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# Exploring Cost Stickiness in the Textile Industry: A Comparative Analysis between the Nordic Countries and Spain through Panel Data Analysis

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**Abstract:** This study explores the complexities of cost behavior in the textile industry, conducting a comparative analysis between firms in the Nordic countries and Spain. Our main goal is to examine how distinct economic and corporate governance models impact the cost management strategies of textile firms. Utilizing a panel dataset from the Orbis database covering the years 2017 to 2022, we reveal significant differences in cost stickiness between these regions. Notably, Nordic textile firms demonstrate a stronger tendency toward cost stickiness compared to their Spanish counterparts. This difference is largely attributed to the Nordic textile firms' more cautious approach to adjusting costs in response to decreases in revenue, potentially motivated by a commitment to sustainability, eco-friendly technologies, and long-term business success. Our analysis not only highlights the complex interaction between the global challenges confronting the textile sector and the unique economic and governance environments but also maps out how these elements shape cost management strategies. By offering insights to both academics and practitioners, this study advocates for a comprehensive cost management approach, capable of navigating demand volatilities and strategic complexities faced by textile firms.

**Keywords:** textile industry; cost stickiness; Nordic countries; Spain



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## 1. Introduction

In the dynamic landscape of global markets, cost behavior has emerged as a key topic in financial management literature. The concept of cost stickiness, characterized by the asymmetric response of operational costs to fluctuations in sales volume, arises as a significant research area due to its impact on operational efficiency and corporate performance [1,2]. Despite extensive research into cost stickiness, a notable gap remains in our comprehension of how regional variations influence cost behavior, especially within the textile industry. This sector, characterized by its substantial environmental footprint, high fixed costs, labor-intensive processes, complex supply chains, and the need for rapid adaptation to changing consumer preferences [3–5], offers a fertile ground for exploring cost management strategies in response to challenges like sustainability, fast fashion, and technological innovation [6–9].

Within this context, the diverse economic conditions, labor market structures, and corporate governance models found in the Nordic countries compared to Spain provide an intriguing perspective for examining how these differences impact cost management approaches in the textile industry. Our research, utilizing data from the Orbis database covering the years 2017 to 2022, investigates the interconnected dynamics between annual changes in operating expenses and simultaneous variations in sales revenues, aiming to clarify the irregular patterns of cost behavior.

The research reveals a stronger inclination toward cost stickiness within Nordic textile companies. It specifically points out that operational costs in the Nordic region are less reactive to decreases in sales compared to their Spanish counterparts. This noticeable stickiness could suggest a preference for a more thoughtful strategy in managing costs during periods of falling revenues in the Nordic countries, driven by a mix of economic considerations, managerial expectations, and strategic priorities focused on sustainability, technologic innovation, and long-term success. On the other hand, the more unpredictable economic environment in Spain and a business culture that emphasizes quick response to market changes provide a clear rationale for the comparatively lower levels of cost stickiness observed in Spanish textile firms.

Our study enhances the comprehension of cost behavior by revealing the varied effects of economic, political, and governance factors on developing cost management strategies within the textile industry in both the Nordic countries and Spain. By focusing on the critical role of the textile industry in the global economy and highlighting the unique economic and corporate governance features that separate the Nordic countries from Spain, this research not only advances the discussion on cost behavior but also equips policymakers, industry stakeholders, and practitioners with essential insights for designing more robust and efficient cost management systems in times of uncertainty.

Additionally, recent advancements in global educational collaborations, as illustrated by Yan et al., shed light on the impactful role of cross-regional partnerships in enhancing knowledge, technology, and best practice exchanges across sectors, including textiles and fashion [10]. These collaborative efforts not only support academic exchanges but also deepen the understanding of global market dynamics, crucial for industries within the highly interconnected global economy. The growing focus on making textile and fashion education more international further highlights the necessity of integrating worldwide perspectives into industry practices [11], thereby contributing to the discourse on preparing future industry leaders with the skills to succeed in a globalized market.

Building on this, our research delves into the financial complexities of the textile industry across various regions. We aim to make a significant contribution to the discourse on financial management strategies by examining how political, economic, and governance issues influence cost behavior and stickiness in the textile sector. Such investigation is crucial for understanding the complex interplay of factors affecting the industry's financial health and for informing more effective management practices in a global context.

## 2. Background

The investigation into cost behavior, especially the phenomenon of cost stickiness—where operational costs increase rapidly with revenue gains but decrease at a slower pace when revenues fall—has become a key area of focus in financial management studies. This behavior, which clarifies the complexities of cost management and emphasizes its critical importance in financial decision-making, has attracted significant interest across numerous studies [1,2,12–18]. Cost stickiness, reflecting the challenges managers face in response to changes in demand, involves the complex balance between preserving operational capabilities and cutting back on resources to enhance cost effectiveness, shaped by factors such as adjustment costs, managerial expectations, resource availability, and incentives [1,2,19].

