debts, and EBITDA are selected. Followed by the constructed internal performance variables for the following analysis, presented in Table 3. To assess the impact of the economic climate on manufactory performance, variables of the real business cycle are considered as: real GDP growth, interest rate, and level of unemployment.

Unemployment in yearly differences are analyzed. To control energy prices, the electricity and gas price indices are applied to the French industry. It takes the values in logarithms to facilitate further interpretation. Additionally, it identifies Hermès manufactories separately, as they are part of a large luxury group and may exhibit different dynamics.

Given that most leather is sourced from cattle, the statistics on annual beef and veal production in thousands of tones from the OECD-FAO Agricultural Outlook are utilized. LVMH sources leather not only from Europe but also from the U.S. [62], while Hermès [63] has declared that its leather supply remains within Europe.

Other companies have not officially disclosed their leather sourcing. In this paper, the author assumes that the leather for the industry is generally imported from Europe. This study analyzes the year-over-year changes in production by examining the differences in logarithmic values. Meat price fluctuations can significantly impact an industry relying on leather, which is primarily sourced from cattle.

For this analysis, author focuses on beef prices, specifically the "Adult male indicative price", as reported in a weekly database for each European Union country.

Since the precise origin of the leather for each manufactory within the EU is unknown, first calculated the average beef price across all EU countries on a weekly basis.

Next, these weekly prices into annual averages are aggregated. To ensure comparability, these prices for inflation on meat in the EU are adjusted. For further analysis, the calculation of the changes in beef prices by taking the differences in their logarithmic values is performed. For measuring water availability conditions, the SPEI indices are used. The data was sourced from the CSIC SPEI database. The values are represented as small grid squares with a spatial resolution of 0.5 degrees, covering the Earth's surface. The data is available on a monthly basis, with SPEI timescales ranging from 1 to 48 months. In particular, the SPEI12, SPEI24, and SPEI48 indicators, corresponding to one, two, and four years of climatic dynamics are used, respectively; for the end of December. In cases where December values were missing for some years, linear interpolation to estimate the December value is applied. Given the presence of multiple manufacturing locations for the same company and the appearance of new locations over time, it took the SPEI for each site listed in the current year and then averaged the results.

To distinguish the effects of droughts, the variables *SPEI_drought* for each time period (Figure 7) is created. Given small number of observations for *SPEI_flood,* this study is directed not to consider them for this study. *SPEI_drought* captures values below -1, indicating dry conditions that exceed normal levels.

To simplify the interpretation of coefficients, the absolute values of these indicators are used.

**Table 3:** List of variables.

| Name | Denotation | Explanation |
|---|---|---|
| Internal performance variables | | |
| Return on assets (ROA) | roa | $\frac{\text{Net profit}}{\text{Total assets}}$ |
| Lag of ROA | lag_roa | $ROA_{t-1}$ |
| Return on sales (ROS) | ros | $\frac{\text{EBITDA}}{\text{Sales}}$ |
| Lag of ROS | lag_ros | $ROS_{t-1}$ |
| Company’s size | size | Natural logarithm of firm’s total assets |
| Company’s age | age | Firm’s number of years in operation |
| Leverage ratio | indebtedness | $\frac{\text{Total debts}}{\text{Total assets}}$ |
| Hermès group indicator | is_hermes | 1 if Hermès manufactory, else 0 |
| Macroeconomic and environmental variables | | |
| GDP growth | gdp_growth | Real GDP growth |
| Interest rate | rate | Marginal lending facility rate |
| Unemployment rate | u_rate | Level of unemployment rate in France |
| Electricity price | elec_price | Industrial electricity price index |
| Gas price | gas_price | Industrial gas price index |
| Production of beef and veal | EU_beef_veal_ production | Annual beef and veal production in thousands of tones |
| Beef price | beef_price | Average beef price across all EU countries |
| SPEI drought indicators | SPEI12_ drought, SPEI24_ drought, SPEI48_ drought | Drought measures indicating drought for one, two and four years |

