

Do Product Returns Distort Retail Profitability? Evidence from Transaction Data

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Abstract: This study examines how product returns affect retail profitability using transaction-level data. While returns are often treated as a routine operational issue, their financial implications are not always fully captured in standard performance metrics. The analysis introduces a return-adjusted profitability framework and applies it to a multi-year retail dataset, allowing for a detailed examination of how returns influence margins across transactions and product categories. The results show that returns are generally associated with lower profitability, although the magnitude of the effect varies depending on product characteristics and over time. The study contributes to the literature by providing a practical and replicable approach to incorporating returns into profitability measurement at a granular level. It also highlights how conventional performance indicators may overestimate economic performance when transaction reversals are not explicitly considered. These findings are particularly relevant for retail environments where analytical systems are still developing and where reliance on aggregated indicators may limit the accuracy of decision-making.

Keywords: *Product returns; retail profitability; transaction data; performance measurement; emerging markets*

1. Introduction

Product returns have become an increasingly important feature of modern retail environments, yet their impact on profitability remains difficult to assess. While prior research has often focused on aggregate return rates, less attention has been given to how returns operate at the transaction level. This gap becomes more important in retail environments where operational constraints and market conditions differ from those typically observed in developed economies.

In many retail environments, particularly those characterized by the development of analytical systems and evolving operational practices, return management remains a challenging area. In such contexts, the financial implications of returns may be more difficult to anticipate and fully incorporate into routine performance measurement. Understanding these dynamics can therefore provide useful insights for both practitioners and researchers.

This study examines the relationship between product returns and retail profitability using detailed transaction data. By focusing on individual transactions, the analysis seeks to capture patterns that are not visible in aggregated data. In addition, the issues addressed in this study are particularly relevant in the context of developing retail systems, including those found in many African economies. In such environments, data limitations and reliance on simplified performance indicators may increase the risk of misinterpreting financial outcomes. As a result, improving the accuracy of profitability measurement can play an important role in supporting more efficient resource allocation and sector development.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature. Section 3 describes the methodology and data. Section 4 presents the results, followed by a discussion. Finally, Section 5 concludes the paper.

2. Literature Review

Product returns and retail performance dynamics

Product returns have become an increasingly relevant phenomenon in modern retail environments, particularly in sectors characterized by intense competition, promotional activity, and customer-oriented service policies. Flexible return policies are frequently used as a strategic instrument to reduce perceived purchase risk and stimulate demand. However, while such policies may enhance customer satisfaction and short-term sales performance, they simultaneously generate financial and operational consequences that are not always fully captured in traditional performance measurement systems.

The literature on product returns has traditionally focused on reverse logistics and operational efficiency. Studies emphasize the cost implications associated with inspection, restocking, refurbishment, transportation, and potential disposal of returned products (Rogers & Tibben-Lembke, 2001; Stock et al., 2002). These costs can significantly erode gross margins, especially in categories with low price points or thin contribution margins. Nevertheless, beyond direct operational costs, returns also influence revenue recognition, demand forecasting accuracy, inventory turnover, and working capital requirements.

From a managerial perspective, product returns create a structural tension between customer relationship management and profitability preservation. Retailers must balance the competitive advantage gained through lenient return policies with the financial risks arising from opportunistic behavior or excessive return rates. The financial impact of returns may therefore vary depending on product characteristics, price levels, and margin structures (Petersen & Kumar, 2009; Griffis et al., 2012) sever.

Moreover, recent developments in omnichannel retailing have further complicated return management. The integration of physical and online channels increases return flexibility but also amplifies logistical complexity. Empirical evidence suggests that return rates are often higher in online environments, where customers face greater uncertainty regarding product fit or quality. As a result, return management has evolved from an operational afterthought to a strategic concern with measurable implications for financial performance.

In addition, recent research highlights that the financial implications of return policies may differ across retail formats and customer segments, suggesting the need for empirical approaches that examine profitability impacts at a granular level (Zhang, Ren, & Li, 2024). Despite these advances, some aspects of return-related profitability remain less explored, particularly at a more disaggregated level.