Managerial reluctance to downsize, exacerbated by both the economic and reputational consequences of such decisions [1,20,21], emerges as a central determinant in the persistence of cost stickiness, particularly during economic recessions. This aversion to reducing unused resources highlights a strategic dimension of cost stickiness, where it goes beyond a simple response to economic fluctuations and becomes a conscious strategic decision in the face of uncertain demand [1,21]. This strategic viewpoint is crucial, emphasizing the importance of understanding the logic behind resource allocation decisions, where optimism about future demand can encourage resource preservation even in times of sales decline, thereby contributing to cost stickiness [13,22–24].

Furthermore, the amount of initial resource slack within a firm significantly influences cost management strategies, influencing whether a firm is likely to increase resources in line with sales growth or, alternatively, postpone such expansions. This interaction highlights the link between initial slack and cost stickiness [1,25], emphasizing the complex decision-making involved in resource allocation. The influence of managerial intentions and the resulting agency costs add another layer of complexity to this scenario [14,17,26–29], where inclinations toward empire-building can intensify cost stickiness. This occurs as managers put personal ambitions ahead of cost effectiveness, posing a challenge to the alignment of managerial incentives with the broader objectives of the organization [30–32].

Despite significant empirical advancements in understanding cost stickiness, its determinants, and implications for management and firm performance [1,2,13,21,29], there remain less explored areas in research concerning how cost management is influenced by business and industry-specific contexts, particularly across diverse geographical landscapes [24,33–39]. This study aims to bridge this gap by examining the textile industry's cost stickiness within the contrasting labor markets and business environments of the Nordic countries and Spain.

The textile sector in the Nordic countries, renowned for its commitment to sustainability and technological innovation [40–43], presents a pronounced contrast to Spain's significant economic influence and global presence in fashion retail [44–47]. This divergence extends to labor market dynamics and corporate governance models, providing a distinctive perspective to examine how these differences might shape cost management strategies in the textile industry.

The Nordic emphasis on social welfare and sustainability combined with a corporate culture that values innovation and technological development [41,42,48–52] suggests a propensity among textile firms toward maintaining higher fixed costs for long-term viability. Conversely, the Spanish textile industry reflects a more volatile economic scenario and a business culture that emphasizes rapid response to changing market conditions with a predisposition toward agile cost adjustments [53].

Managerial decisions significantly impact cost stickiness, but these choices occur within a broader economic and cultural context. In the Nordic countries, for example, strong labor protections are a defining feature, supported by comprehensive regulations that ensure job security, even in times of downsizing. This environment is reinforced by extensive social safety nets, robust union membership that fosters collective bargaining, and a cultural emphasis on employee welfare, encouraging dialogue and agreement between employers and workers [54–56]. Denmark's Act on Employment Clauses, significantly revised in 2016, strikes a balance between protecting business interests and safeguarding employees' rights to career mobility and opportunities. Similarly, the Employment Protection Act in Sweden underwent significant revisions that came into effect starting 30 June 2022 to enhance the flexibility and clarity around the termination of employment, thereby stimulating labor market dynamics. These revisions are aligned with Sweden's societal ideals of promoting equality, fostering social unity, and ensuring comprehensive welfare support. These principles allow the Nordic labor markets to maintain lower unemployment rates, thanks to flexible labor policies and extensive social safety networks that support worker retraining and mobility, thus permitting companies to adjust their workforce dynamically without resorting to widespread job cuts. This collaborative approach tends to encourage more refined cost-reduction strategies aimed at preserving jobs, like temporary reductions in work hours, rather than drastic actions, potentially leading to greater cost stickiness as businesses may choose to retain staff even in times of reduced demand.

In contrast, Spain's labor market, characterized by higher unemployment and structural inefficiencies, faces challenges in matching labor demand with skills and is highly sensitive to economic variations [57–60]. Efforts to mitigate these challenges include the 2012 Labor Market Reform (Law 3/2012), which sought to increase employment flexibility and promote job creation, thereby facilitating easier workforce adjustments in response to economic conditions. Despite such reforms, the persistently high unemployment rates

and socio-economic considerations present ongoing challenges. In this scenario, textile firms might lean toward adjusting workforce size as a primary cost-saving measure, navigating the complex landscape of social, political, and regulatory challenges driven by economic necessity.

Therefore, when compared, Nordic textile firms seem more adept at implementing flexible labor cost management strategies in response to declining sales, sidestepping widespread job cuts. This ability is rooted in their versatile labor markets, encouraged by comprehensive social safety nets and a consensus-driven culture, all of which support employment preservation strategies. Conversely, Spanish textile companies, facing higher structural unemployment and a more rigid labor market, might more swiftly adjust their workforce in response to declining sales. This difference highlights the Nordic dedication to employee welfare and job security, leading to a more prudent approach to labor cost management and thus contributing to increased cost stickiness.