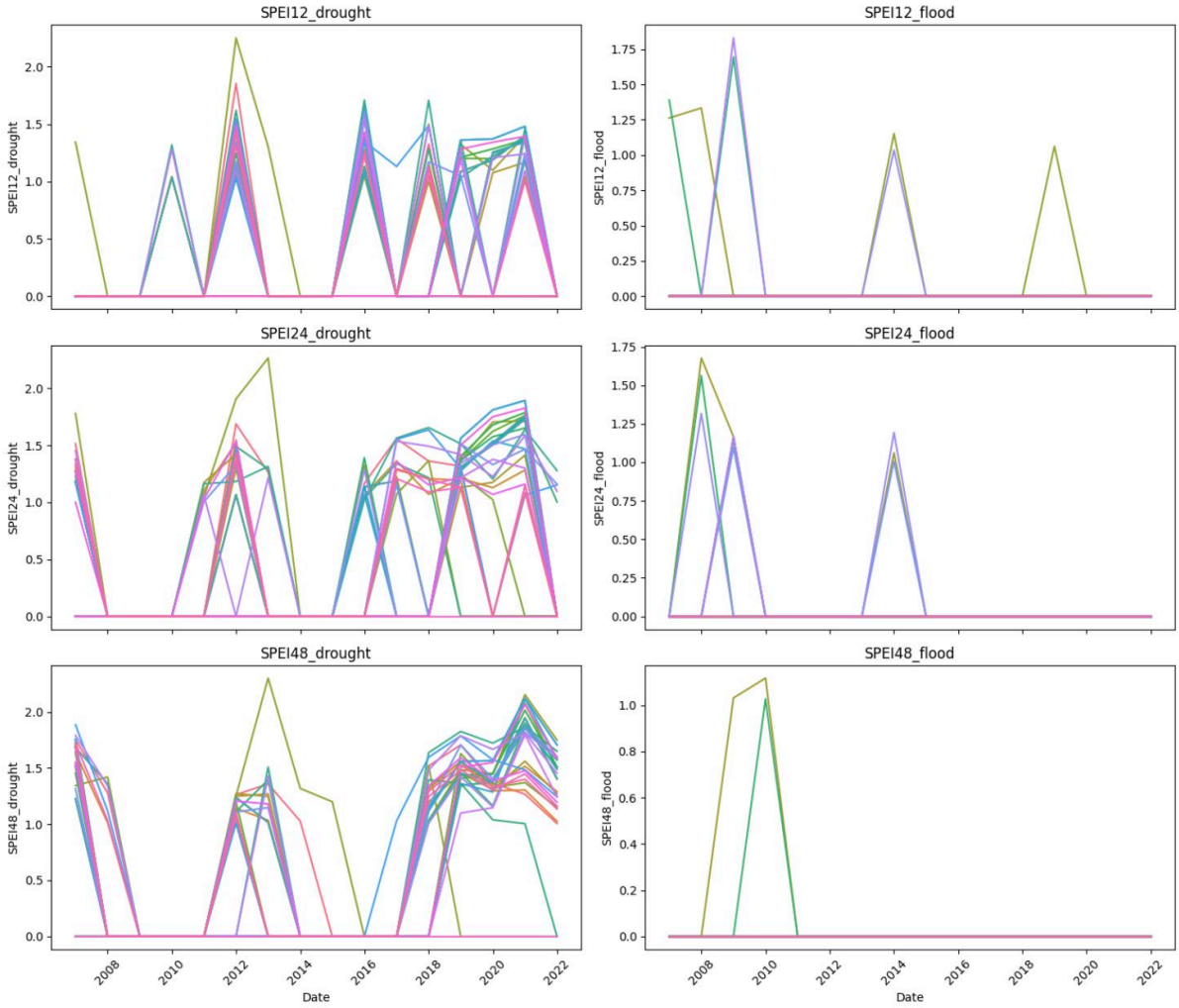


**Figure 7.** SPEI indicators dynamics for manufactories locations.

### *3.3. Hypothesis formulation and sample selection*

Sources for data on macroeconomic variables are obtained from various references such as electricity and gas prices [66], inflation [67], marginal lending facility rate [68], unemployment [69], beef and veal production [70], SPEI indices [71], beef prices [72], European Union inflation on meat [73], and professional equality index Egapro [74].

This study aims to test the following hypotheses:

1- The implementation of CSR practices does not have a negative impact on financial performance.

2- Rising energy costs and raw material prices affect financial performance.

3- Climate conditions, measured by drought indices, negatively impact financial performance.

4- External factors (business cycle variables, energy prices, climate conditions) affect Hermès manufactories differently compared to other companies.

To test these hypotheses, the sample was constructed based on data availability. Initially, financial balance sheets from Societe.com were reviewed, identifying 101 luxury companies with at least one published balance sheet. Data on professional equality (Egapro) was available for the period 2018 to 2023. For the analysis of the first hypothesis, a subsample of 23 (two manufacturers with subsequent outlier values in ROA and ROS during this period are eliminated.) luxury companies were selected, comprising firms that had published both financial balance sheets and professional equality information during the specified period.