Recent literature has increasingly examined the economic implications of product returns in modern retail environments, particularly in the context of omnichannel strategies and evolving consumer behavior. Several studies highlight that lenient return policies can enhance customer satisfaction and stimulate demand, thereby contributing positively to sales performance in the short term (Bower & Maxham, 2023; Petersen & Kumar, 2009). However, other contributions emphasize that high return rates may significantly erode margins and increase operational complexity, especially when reverse logistics costs are substantial (Hübner et al., 2023).

More recent empirical work suggests that the profitability impact of returns is not uniform but depends on factors such as product characteristics, customer segments, and channel structure (Zhang et al., 2024). In online retail environments, for example, higher uncertainty regarding product fit and quality has been associated with increased return rates, which may offset the revenue gains generated by more flexible return policies.

Despite these advances, existing research has largely focused on aggregate return rates, reverse logistics efficiency, or policy design. Comparatively less attention has been given to how returns affect profitability at the transaction level and how their impact may vary across product categories and over time. In particular, the integration of return-adjusted profitability measures into routine performance evaluation remains underexplored in the literature.

This gap is especially relevant in retail environments where analytical systems are still developing and where managerial decisions often rely on aggregated performance indicators. By focusing on transaction-level data, the present study contributes to the literature by providing a more granular perspective on how product returns influence profitability measurement.

Returns and profitability measurement systems

Traditional retail performance measurement relies heavily on accounting-based indicators such as gross margin, contribution margin, and sales growth. These metrics are typically derived from recorded transactions and assume that completed sales represent finalized economic exchanges. However, when transactions are subsequently reversed through returns, the underlying profitability calculations may become distorted.

Although accounting systems record returns as negative sales or adjustments, routine managerial dashboards and performance reports may not always incorporate return-adjusted metrics explicitly at the category or subcategory level. In practice, managers frequently rely on aggregated sales figures without systematically

distinguishing between completed and reversed transactions. This can lead to overestimation of effective margins and misinterpretation of category performance.

Performance measurement theory highlights the importance of aligning financial indicators with underlying economic reality. When measurement systems fail to incorporate relevant cost drivers or transaction reversals, managerial decision-making may become biased. For instance, categories with high nominal sales but elevated return rates may appear profitable in standard reports while generating lower effective margins once returns are accounted for.

Furthermore, pricing decisions, promotional strategies, and assortment planning often rely on historical margin indicators. If such indicators do not reflect the economic consequences of returns, retailers may inadvertently promote products or categories that are structurally vulnerable to profitability erosion. Integrating return-adjusted indicators into routine reporting systems may therefore improve transparency and support more informed decision-making.

Heterogeneity across product categories

Retail environments are inherently heterogeneous. Product categories differ in terms of price dispersion, margin structure, demand volatility, and return propensity. High-value technology products may exhibit different return dynamics compared to low-value office supplies or consumables. Similarly, bulky items such as furniture may entail distinct logistical and restocking implications relative to small, packaged goods.

Empirical studies indicate that return behavior is not uniformly distributed across product categories. Factors such as product complexity, degree of standardization, perceived quality uncertainty, and consumer involvement influence the likelihood of post-purchase dissatisfaction and subsequent returns. Consequently, identical return rates may have divergent financial implications depending on the economic characteristics of each category.

From a performance measurement perspective, this heterogeneity implies that aggregate return statistics may conceal category-specific vulnerabilities. A moderate overall return rate may mask substantial exposure in particular segments. Transaction-level analysis offers a more granular approach that enables the identification of subcategories where returns exert a disproportionate impact on profitability.

In addition, margin sensitivity to returns may depend on pricing structures and discount intensity. Categories characterized by aggressive promotional activity or narrow contribution margins are likely to be more sensitive to transaction reversals. Therefore, analyzing profitability at a disaggregated level provides deeper insight into structural performance differences within the retail assortment.