The investigation into cost behavior within the textile sector shows that managerial forecasts about future demand are heavily influenced by fashion trends, shifts in the global economy, and consumer preferences [61,62]. This situation indicates that a positive outlook may prompt managers to maintain or even increase investments in raw materials, labor, and eco-friendly technologies. In the Nordic countries, the expectation of consistent or increasing demand, supported by solid welfare systems and state support [49,63], encourages a management approach focused on long-term strategic planning and dedication to green practices and technological innovation [64]. This environment provides Nordic managers with the flexibility to plan and adjust without the urgent need for significant cost cuts, leading to a preference among Nordic textile companies for strategies that emphasize sustained growth and improving market position rather than immediate cost-reduction measures. Conversely, Spanish textile companies navigate a more volatile economic landscape that demands quick adaptability and aggressive cost management to remain competitive in a dynamic market [65,66]. This setting inclines Spanish firms to implement cost reductions in response to decreases in sales. In this sense, Weiss emphasizes the impact of managerial forecasts on resource allocation decisions, suggesting that optimistic managers might prioritize long-term growth and market positioning over immediate cost reductions [13]. Similarly, Banker and Byzalov explore the complex decisions managers face when balancing operational flexibility with market opportunities, noting that such strategic choices directly influence the stickiness of costs [2]. Thus, according to this strategic vision in managerial decisions, Nordic textile firms will exhibit higher cost stickiness than their Spanish peers.

Additionally, the initial amount of resource slack within a firm plays a critical role in its ability to respond to demand shifts [1,25,26]. The textile industry, susceptible to rapid changes in market trends, presents a managerial challenge in maintaining adequate slack to capitalize on market opportunities while minimizing cost stickiness. Nordic countries, with their higher commitment to innovation, social welfare, and stability are likely to have more resource slack, often reflected in investments in green technologies and sustainable practices spurred by government policies [54,67]. These investments, challenging to scale back quickly in response to short-term decreases in demand, lead to heightened cost stickiness [1,26]. In contrast, the demanding Spanish business landscape encourages textile firms to maintain efficient operations, ensuring operational agility and cost effectiveness. This strategic positioning results in reduced cost stickiness, as firms can more rapidly adjust their operations and cost frameworks in alignment with market shifts.

In sum, the theoretical arguments developed above suggest that the combination of managerial strategies focused on long-term growth, labor market dynamics, and the initial level of resource slack will make Nordic textile managers more likely to emphasize long-term sustainability over short-term profits which will lead them to adjust costs proactively than reactively and result in higher cost stickiness compared to their Spanish peers.

From a different perspective grounded in agency theory, cost stickiness can also be influenced by agency costs. Managers' tendencies toward empire-building strategies [30,68], which aim to increase their influence or prestige at the expense of financial efficiency [1,31,32],

lead to operational costs that do not decrease proportionally with declines in revenue, thus heightening cost stickiness [26,69].

Investigating the case of Trigema, a German textile company known for keeping its supply chain entirely localized within Germany while others pursue globalization, offers an insightful perspective on supply chain management, particularly in terms of agency costs and the avoidance of "empire-building" or megalomania. Trigema's success, where many of its competitors failed, highlights the potential benefits of a simplified, localized supply chain [70–72]. As Fawcett et al. describe, managing the intricate balance between technology, information systems, and human elements like culture, trust, and willingness to collaborate is essential for effective supply chain collaboration [73]. These aspects are particularly relevant when considering Trigema's approach, which likely emphasizes strong internal collaboration and minimizes the barriers identified in global supply chains. Lambert and Cooper highlight the importance of cross-functional integration within supply chains, emphasizing that strategic collaboration across different departments and organizations leads to more successful supply chain management outcomes [74]. Lee further argues that the most successful supply chains are those that are agile, adaptable, and aligned, suggesting that Trigema's strategy may inherently embody these characteristics by staying local and integrated [75]. This agility and adaptability are contrasted against the backdrop of globalization, where outsourcing often introduces complexity and potential misalignment among supply chain partners. Trigema's decision to maintain control over both production and distribution could serve as a model for achieving such integration, reducing the agency costs associated with more fragmented, global supply chains. The concept of agency cost in supply chain management is crucial, emphasizing the trade-offs between control and flexibility.

This issue is particularly evident in dynamic industries like textiles, where the demand for quick adaptation to market trends may drive managerial decisions that favor expansion over financial prudence. Such unplanned expansion might result in poor integration of acquisitions and financial pressures that result in financial instability and shift attention away from innovations and efficiency improvements in the core business, potentially harming competitive advantage.