To evaluate long-term resilience and to estimate hypotheses 2-5, another subsample was identified, consisting of 31 luxury companies with financial data spanning from 2006 to 2021 (Table 4).

Additionally, nonlinear relationships between selected variables were analyzed, revealing a quadratic relationship between return on assets (ROA) and indebtedness. This relationship was incorporated into the baseline models to ensure robustness in the analysis (Figure 8).

**Table 4:** List of manufactories.

| Name of manufactory | Activity type | Group name | Workforce range |
|---|---|---|---|
| Les Etuis Mirault | Wrapper | Independent | 100-249 |
| Ateliers d'Armançon | Bags and small leather pieces | MAROQUINERIE AUGUSTE THOMAS | 500-999 |
| Maroquinerie Thierry | Versatile | Établissements Thierry | 100-249 |
| Maroquinerie Auguste Thomas | Bags and small leather pieces | MAROQUINERIE AUGUSTE THOMAS | 20-49 |
| Soc Frédéric Butet | Saddlery | L.I.M GROUP | 20-49 |
| Sophan | Bags and small leather pieces | AAIMS | 50-99 |
| Ateliers Réunis du Centre Ouest | Bags and small leather pieces | ARCO CHÂTELLERAULT | 500-999 |
| Société Bruno Delgrange | Saddlery | Independent | 20-49 |
| Maroquinerie Renouard | Versatile | La maison Renouard | 20-49 |
| Société Noras | Bags and small leather pieces | Independent | 100-249 |
| Maroquinerie Marjo | Bags and small leather pieces | MAROQUINERIE AUGUSTE THOMAS | 100-249 |
| Manufacture Maroquinerie du Dauphiné | Bags and small leather pieces | Tolomei | 250-499 |
| Maroquinerie de Champagne | Bags and small leather pieces | BEYNAT ET JANNIAUX | 20-49 |
| La Maroquinerie du Sud-Ouest | Bags and small leather pieces | Hermès | 250-499 |
| Les Manufactures de Franche-Comté | Bags and small leather pieces | Hermès | 500-999 |
| Ateliers Nantais de Maroquinerie | Versatile | Ateliers Nantais de Maroquinerie | 250-499 |
| Maroquinerie de Saint-Antoine | Bags and small leather pieces | Hermès | 100-249 |
| Atelier du Bracelet Parisien | Leather accessories | ABP Concept | 20-49 |
| Société Gaston Mercier Développement | Saddlery | Independent | 10-20 |
| Créations J.C. Perrin | Leather accessories | Groupe Créations Perrin | 100-249 |
| LIM France | Saddlery | L.I.M GROUP | 100-249 |
| S.I.S. | Leather accessories | Groupe SIS | 1000-4999 |
| Maroquinerie des Ardennes | Versatile | Hermès | 250-499 |
| Maroquinerie de Saulieu | Leather accessories | MAROQUINERIE AUGUSTE THOMAS | 100-249 |
| Antarès Sellier France | Saddlery | A.D.B Holding | 50-99 |
| Les Ateliers de Verneuil-en-Halatte | Bags and small leather pieces | Groupe Chanel | 250-499 |
| Commerciale de Maroquinerie | Bags and small leather pieces | Abriss | 250-499 |
| Établissements Laffargue | Bags and small leather pieces | Independent | 20-49 |
| Beynat et Janniaux | Versatile | BEYNAT ET JANNIAUX | 20-49 |
| Selmo-Jelen | Bags and small leather pieces | MAROQUINERIE AUGUSTE THOMAS | 100-249 |
| Sacar | Seat upholstery | VSR | 100-249 |

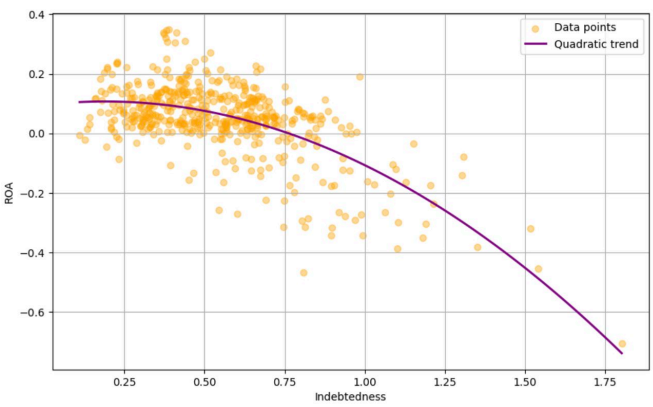


**Figure 8.** Relationship between indebtedness and ROA.

### *3.4. Method for long term factor analysis*

The following panel linear regression models with fixed effects (chosen based on Hausman test) as my baseline models is used:

$$ROA_{it} = \alpha_i + \beta_1 * ROA_{it-1} + \beta_2 * age_{it} + \beta_3 * size_{it} + \beta_4 * indebtedness_{\text{it}} + \beta_5 * indebtedness\_squared_{it} + \beta_6 * gdp\_growth_{it} + e_{it} \quad (4)$$

$$ROS_{it} = \alpha_i + \beta_1 * ROS_{it-1} + \beta_2 * age_{it} + \beta_3 * size_{it} + \beta_4 * indebtedness_{\text{it}} + \beta_5 * gdp\_growth_{it} + e_{it} \quad (5)$$

To equations (4) and (5) include a pair of variables. One comes from real business cycle (interest rate, unemployment rate), meat consumption, energy price (electricity and gas) and droughts variables, and another makes an interaction is_hermes with a chosen variable. Then a full model according to the significance of variables is estimated. A potential concern in this analysis is the presence of Nickell bias [64], as the model includes a lagged dependent variable as a regressor, and the dataset consists of 16 time periods and 31 entities. The article indicates that Nickell bias becomes significant when the number of periods ($T$) is fewer than 10. The bias is approximated by the formula (6):

$$bias \approx -\frac{\rho}{T} \quad (6)$$

where $\rho$ represents the autocorrelation coefficient of the dependent variable, and $T$ is the number of time periods. Using the correlation coefficients between the dependent variables and their respective lags from the correlation matrix (Figure 9), the calculated biases are approximately −4.1% for ROA and −4.8% for ROS.

While the GMM approach could address this bias by generating internal instruments, it is not suitable for this dataset due to its small size (N=31 entities). GMM requires a large cross-sectional sample to produce strong instruments and reliable estimates, and the combination of relatively few entities and a moderately large $T$ leads to issues such as instrument proliferation and weak identification. Given these limitations, the bias is not corrected in the current analysis. However, it is acknowledged that the estimated coefficients for the lagged dependent variables are slightly downward biased due to the Nickell effect. The results should be interpreted with this consideration in mind. The Arellano robust covariance matrix estimator, combined with the HC3 type of variance-covariance matrix [65], was employed to address potential heteroscedasticity in the data. Additionally, the Variance Inflation Factor test was conducted, and no evidence of multicollinearity issues was identified.

## 4. Result

Figure 10 shows that only three values are below the recommended threshold for the Professional Equality Index, with the majority of companies achieving scores above 85. Figures 11 and 12 illustrates a positive relationship between ROA (ROS) and the Professional Equality Index, prompting further investigation into whether disclosure of this information has a significant effect on the financial performance metrics of luxury companies. Tables 5 and 6 provide the estimation results for the ROA and ROS models.