Dynamic adaptation and organizational learning

The impact of returns on profitability is not necessarily static. Retail organizations may adapt over time by refining pricing strategies, improving quality control, enhancing product descriptions, or optimizing return handling procedures. Organizational learning theory suggests that firms accumulate experience and gradually improve operational efficiency in response to recurring challenges.

Over time, retailers may implement preventive measures aimed at reducing avoidable returns, such as clearer product information, improved customer support, or more targeted promotions. They may also enhance reverse logistics processes to minimize handling costs and recovery losses. These adaptations can moderate the negative financial impact of returns.

Analyzing the temporal evolution of return-related profitability effects, therefore, provides additional insight into whether firms successfully mitigate the economic consequences of returns. A declining marginal effect of returns on profit may reflect improvements in operational processes, pricing adjustments, or more effective customer segmentation.

In this context, transaction-level data covering multiple years allows examination of both cross-sectional heterogeneity and dynamic patterns. Such analysis contributes to a more comprehensive understanding of how return behavior interacts with performance measurement systems in evolving retail environments.

Performance Measurement and Financial Accuracy in Retail Contexts

Performance measurement systems play a central role in managerial decision-making and organizational control. In retail environments, financial indicators such as sales growth, gross margin, and contribution margin are frequently used as benchmarks for evaluating category performance and managerial effectiveness. However, performance measurement literature emphasizes that indicators must accurately reflect underlying economic activity to support sound decision processes.

When measurement systems fail to incorporate relevant economic adjustments, distortions may arise. In the context of retail operations, product returns represent a form of transaction reversal that can affect both revenue recognition and margin calculation. Although accounting standards provide mechanisms for recording returns, internal managerial dashboards do not always adjust performance indicators in a manner that reflects effective realized profitability.

Theoretical perspectives on management control systems suggest that misalignment between reported indicators and economic reality may generate unintended behavioral consequences. Managers whose performance evaluations are based on unadjusted sales or margins may prioritize strategies that increase nominal sales without adequately considering return risk. For example, aggressive discounting or liberal return policies may temporarily inflate sales figures while simultaneously increasing the probability of subsequent reversals.

Accurate performance measurement, therefore, requires integration of risk-related components into profitability indicators. In financial management theory, expected value frameworks account for potential reversals or losses when evaluating economic outcomes. Applying a similar logic to retail performance measurement implies that margins should be assessed net of return exposure rather than on the basis of gross transaction records alone.

Furthermore, as retail environments become increasingly data-driven, the availability of transaction-level information enables more precise indicator construction. Advances in business analytics allow organizations to move beyond aggregated reporting and towards refined measurement systems that capture operational realities. Incorporating return-adjusted profitability metrics aligns financial reporting more closely with realized economic performance.

In this regard, the present study contributes to performance measurement discussions by demonstrating a practical and implementable approach to integrating return considerations into routine margin analysis. By highlighting the measurable difference between theoretical and adjusted profitability indicators, the study reinforces the importance of aligning managerial metrics with transactional realities.

Theoretical Framework

The relationship between product returns and profitability can be better understood when considered through established theoretical perspectives in accounting and management research. From an accounting perspective, performance indicators are expected to reflect the underlying economic reality of transactions. However, when completed sales are later reversed through returns, standard profitability measures may not fully capture realized outcomes. This creates a potential discrepancy between reported margins and effective financial performance.

In addition, agency theory provides a useful lens to interpret the managerial implications of such discrepancies. When performance evaluation is based on unadjusted sales or margin indicators, managers may have incentives to prioritize short-term revenue generation without fully accounting for the risk of returns. This may lead to decisions that improve reported performance while weakening actual profitability.

Contingency theory further suggests that the relevance and accuracy of performance measurement systems depend on the specific characteristics of the operating environment. In retail settings, where product categories, pricing structures, and return behavior vary considerably, a single, standardized approach to profitability measurement may not adequately reflect these differences.