However, the occurrence of empire-building activities and the associated agency costs may vary between Spain and the Nordic countries, reflecting differences in economic, cultural, governance, and regulatory contexts. In the Nordic countries, the corporate governance model encourages a collaborative relationship among companies and their stakeholders—employees, customers, communities, and the environment. This approach ensures that managerial decisions align more closely with wider societal goals [76]. In such a setting, management practices are characterized by inspirational integrity, forward-looking leadership, team unity, a focus on performance, and collaboration [77]. Therefore, in the Nordic countries, investment or expansion decisions are carefully assessed for their contribution to broad goals, reducing actions that favor managers at the expense of shareholders or other stakeholders. Additionally, although both the Nordic countries and Spain have established legal protections for external interests, the Nordic system generally provides stronger protections and transparency, backed by its more proactive regulatory approach [78,79]. As a result, the propensity for empire-building driven by personal ambitions is reduced in the Nordic countries due to the presence of a governance structure closely interlinked with societal values of consensus and stakeholder involvement which derives in long-term ethical practices. Thus, Nordic textile firms' managers decrease their incentives to retain unused resources when sales decrease to protect their empire-building strategies. Conversely, Spain's institutional environment, marked by limited protection for external stakeholder interests and a lower risk of litigation might afford managers more freedom in strategic decision-making [80]. This could encourage textile firms' empire-building actions, where managers embark on aggressive expansions or invest in high-visibility projects to increase their prominence or control within the company. Such

actions can inflate operational expenses that are challenging to reduce, further contributing to cost stickiness.

Consequently, given the arguments presented, the question of whether Nordic textile firms exhibit higher or lower levels of cost stickiness compared to their Spanish counterparts remains an empirical issue. We hypothesize that if cost stickiness is primarily influenced by economic factors, as suggested by adjustment cost theory, Nordic textile firms will show higher levels of cost stickiness than their Spanish counterparts. Conversely, if cost stickiness is predominantly driven by managerial opportunism, leading to agency costs, we might see lower levels of cost stickiness in Nordic textile firms compared to their Spanish peers. The empirical findings will ultimately clarify the direction of this relationship.

## 3. Methodology

### 3.1. Sample

This study utilizes a dataset derived from the Orbis database by Moody's (New York, NY, USA), focusing on the textile industry, specifically within the Standard Industrial Classification (SIC) code 22 (Textile Mills). The choice to concentrate on SIC code 22, which represents businesses primarily engaged in the textile mill sector, was driven by the desire to closely examine the core activities most relevant to our research on cost stickiness. Given the textile industry's diversity, this focus aimed to ensure a manageable scope for in-depth analysis within a more homogenized group of firms, despite the potential for variability in cost dynamics and business models across the broader industry variety.

Firms classified under SIC code 22 are engaged in various stages of textile production, from raw material processing to the creation of finished fabrics. Given the specialized nature of their operations, these companies often exhibit complex supply chain structures. However, compared to the entire textile and garment industry range, companies within SIC code 22 might be considered to have relatively shorter supply chains. This is because their operations are more concentrated on specific stages of textile production, rather than spanning from raw material sourcing to the retailing of finished garments.

The propensity for shorter supply chains in these firms suggests a direct link to cost stickiness, primarily due to the necessity of maintaining operational capacity (such as machinery and skilled labor) despite fluctuations in demand. However, it is essential to recognize that even within the scope of SIC code 22, the degree of supply chain complexity can vary significantly among firms, influenced by factors such as the diversity of their product lines, their sourcing strategies, and their customer bases. Therefore, while we might initially categorize these firms as having shorter supply chains, the specific characteristics and strategic choices of each company could lead to variations in how supply chain structures impact cost behavior.

The dataset encompasses firms located in the Nordic countries (Denmark, Finland, Iceland, Norway, Sweden) and Spain, covering the period from 2017 to 2022. The final sample consists of 809 observations, achieved through the application of winsorization, a statistical method aimed at moderating the effects of extreme observations. By limiting extreme values to better match the rest of the dataset, winsorization aids in reducing the distortion caused by outliers in the analysis. Specifically, we used the "winsor" command in Stata 14 to adjust values at both ends of our dataset to the nearest values within a predetermined percentile range. For this study, we set the threshold at the 1% level, meaning we replaced the lowest and highest 1% of data points with the closest available values at the 1st and 99th percentiles, respectively. This technique is crucial for enhancing the stability of variance across our data, thereby improving the accuracy and reliability of our statistical estimates, without significantly modifying the overall distribution of the data.

### 3.2. Estimation Model

We first use the foundational cost behavior model, which establishes a relationship between annual variations in operating expenses (*OC*) and simultaneous fluctuations in sales revenue (*SALE*). This model draws upon the seminal work of Anderson et al. [1].

The theoretical underpinning behind the model proposed by Anderson et al. focuses on how managerial decisions and the pre-existing cost structure influence the asymmetric cost response to changes in activity levels, challenging the traditional view that costs adjust mechanically and symmetrically [1]. This model suggests that in the short term, managers make decisions leading to an asymmetric cost response to activity changes, primarily due to deliberate managerial adjustments and associated adjustment costs.