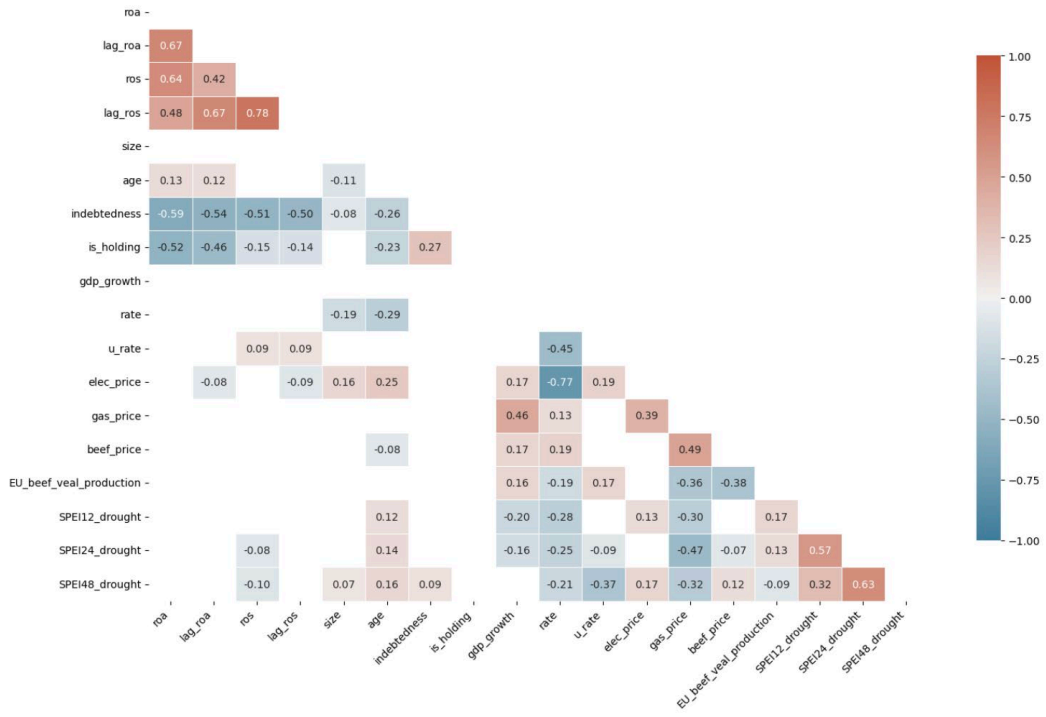


**Figure 9.** Significant correlation matrix.

**Table 5:** Variables with results for ROA.

| | Dependent variable: ROA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| lag_roa | 0.195*** | 0.190*** | 0.188*** | 0.195*** | 0.194*** | 0.199*** | 0.199*** | 0.197*** | 0.200*** | 0.203*** |
| | (0.051) | (0.056) | (0.051) | (0.052) | (0.052) | (0.053) | (0.052) | (0.052) | (0.052) | (0.055) |
| age | -0.0002 | -0.002 | -0.003 | -0.002 | -0.002 | -0.002 | -0.002 | -0.002 | -0.001 | |
| | (0.003) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | |
| size | 0.003 | 0.002 | 0.003 | 0.002 | 0.002 | 0.003 | 0.003 | 0.002 | 0.003 | |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | |
| indebtedness | -0.044 | -0.049 | -0.032 | -0.055 | -0.068 | -0.045 | -0.039 | -0.061 | -0.037 | -0.056 |
| | (0.110) | (0.113) | (0.105) | (0.110) | (0.095) | (0.107) | (0.104) | (0.106) | (0.106) | (0.090) |
| indebtedness_squared | -0.140* | -0.138* | -0.142** | -0.134* | -0.126** | -0.140* | -0.143** | -0.133* | -0.142** | -0.127** |
| | (0.075) | (0.080) | (0.070) | (0.075) | (0.064) | (0.074) | (0.071) | (0.074) | (0.072) | (0.062) |
| gdp_growth | 0.003** | 0.003** | 0.003* | 0.002 | 0.003** | 0.003** | 0.003** | 0.003** | 0.003** | 0.003** |
| | (0.001) | (0.001) | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| rate | 0.005 | | | | | | | | | |
| | (0.006) | | | | | | | | | |
| is_hermes_rate | 0.006 | | | | | | | | | |
| | (0.005) | | | | | | | | | |
| u_rate | | -0.002 | | | | | | | | |
| | | (0.005) | | | | | | | | |
| is_hermes_u_rate | | -0.014 | | | | | | | | |
| | | (0.025) | | | | | | | | |
| elec_price | | | 0.001 | | | | | | | 0.0002 |
| | | | (0.001) | | | | | | | (0.0005) |
| is_hermes_elec_price | | | -0.002** | | | | | | | -0.001 |
| | | | (0.001) | | | | | | | (0.001) |
| gas_price | | | | 0.0003 | | | | | | |
| | | | | (0.0003) | | | | | | |
| is_hermes_gas_price | | | | -0.001 | | | | | | |
| | | | | (0.001) | | | | | | |
| beef_price | | | | | -0.036 | | | | | -0.019 |
| | | | | | (0.065) | | | | | (0.070) |
| is_hermes_beef_price | | | | | -0.760*** | | | | | -0.803*** |
| | | | | | (0.255) | | | | | (0.259) |
| EU_beef_veal_production | | | | | | 0.147 | | | | |
| | | | | | | (0.227) | | | | |
| is_hermes_EU_beef_veal_production | | | | | | -0.101 | | | | |
| | | | | | | (0.376) | | | | |
| SPEI12_drought | | | | | | | 0.008 | | | 0.007 |
| | | | | | | | (0.006) | | | (0.006) |
| is_hermes_SPEI12_drought | | | | | | | -0.041*** | | | -0.037*** |
| | | | | | | | (0.012) | | | (0.013) |
| SPEI24_drought | | | | | | | | 0.002 | | |
| | | | | | | | | (0.006) | | |
| is_hermes_SPEI24_drought | | | | | | | | 0.016 | | |
| | | | | | | | | (0.018) | | |
| SPEI48_drought | | | | | | | | | -0.007 | |
| | | | | | | | | | (0.005) | |
| is_hermes_SPEI48_drought | | | | | | | | | -0.007 | |
| | | | | | | | | | (0.023) | |
| Adjusted $R^2$ | 0.294 | 0.294 | 0.297 | 0.293 | 0.308 | 0.291 | 0.297 | 0.292 | 0.293 | 0.302 |
| F Statistic | 30.464*** | 30.519*** | 30.860*** | 30.361*** | 32.318*** | 30.199*** | 30.933*** | 30.272*** | 30.453*** | 25.436*** |