Finally, the study is also related to the literature on management control systems, which emphasizes the importance of aligning performance metrics with operational realities. When key elements such as transaction reversals are not explicitly incorporated into measurement systems, the resulting indicators may provide an incomplete basis for decision-making.

Taken together, these perspectives support the argument that product returns should be considered an integral component of profitability measurement rather than a purely operational issue. The empirical analysis that follows is therefore aimed at assessing how the inclusion of return-related adjustments influences the interpretation of financial performance at the transaction level.

3. Data and Method

Data description

The analysis is based on a multi-year retail transaction dataset covering the period 2014–2017. The dataset contains order-line level information, including sales value, profit, discounts, quantity sold, product subcategory, and a return indicator specifying whether a transaction was subsequently reversed.

The data represent a multi-category retail environment including office supplies, furniture, and technology products across different customer segments. Such datasets are commonly used in retail analytics research and provide a suitable context for demonstrating practical profitability measurement frameworks. It corresponds to a publicly available retail transaction dataset widely used in empirical analytics research.

After data cleaning and removal of incomplete observations, the final sample consists of 29,911 transactions distributed across multiple product subcategories. The presence of detailed transaction-level variables allows for the construction of return-adjusted profitability measures and the estimation of regression models controlling for observable commercial characteristics.

Importantly, the objective of this study is not to generalize the findings to a specific geographic context but to demonstrate how return-adjusted profitability metrics can be constructed and applied using standard transactional retail data. While the dataset does not correspond to a particular regional setting, the analytical framework developed in this study may apply to a wide range of retail environments, including those where analytical capabilities and return management practices are still evolving.

Research design and analytical approach

This study adopts a quantitative research design based on transaction-level retail data. The analytical approach combines descriptive analysis with regression modelling to evaluate the financial implications of product returns. The empirical analysis focuses on identifying statistical associations between product returns and transaction-level profitability rather than establishing causal relationships. While this approach does not allow for causal inference, it provides meaningful insights into how returns are systematically related to financial performance within the observed dataset.

Transaction-level analysis is particularly appropriate in this context because it enables direct observation of individual sales outcomes, including revenue, profit, discount intensity, quantity sold, and return status. Unlike aggregate accounting reports, transaction-level data allows more precise adjustment of profitability measures and provides a granular view of financial performance across product subcategories.

The methodological framework is deliberately designed to be replicable using standard retail datasets. Rather than relying on complex econometric techniques, the study employs linear regression models that are commonly used in applied business research. This approach enhances transparency and ensures that the analytical procedure can be implemented by practitioners using widely available statistical tools.

Variable definition and measurement

The dependent variable in the regression analysis is transaction-level profit. Profit is measured as the monetary contribution generated by each transaction after accounting for discounts and cost adjustments recorded in the dataset. This variable captures the immediate financial outcome associated with each sale.

The key independent variable is a binary return indicator. This variable takes the value of 1 if a transaction was subsequently reversed through a product return and 0 otherwise. The inclusion of this variable allows estimation of the marginal effect of returned transactions on profitability.

Several control variables are incorporated to account for observable commercial characteristics that may influence profit:

Sales value: Measured as the monetary amount associated with each transaction. Higher sales values are generally expected to correlate positively with profit.

Discount level: Measured as the monetary or percentage discount applied to the transaction. Greater discount intensity may reduce contribution margins.

Quantity sold: Measured as the number of units sold in each transaction. Larger quantities may influence profitability through scale effects.

Including these control variables reduces omitted variable bias and improves the robustness of the estimated relationship between returns and profitability.

Regression specification and assumptions

The baseline regression model is specified as:

$$\text{Profit}_i = \beta_0 + \beta_1 \text{Return}_i + \beta_2 \text{Sales}_i + \beta_3 \text{Discount}_i + \beta_4 \text{Quantity}_i + \varepsilon_i$$

where ε_i represents the error term.

Linear regression is chosen due to its interpretability and suitability for estimating marginal effects in applied management research. The coefficient β_1 represents the average change in transaction-level profit associated with returned transactions, holding other observable characteristics constant.