The equation is as follows:

$$\Delta lnOC_{it} = \alpha_0 + \alpha_1 \Delta lnSALE_{it} + \alpha_2 DEC_{it} \times \Delta lnSALE_{it} + \alpha_3 SD_{it} \times DEC_{it} \times \Delta lnSALE_{it} + \alpha_4 lnDEBT_{it} \times DEC_{it} \times \Delta lnSALE_{it} + \alpha_5 SD_{it} + \alpha_6 lnDEBT_{it} + Y_t + \varepsilon_{it} \quad (1)$$

$\Delta lnOC_{it}$ is the logarithmic change in operating costs for firm $i$ in year $t$, $\Delta lnSALE_{it}$ denotes the logarithmic change in sales for firm $i$ in year $t$, and $DEC_{it}$ represents a binary variable that equals one if the firm observes a decline in sales in year $t$, and zero otherwise. $Y_t$ represents the annual effect in the panel data.

Within this equation, the coefficient $\alpha_1$ illustrates the percentage adjustment in costs associated with a 1% increase in sales. Conversely, the combination of $\alpha_1 + \alpha_2$ represents the cost adjustment percentage for a 1% decrease in sales. Thus, $\alpha_2$ is aimed at capturing the asymmetrical nature of cost behavior. Specifically, a negative value of $\alpha_2$ indicates that costs decrease by a smaller percentage than they increase for a 1% change in sales, highlighting the concept of cost stickiness. To perform a comparative analysis of cost stickiness between Nordic countries and Spain, we performed regression analysis for the two regions.

Following previous research, we incorporate specific control variables into our analysis to distinguish the effects of sales fluctuations on cost behavior from other potential influencing factors [2,16,26,81]. First, we examine the pattern of consecutive sales declines, using a dummy variable ($SD_{it}$) that equals 1 when sales declined in the previous period, and 0 otherwise. Second, we explore the role of debt, calculated as the natural log of the ratio of total debt to total assets ($lnDEBT_{it}$). By integrating these variables, we isolate the impact of sales changes on cost dynamics from different aspects of financial performance, specifically financial downturns and the company's leverage.

## 4. Results

Table 1 displays the descriptive statistics for variables analyzed in the context of sticky costs. The change in operating costs ($\Delta lnOC_i t$) across the entire sample (Panel A, Table 1) averages 0.033 with a median of 0.019, indicating a modest upward trend. The standard deviation, at 0.126, suggests moderate variability in operating cost changes. Similarly, the change in sales ($\Delta lnSALE_{it}$) has an average of 0.032 and a median of 0.016, also reflecting a slight upward movement with a larger standard deviation of 0.143, indicating more significant dispersion in sales changes compared to operating costs. The leverage ratio, measured as the ratio of total debt to total assets ($DEBT_{it}$), shows an average of 0.350 and a median of 0.337, with a standard deviation of 0.180, pointing to relatively low variability across the sample. The variable indicating a sales decrease in the previous period ($SD_{it}$) averages 0.538, suggesting that about 53.8% of the sample experienced a declining sales trend.

Panel B of Table 1 details the variables by country. In Denmark, changes in operating costs and sales, at 0.008 and 0.004, respectively, suggest a relatively stable economic environment with low variability in both metrics. Denmark's leverage ratio, slightly higher at 0.386, and a sales decline rate of 0.444 in the previous period indicate less frequent sales declines compared to the overall sample average. Finland, with a change in operating costs of 0.004 and a more significant change in sales of 0.036, indicates that sales fluctuations exceed those in operating costs. Finland's leverage ratio at 0.375, near the whole sample's average, and a sales decline rate of 0.485 in the previous period show a marginally lower occurrence of sales declines than the general sample. Iceland reveals higher changes in both operating costs and sales (0.09 and 0.104, respectively), suggesting a more volatile economic

condition. Its leverage ratio, at 0.337, closely aligns with the Nordic average, accompanied by a sales decline rate of 0.500, indicating an even distribution of sales declines in the prior period. Norway reports changes in operating costs and sales of 0.09 and 0.046, respectively, also marking the lowest leverage level among the Nordic countries at 0.313 and the highest sales decline rate at 0.684 in the prior period. This points to significant operational cost fluctuations and a high frequency of sales declines. Sweden, with minimal changes in operating costs (0.001) and sales (0.005), suggests a very stable economic situation with minimal variation in these metrics. Its leverage ratio of 0.344 and a sales decline rate of 0.519 in the previous period indicate a moderate tendency toward reduced sales. Collectively, the Nordic countries (228 observations) show changes in operating costs and sales of 0.026 and 0.029, respectively, reflecting moderate economic dynamics across the region. Their leverage ratio of 0.348 and a sales decline rate of 0.571 in the prior period offer a balanced view of sales decline trends in the Nordic area. Spain, with 581 observations, displays changes in operating costs and sales of 0.033 and 0.032, suggesting consistent variability in both metrics. Its leverage ratio of 0.351 indicates a level similar to the Nordic countries, with a sales decline rate of 0.525 in the previous period, suggesting a comparable trend in sales declines.