Note: *p<0.1; **p<0.05; ***p<0.01

**Table 6:** Variables with results for ROS.

| | Dependent variable: ROA | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| lag_ros | 0.544*** | 0.558*** | 0.559*** | 0.567*** | 0.547*** | 0.564*** | 0.560*** | 0.551*** | 0.551*** | 0.564*** | 0.560*** |
| | (0.106) | (0.107) | (0.107) | (0.110) | (0.115) | (0.109) | (0.110) | (0.111) | (0.106) | (0.106) | (0.104) |
| age | -0.002 | -0.002 | -0.003* | -0.001 | -0.002 | -0.001 | -0.002 | -0.001 | -0.001 | -0.001 | -0.001 |
| | (0.002) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| size | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* | 0.002* |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| indebtedness | -0.139*** | -0.123*** | -0.127*** | -0.117*** | -0.122*** | -0.118*** | -0.116*** | -0.122*** | -0.119*** | -0.136*** | -0.135*** |
| | (0.037) | (0.033) | (0.039) | (0.035) | (0.034) | (0.035) | (0.035) | (0.035) | (0.035) | (0.039) | (0.038) |
| gdp_growth | 0.004*** | 0.004*** | 0.003*** | 0.003** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** | 0.003* | 0.003** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) |
| rate | -0.001 | | | | | | | | | 0.002 | 0.002 |
| | (0.004) | | | | | | | | | (0.004) | (0.004) |
| is_hermes_rate | -0.016*** | | | | | | | | | -0.021*** | -0.018*** |
| | (0.006) | | | | | | | | | (0.006) | (0.006) |
| u_rate | | 0.001 | | | | | | | | | |
| | | (0.003) | | | | | | | | | |
| is_hermes_u_rate | | 0.015 | | | | | | | | | |
| | | (0.011) | | | | | | | | | |
| elec_price | | | 0.001 | | | | | | | | |
| | | | (0.0005) | | | | | | | | |
| is_hermes_elec_price | | | 0.001 | | | | | | | | |
| | | | (0.001) | | | | | | | | |
| gas_price | | | | 0.0004* | | | | | | 0.001** | 0.0004* |
| | | | | (0.0003) | | | | | | (0.0003) | (0.0002) |
| is_hermes_gas_price | | | | 0.001 | | | | | | | |
| | | | | (0.0004) | | | | | | | |
| beef_price | | | | | -0.011 | | | | | | |
| | | | | | (0.054) | | | | | | |
| is_hermes_beef_price | | | | | -0.264 | | | | | | |
| | | | | | (0.194) | | | | | | |
| EU_beef_veal_production | | | | | | -0.006 | | | | 0.137 | 0.100 |
| | | | | | | (0.136) | | | | (0.142) | (0.158) |
| is_hermes_EU_beef_veal_production | | | | | | -0.574*** | | | | -0.648*** | -0.792*** |
| | | | | | | (0.180) | | | | (0.188) | (0.193) |
| SPEI12_drought | | | | | | | 0.006 | | | 0.009 | |
| | | | | | | | (0.005) | | | (0.006) | |
| is_hermes_SPEI12_drought | | | | | | | -0.033** | | | -0.046*** | |
| | | | | | | | (0.013) | | | (0.012) | |
| SPEI24_drought | | | | | | | | -0.008 | | | |
| | | | | | | | | (0.008) | | | |
| is_hermes_SPEI24_drought | | | | | | | | 0.024 | | | |
| | | | | | | | | (0.019) | | | |
| SPEI48_drought | | | | | | | | | -0.008* | | -0.004 |
| | | | | | | | | | (0.005) | | (0.004) |
| is_hermes_SPEI48_drought | | | | | | | | | 0.010 | | |
| | | | | | | | | | (0.014) | | |
| Adjusted R2 | 0.436 | 0.430 | 0.433 | 0.432 | 0.429 | 0.429 | 0.431 | 0.431 | 0.430 | 0.447 | 0.440 |
| F Statistic | 59.870*** | 58.629*** | 59.330*** | 59.071*** | 58.318*** | 58.384*** | 58.829*** | 58.818*** | 58.603*** | 36.872*** | 39.125*** |

Note: *p<0.1; **p<0.05; ***p<0.01

For both metrics, the lagged performance indicators exhibit a strong, positive, and statistically significant effect across all model specifications. This aligns with previous research highlighting the robustness of past profitability as a reliable predictor of current performance. Among firm-specific characteristics, size shows a modest but

positive effect on ROS, while age does not significantly influence either metric. Indebtedness demonstrates a nuanced relationship with ROA, as indicated by a significant quadratic term. This suggests that as debt levels rise, their impact on ROA becomes increasingly negative.