Although the study does not focus on advanced econometric modelling, standard regression assumptions are considered. These include linearity of relationships, independence of observations, and absence of perfect multicollinearity among explanatory variables. Given the transaction-level structure of the dataset, individual observations represent separate sales events, reducing concerns regarding serial dependence. However, the analysis does not explicitly model potential heteroscedasticity or hierarchical clustering effects, which is acknowledged as a limitation. In addition, although the model is intentionally kept simple to ensure interpretability, potential econometric issues such as heteroscedasticity and within-group correlation are considered in supplementary analyses. Addressing these aspects helps ensure that the estimated relationships are not sensitive to standard violations of classical regression assumptions.

Subcategory and temporal analysis

To explore heterogeneity, separate regressions are estimated for selected product subcategories. This approach allows identification of category-specific sensitivity to returns and provides insight into structural differences within the retail assortment.

In addition, year-specific regressions are conducted to evaluate whether the profitability impact of returns changes over time. Temporal analysis enables examination of dynamic adaptation processes and potential organizational learning effects. Comparing coefficients across years offers an indication of whether the financial consequences of returns are stable or evolving.

Construction of return-adjusted profitability measures

Beyond regression modelling, return-adjusted sales and margin indicators are constructed by excluding transactions flagged as returned. The adjusted margin is calculated as adjusted profit divided by adjusted sales. Comparing theoretical and return-adjusted margins provides a descriptive estimate of potential overestimation when returns are ignored.

This framework is intentionally simple and does not require additional cost allocations beyond the recorded transactional data. Its practical relevance lies in its feasibility for implementation within standard accounting or enterprise resource planning systems.

It is important to note that the adjusted profitability measures do not incorporate additional costs associated with reverse logistics processes, such as handling, transportation, inspection, or refurbishment of returned products. As a result, the estimated impact of returns on profitability may be conservative, as the full economic cost of returns is likely to be higher than what is captured by transaction-level profit data alone. Despite this limitation, the simplified framework remains useful for illustrating how return-related adjustments can improve the accuracy of performance measurement in practical settings.

Robustness checks

To assess the reliability of the regression results, several robustness checks are conducted.

First, potential heteroscedasticity is considered, given the cross-sectional nature of transaction-level data. Although the baseline models are estimated using ordinary least squares, additional estimations using heteroscedasticity-robust standard errors yield qualitatively similar results, suggesting that the main findings are not driven by unequal variance in the error terms.

Second, to account for potential correlation within product categories, standard errors are clustered at the subcategory level. This adjustment allows for more conservative inference by relaxing the assumption of independent error terms across observations within the same category. The results remain consistent in terms of sign and statistical significance.

Third, alternative model specifications are estimated by excluding extreme observations and testing different functional forms of the dependent variable. These variations do not materially affect the direction or magnitude of the estimated coefficients, reinforcing the robustness of the main conclusions.

Overall, these checks provide additional confidence that the observed relationship between product returns and profitability is not driven by model specification or statistical artefacts.

4. Results and Discussion

While the overall patterns are relatively clear, some results require more careful interpretation and may reflect underlying differences that are not directly observable in the dataset. This section presents the main empirical results obtained from the data. The focus is on straightforwardly describing the observed patterns, before turning to their interpretation in the next section.

Descriptive evidence and return-adjusted margins

This subsection compares standard profitability indicators with return-adjusted measures to see whether ignoring returns leads to noticeable differences in performance evaluation.

Table 1 reports summary statistics for sales, profit, return rates, and margin measures. The overall return rate in the sample is 3.26%, which does not seem particularly high at first glance. However, when comparing the theoretical margin (based on all transactions) with the adjusted margin (excluding returned transactions), a small but consistent difference appears.