**Table 1.** Descriptive statistics.

| **Panel A. Descriptive Statistics (Whole Sample)** | | | | | |
|---|---|---|---|---|---|
| **Variable** | **Mean** | **Median** | **Standard Deviation** | **First Quartile** | **Third Quartile** |
| $\Delta lnOC_{it}$ | 0.033 | 0.019 | 0.126 | −0.064 | 0.129 |
| $\Delta lnSALE_{it}$ | 0.032 | 0.016 | 0.143 | −0.076 | 0.141 |
| $DEBT_{it}$ | 0.350 | 0.337 | 0.180 | 0.209 | 0.461 |
| $SD_{it}$ | 0.538 | 1.00 | 0.498 | 0.00 | 1.00 |
| **Panel B. Descriptive Statistics (by Country)** | | | | | |
| **Country** | **Observations** | $\Delta lnOC_{it}$ | $\Delta lnSALE_{it}$ | $DEBT_{it}$ | $SD_{it}$ |
| Denmark | 24 | 0.008 | 0.004 | 0.386 | 0.444 |
| Finland | 44 | 0.004 | 0.036 | 0.375 | 0.485 |
| Iceland | 5 | 0.09 | 0.104 | 0.337 | 0.500 |
| Norway | 90 | 0.09 | 0.046 | 0.313 | 0.684 |
| Sweden | 65 | 0.001 | 0.005 | 0.344 | 0.519 |
| Nordic countries | 228 | 0.026 | 0.029 | 0.348 | 0.571 |
| Spain | 581 | 0.034 | 0.032 | 0.351 | 0.525 |

Table 2 presents the findings of the regressions. While the prevailing body of literature on cost behavior analysis has predominantly employed Ordinary Least Squares (OLS) estimations, offering foundational insights into the dynamics of cost management within firms, our research seeks to advance this understanding by adopting a more detailed analytical framework. The application of OLS, although widely accepted for its simplicity and ease of interpretation, may not fully capture the intricate dynamics of endogeneity that characterize the relationship between operating expenses and sales revenue. Recognizing this limitation, our study proposes a methodological shift toward the Generalized Method of Moments (GMM) estimator. This specifically involves leveraging the Arellano and Bond estimator, as enhanced by Blundell and Bond [82,83], using the xtabond2 command in Stata [84]. This advanced econometric approach allows us to address several critical issues, most notably the endogeneity problem. Endogeneity often arises in empirical research due to omitted variable bias, measurement error, or simultaneity. In the context of our study, one concern revolves around simultaneity and the potential bidirectional causality between operating expenses and sales revenue. For example, a company might increase its operating expenses (such as marketing or expanding production capacity) with the aim of boosting

sales revenue. Conversely, an increase in sales revenue could provide the company with the necessary resources to finance an increase in operating expenses. Moreover, there may be unobserved factors (omitted variables) that affect both operating expenses and sales revenue, leading to a correlation between the independent variables and the error term in a regression model. For instance, product quality, management efficiency, or market conditions might influence both operating expenses and sales revenue, but if these factors are not included in the model, they can cause endogeneity issues. Such endogeneity can lead to biased and inconsistent parameter estimates if traditional estimation methods are employed.

**Table 2.** Regression analysis.

| | **Model 1 (Whole Sample) ($\Delta lnOC_{it}$)** | **Model 2 (Spain) ($\Delta lnOC_{it}$)** | **Model 3 (Nordic Countries) ($\Delta lnOC_{i}$)** |
|---|---|---|---|
| $\Delta lnSALE_{it}$ | 0.899 *** | 0.901 *** | 0.957 *** |
| | (30.527) | (38.286) | (18.0125) |
| $DEC_{it} \times \Delta lnSALE_{it}$ | −0.153 ** | −0.145 ** | −0.339 ** |
| | (−2.004) | (−2.557) | (−2.744) |
| $SD_{it} \times DEC_{it} \times \Delta lnSALE_{it}$ | 0.110 ** | 0.124 ** | 0.132 ** |
| | (2.100) | (2.381) | (2.607) |
| $lnDEBT_{it} \times DEC_{it} \times \Delta lnSALE_{it}$ | 0.101 ** | 0.151 ** | 0.117 ** |
| | (2.201) | (2.375) | (2.001) |
| $SD_{it}$ | −0.001 *** | −0.002 *** | −0.0038 *** |
| | (−4.591) | (−5.921) | (−6.833) |
| $lnDEBT_{it}$ | 0.001 | 0.002 | −0.008 |
| | (0.017) | (0.914) | (−1.291) |
| *Constant* | −0.000 | 0.002 | −0.001 |
| | (−0.397) | (0.243) | (1.114) |
| Year effects | Yes | Yes | Yes |
| Hansen test | 23.45 | 38.74 | 12.61 |
| m2 test | 0.88 | 0.77 | 0.67 |
| z1 test | 116.29 *** | 172.33 *** | 246.80 *** |
| z2 test | 5.21 *** | 4.97 *** | 10.31 *** |
| Observations | 683 | 575 | 108 |

t-statistics in parentheses *** $p < 0.01$, ** $p < 0.05$.