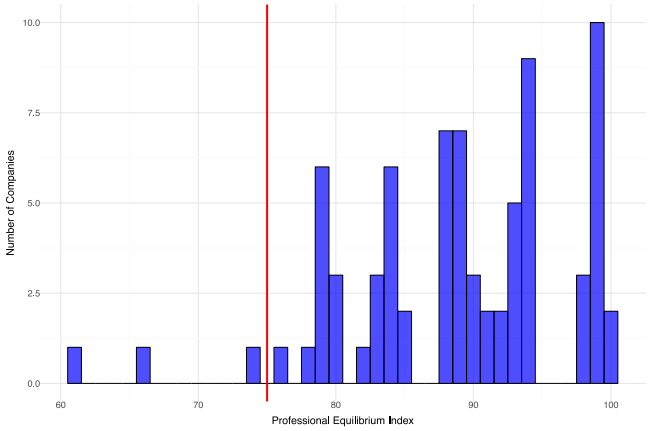


**Figure 10.** Histogram of professional equality index values indicated by manufactories.

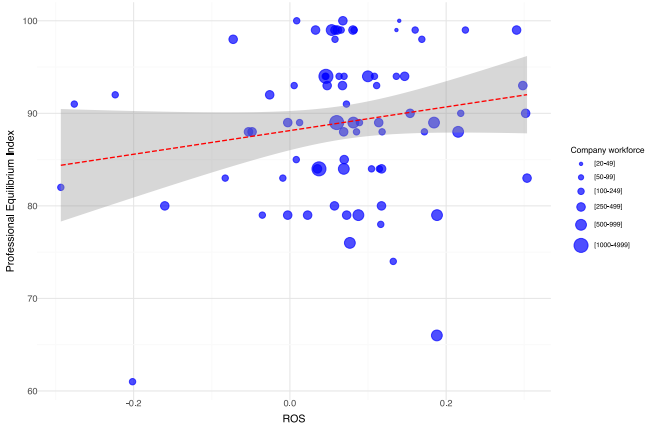


**Figure 11.** Analysis of professional equality index - Dependence of professional equality index values and ROA.

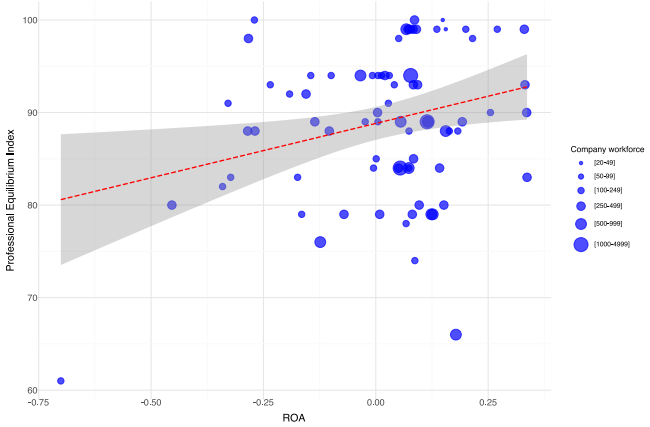


**Figure 12.** Analysis of professional equality index - Dependence of professional equality index values and ROA.

The linear effect of indebtedness on ROS, however, remains consistently negative and significant. These findings are consistent across all models.

In the ROS model, gas prices exhibit a statistically significant positive effect; however, the economic significance of this finding is negligible, as a one percent increase in gas prices corresponds to a mere 0.000004-point rise in ROS. Additionally, while SPEI48_drought is significant in one specification of the ROS model, its effect on drought conditions lacks consistency across other model variations.

The significant coefficient for is_hermes_rate in the ROS model indicates that Hermès manufactories are particularly sensitive to borrowing costs, a characteristic not observed in other firms. Furthermore, the significant negative coefficient for is_hermes_SPEI12_drought in models for both financial performance metrics underscores Hermès manufactories' vulnerability to drought conditions. While the coefficient for elec_price in the ROA model is significant for Hermès manufactories, this result is not stable across other specifications.