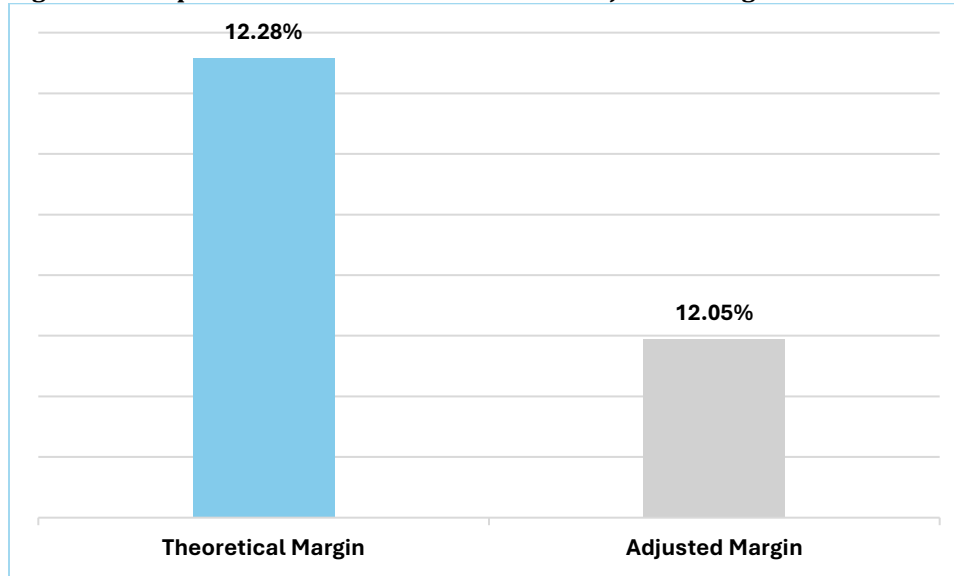
Table 1: Descriptive statistics and return-related metrics

Variable	Value
Nº transacciones	29.911
Ventas totales	7.116.072
Beneficio total	853.608
Nº devoluciones	976
% devoluciones	3,26%
Margen teórico (%)	12,28%
Margen ajustado (%)	12,05%

Note: Adjusted margin excludes transactions corresponding to returned orders.

Figure 1 shows this gap visually. Although the difference is not large in absolute terms, it points in the same direction: conventional margin indicators tend to slightly overstate profitability when returns are not taken into account.

Figure 1: Comparison between theoretical and adjusted margins



Subcategory heterogeneity

Looking only at aggregate figures can hide important differences across product types. Table 2, therefore, breaks down return rates and margin differences by subcategory.

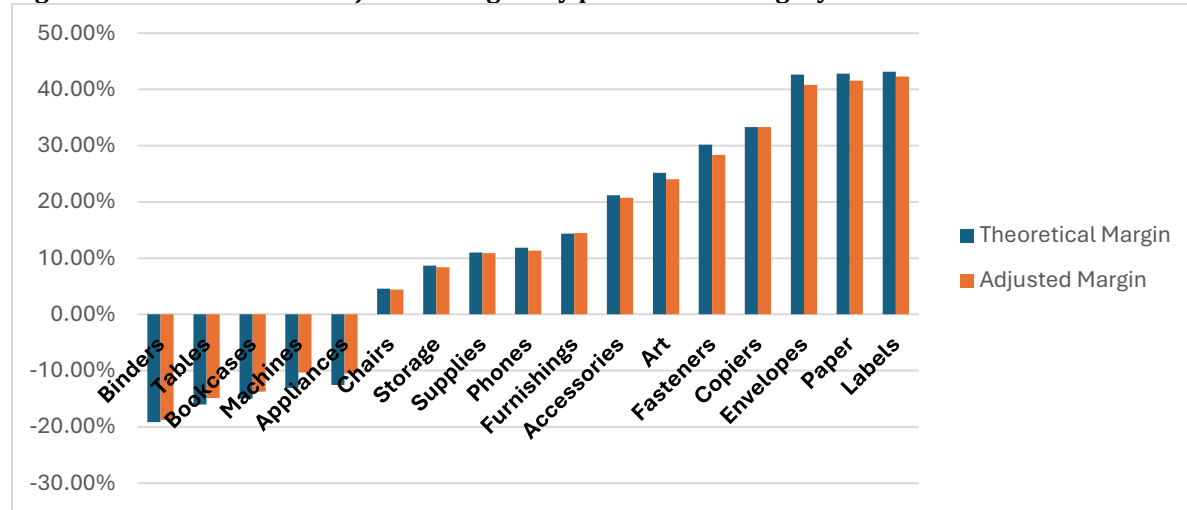
Table 2: Impact of product returns on profitability by subcategory.