The GMM estimator is particularly suited for our analysis for several reasons. First, it enables us to exploit the panel structure of our data, using internal instruments generated from the lagged values of our variables of interest. This is critical for mitigating the impact of endogeneity by ensuring that our instruments are not correlated with the error terms. Second, the Blundell and Bond extension of the original Arellano and Bond estimator improves efficiency by incorporating additional moment conditions, which is particularly beneficial in the presence of weak instruments [82,83]. By adopting the GMM approach, we aim to achieve more reliable and robust estimates, providing insights into cost behavior that are not confounded by endogeneity.

The analysis of the entire sample (Table 2, Model 1) reveals a significant positive relationship between sales revenue changes ($\Delta lnSALE_{it}$) and operating cost changes ($\Delta lnOC_{it}$), with a coefficient of 0.899 ($p < 0.01$). This indicates that operating costs increase with sales revenue. The interaction term, $DEC_i t \times \Delta lnSALE_{it}$, is negative (−0.153, $p < 0.05$), implying that the reduction in operating costs during sales declines is not as pronounced, further evidencing the sticky nature of costs.

Model 2 in Table 2 (Spain) presents a coefficient for $\Delta lnSALE_{it}$ of 0.901 ($p < 0.01$), indicating a positive and significant relationship between sales revenue changes and operating cost changes. The interaction term $DEC_{it} \times \Delta lnSALE_{it}$ is −0.145 ($p < 0.05$), suggesting that operating costs in Spain do not decrease as significantly during periods of sales decline, indicative of cost stickiness.

Model 3 in Table 2 (Nordic Countries), on the other hand, shows a more pronounced relationship with a $\Delta lnSALE_{it}$ coefficient of 0.957 ($p < 0.01$). The interaction term in this model is notably more negative at −0.339 ($p < 0.05$), suggesting a stronger presence of sticky costs in the Nordic region compared to Spain. This implies that operating costs in the Nordic countries are less likely to decrease in proportion to a reduction in sales, highlighting a more substantial effect of cost stickiness.

Thus, when comparing the results of Models 2 and 3, it becomes evident that the Nordic countries exhibit higher levels of sticky costs than Spain. This is primarily evidenced by the more negative interaction term in the Nordic countries model, indicating that operating costs in this region are significantly less responsive to decreases in sales revenue.

Regarding control variables, the coefficients for $SDi_t \times DEC_{it} \times \Delta lnSALE_{it}$ in all three models are positive and significant and aligned with the findings of the previous literature [1,81], suggesting managers view the downturn as more sustained following subsequent drops. The impact is slightly more pronounced in the Nordic countries. Likewise, the coefficients for $DEBT_{it} \times DEC_{it} \times \Delta lnSALE_{it}$ are positive and significant in all models. This finding is consistent with earlier research, indicating a greater reduction in stickiness because of creditors' demands for a flexible cost structure to guarantee payments [81]. Remarkably, this effect is more pronounced in Spain than in the Nordic countries.

Turning to the evaluation of the model's validity, the robustness of these findings is supported. The Hansen test, with null hypotheses positing the validity of the instruments, yields values of 23.45 for the whole sample, 38.74 for Spain, and 12.61 for the Nordic countries, indicating that we cannot reject the null hypothesis, and thus, the instruments are valid. Furthermore, the m2 test for second-order autocorrelation produces values of 0.88, 0.77, and 0.67, respectively, supporting the null hypothesis of no autocorrelation presence, affirming the absence of serial correlation issues in the error terms. The Wald tests (z1 and z2) for the joint significance of the reported coefficients and the variables related to years are highly significant in all models, confirming the overall model validity and the importance of including year effects in the analysis.

In the untabulated sensitivity analysis, we also re-ran the models using OLS estimation, widely used in the previous literature, and an alternative panel data estimation method, the fixed-effects estimator. Moreover, we used the stickiness of selling, general, and administrative costs and the cost of goods sold as alternative cost components. In all cases, the results remained consistent (the results are available upon request).

## 5. Discussion

Our results show a higher level of cost stickiness in the Nordic countries compared to Spain within the textile industry. These findings are consistent with the hypothesis that economic factors, labor market dynamics, corporate governance models, and managerial optimism about future demand, significantly influence cost stickiness. The pronounced contrast between the Nordic countries' focus on sustainability, innovation, and social welfare, and Spain's emphasis on flexibility and rapid market response, underscores the strategic decisions firms make in managing costs under uncertain demand conditions. Thus, our empirical evidence suggests that the Nordic textile firms' higher cost stickiness can be attributed to their strategic emphasis on long-term viability and sustainability. This approach is encouraged by a robust social welfare system and a corporate culture valuing innovation and technological development. Such an environment likely fosters managerial decisions inclined toward resource preservation, even in the face of declining sales, reflecting optimism about future demand recovery. Conversely, the Spanish textile industry, operating in a more volatile economic landscape, necessitates agile cost adjustments to maintain competitiveness, thus exhibiting lower cost stickiness.