The ROS model results also reveal that increased EU beef and veal production predominantly impacts Hermès manufactories, while the ROA model indicates that rising beef prices have a negative effect on their performance. Notably, the ROS models demonstrate greater explanatory power than the ROA models, as reflected in their higher adjusted $R^2$ values. This study also performed the t-tests to test whether the differences in ROA and ROS between Hermès manufactories and non-Hermès manufactories are statistically significant. A hypothesis about the true difference in means between group 0 and group 1 is equal to 0 is rejected on a 5% significance level for both ROA and ROS

## 5. Discussion

The observed sensitivity of ROA and ROS to the implementation of internal sustainability practices highlights the potential need for manufacturers to adopt ecological initiatives to enhance long-term profitability. However, this research includes only companies that have publicly disclosed information about professional equality, introducing a potential survivorship bias. Further research is required to comprehensively test the first hypothesis.

Results demonstrate a sector's general resilience from external factors, refusing hypotheses two and three, highlighting the potential space for enhancing ecological initiatives in the luxury leather sector. The interaction terms for Hermès-related variables provide insights into the unique performance dynamics of Hermès manufactories, confirming the fourth hypothesis. The significant sensitivity of Hermès manufactories to borrowing costs underscores the unique financial structures and leverage strategies employed by Hermès. This could reflect their reliance on more complex or higher levels of debt financing compared to other manufacturers.

The significant negative coefficient for is_hermes_SPEI12_ drought across both ROS and ROA models highlights the heightened vulnerability of Hermès manufactories to drought. This vulnerability likely stems from their reliance on agricultural supply chains or raw materials directly affected by environmental factors. Such exposure underscores the importance of sustainable supply chain strategies for Hermès to mitigate these risks. The ROS model shows that increased EU beef and veal production predominantly affects Hermès manufactories. The increase in overall meat production does not necessarily translate to a proportional increase in usable, high-quality leather.

Hermès likely has established, long-term contracts with specialized suppliers for premium hides, who prioritize quality over volume. The costs may rise disproportionately when high-quality hides become scarcer, even as overall leather availability increases. Conversely, the ROA model highlights that rising beef prices negatively impact Hermès' performance. This suggests that Hermès' reliance on premium-quality inputs limits the ability to adapt to broader market trends or absorb cost increases.

The analysis reveals that Hermès manufactories, as part of a large group, demonstrate greater vulnerability compared to other firms in the sector, which is for now a key finding of this study. Despite the inherent advantages of being part of a globally recognized conglomerate, such as better access to financial resources and greater capacity to manage economic challenges, these manufactories are less resilient to external shocks, such as drought conditions, fluctuations in interest rates, and changes in prices on raw sources. Surprisingly, Hermès manufactories are also less profitable, despite the position of the brand in the world. This paradox highlights the complexities and potential inefficiencies associated with large-scale luxury corporations in the luxury manufacturing sector.

## 6. Conclusion

The luxury market is a curious area of study because it combines a focus on maintaining exclusivity and tradition with the need to adapt to changing consumer expectations and global challenges. Nowadays it faces growing concerns about its environmental and social impacts. This makes it a valuable context for exploring the relationship between financial performance, sustainability, and resilience.

The current research tests French luxury leather industry resilience on a sample of 31 French luxury leather manufacturers observed over 16 years (2006–2021). By examining macroeconomic, market, and ecological factors, and incorporating panel regression models with fixed effects, the study aims to look if luxury leather manufacturers succeed in balancing heritage craftsmanship with modern realities.

The discussion sector highlights that the sector exhibits overall resilience to external factors. Results also demonstrate a sensitivity of ROA and ROS to sustainability practices implementation. Hermès manufactories exhibit heightened vulnerability to external shocks such as drought, borrowing costs, and raw material price fluctuations, reflecting their reliance on premium-quality inputs and complex financial structures. Despite the advantages of being part of a large group, such as better financial resources, Hermès manufactories appear less resilient and less profitable compared to other firms in the sector.

Future research could delve deeper into the effects of corporate sustainability initiatives on the financial performance and resilience of luxury leather manufacturers. Exploring renewable energy systems in manufacturing, carbon footprint reduction strategies, waste management and information about investment in innovation could add actionable insights into achieving sustainability goals. Investigating consumer perceptions of sustainable luxury goods and their willingness to pay a premium for such products would also be valuable in shaping strategic priorities for the sector. Finally, comparing the luxury leather sector to other luxury industries could provide deeper insights into the dynamics of resilience.

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