The findings also highlight the influence of labor market dynamics on cost management strategies. The Nordic countries' decentralized collective bargaining systems and strong social safety nets support employment preservation strategies, contributing to higher cost stickiness. In contrast, Spain's higher unemployment rates and structural labor market

inefficiencies drive firms toward more aggressive workforce adjustments, reflecting a direct response to economic pressures.

The study's results align with the notion that managerial intentions, shaped by the broader economic and cultural contexts, play a significant role in determining cost stickiness. In the Nordic countries, the collaborative corporate governance model, which integrates stakeholder interests, seems to mitigate the propensity for empire-building behaviors that could exacerbate cost stickiness.

The difference in cost management approaches between the Nordic countries and Spain not only highlights the critical role of regional economic and cultural frameworks in shaping corporate strategies but also emphasizes the importance of adapting financial management practices to the specificities of each environment. These insights are crucial for firms navigating the complexities of global economic landscapes, offering valuable lessons on the adaptability and strategic foresight required for sustained competitiveness.

## 6. Conclusions

This study contributes to the existing literature on cost stickiness by providing empirical evidence of how contextual factors shape cost management behaviors in the textile industry. By exploring the intersection of economic factors, corporate governance models, and managerial strategies, the paper sheds light on the complex dynamics underpinning cost stickiness, extending beyond the traditional focus on adjustment costs and agency theory.

Our results highlight a more cautious managerial approach to resource adjustment in textile firms operating in the Nordic countries than in those operating in the Spanish setting. Thus, while both regions face global challenges in the textile industry, such as fast fashion dynamics and environmental concerns, the Nordic model's emphasis on sustainability, social welfare, environmental responsibility, and stakeholder engagement appears to promote higher levels of cost stickiness compared to Spain.

Consequently, these differences may stem from strategic choices rather than merely from operational rigidity. Contrary to the notion that cost stickiness results from agency costs, our findings indicate that the observed cost stickiness in the Nordic countries reflects "beneficial" cost behavior. This behavior is linked to optimal resource planning, driven by a long-term managerial orientation and an emphasis on sustainability and genuine stakeholder engagement in these countries.

These findings contribute to the previous literature by advancing our understanding of cost stickiness in textile firms but also highlight the crucial role of geographical, economic, and cultural differences in influencing corporate strategies and financial outcomes, challenging and extending traditional adjustment cost and agency theories by showing that cost behavior is profoundly influenced by broader societal and economic structures. Therefore, this research not only sheds light on the phenomenon of cost stickiness in the textile industry but also illustrates the complexity of managing costs in a globalized economic landscape, highlighting the importance of considering a wide range of factors, including economic conditions, strategic priorities, and governance structures, in understanding and addressing cost behavior.

These results hold practical implications for both managers and policymakers. Understanding the determinants of cost stickiness can help managers of textile companies tailor their cost management strategies to the specific economic and cultural contexts in which they operate. Our study emphasizes the need for a holistic approach to financial management in the textile industry, urging managers to consider not only the immediate financial implications but also the long-term strategic, social, and environmental impacts. For policymakers, the study underscores the importance of labor market policies and corporate governance models in influencing textile firm behavior, particularly in response to economic fluctuations.

As we focus on SIC code 22, our choice might not capture the full range of activities and diversities within the textile industry, causing some difficulties in generalizing our results. We acknowledge some concerns regarding the use of logarithmic transformations

to linearize the regression models. While this method is widely used for its simplicity and interpretability and is an established practice in economic data analysis concerning cost behavior, we recognize that it may not perfectly align with the data distribution or accurately model the relationships under investigation, leading to potential bias.

Additionally, when considering economic behavior, our research approach encounters certain constraints in thoroughly grasping the complex motives behind cost management decisions, including factors like megalomania, envy, and similar motivations [85]. Delving into these subjective characteristics, despite posing substantial methodological challenges, could offer a unique insight into the underlying reasons for cost adjustments.

This study paves the way for future exploration into the strategic facets of cost management across diverse sectors and geographical areas. It underlines the importance of expanding research to encompass a broader array of SIC codes, aiming to provide a more holistic understanding of cost management techniques within the multifaceted textile industry. Future research could also benefit from questioning established analytical frameworks and examining their impact on research outcomes. Furthermore, an examination of specific governance mechanisms or the incorporation of case studies might yield deeper insights into the field. In summary, this research emphasizes the necessity of adopting a comprehensive approach that balances operational efficiency, strategic planning, and societal values.

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