Subcategory	% Returns	Theoretical Margin	Adjusted Margin	Δ Margin
Accessories	2,74%	21,20%	20,71%	-0,49%
Appliances	2,80%	-12,53%	-10,51%	2,02%
Art	4,29%	25,16%	24,03%	-1,12%
Binders	2,65%	-19,15%	-18,72%	0,43%
Bookcases	4,39%	-14,94%	-13,76%	1,18%
Chairs	2,94%	4,56%	4,40%	-0,16%
Copiers	0,00%	33,30%	33,30%	0,00%
Envelopes	4,77%	42,62%	40,81%	-1,81%
Fasteners	5,06%	30,19%	28,37%	-1,82%
Furnishings	3,60%	14,34%	14,47%	0,13%
Labels	2,16%	43,14%	42,28%	-0,86%
Machines	5,74%	-13,07%	-10,33%	2,74%
Paper	2,93%	42,82%	41,57%	-1,26%
Phones	3,65%	11,87%	11,33%	-0,54%
Storage	3,32%	8,66%	8,41%	-0,25%
Supplies	2,10%	11,01%	10,87%	-0,15%
Tables	3,89%	-16,02%	-14,87%	1,15%
Total general	3,26%	12,28%	12,05%	-0,23%

Note: Margin difference expressed in percentage points (pp).

Figure 2 provides a visual comparison across categories. What stands out is that the impact of returns is far from uniform. Some subcategories—such as Envelopes, Fasteners, and Art—show more noticeable reductions in adjusted margins. In contrast, categories like Chairs, Storage, and Supplies display only minor differences. These patterns suggest that the financial effect of returns depends, at least to some extent, on the characteristics of each product category.

Figure 2: Theoretical and adjusted margins by product subcategory



Regression results

To go beyond descriptive comparisons, transaction-level regression models are estimated. These models examine how returns relate to profit while controlling for sales value, discounts, and quantities sold.

Table 3: Impact of product returns on profit by subcategory.

Subcategory	β_{return}	Standard error	p-value	n	R ²
Accessories	-26,82	6,01	0,0000085	2.296	0,801
Appliances	-59,09	12,19	0,0000014	1.394	0,757
Art	-2,60	0,57	0,000006	2.308	0,806
Binders	12,42	22,4	0,579	4.484	0,377
Chairs	9,57	11,11	0,389	1.838	0,668

Note: Coefficients represent the marginal effect of a return on profit per transaction. Linear regressions are estimated controlling for sales, discount, and quantity sold.

In several sub-categories, the return indicator is negative and statistically significant, indicating that returned transactions are associated with lower profitability. However, this is not the case everywhere. In some categories, such as Binders and Chairs, the effect is not statistically significant once other factors are taken into account.

Interaction model

To explore differences across product types more formally, a pooled regression model with interaction terms between returns and product subcategories is estimated.

Table 4: Interaction model between returns and product subcategory.

Variables	Coefficient	Standard error	p-value
Return (Base category: Art)	-54,96	—	< 0,001
Return × Accessories	37,9	—	0,189
Return × Appliances	28,13	—	0,435
Return × Binders	53,61	—	0,014
Return × Chairs	68,34	—	0,027

Note: The base category is Art. The total effect of a return for each subcategory is obtained as the sum of the base Return coefficient and the corresponding interaction term.

The results show that the effect of returns varies across subcategories. The total effect for each category depends on both the base coefficient and the corresponding interaction term.

Temporal analysis

Finally, the analysis looks at how the impact of returns evolves using year-specific regressions.

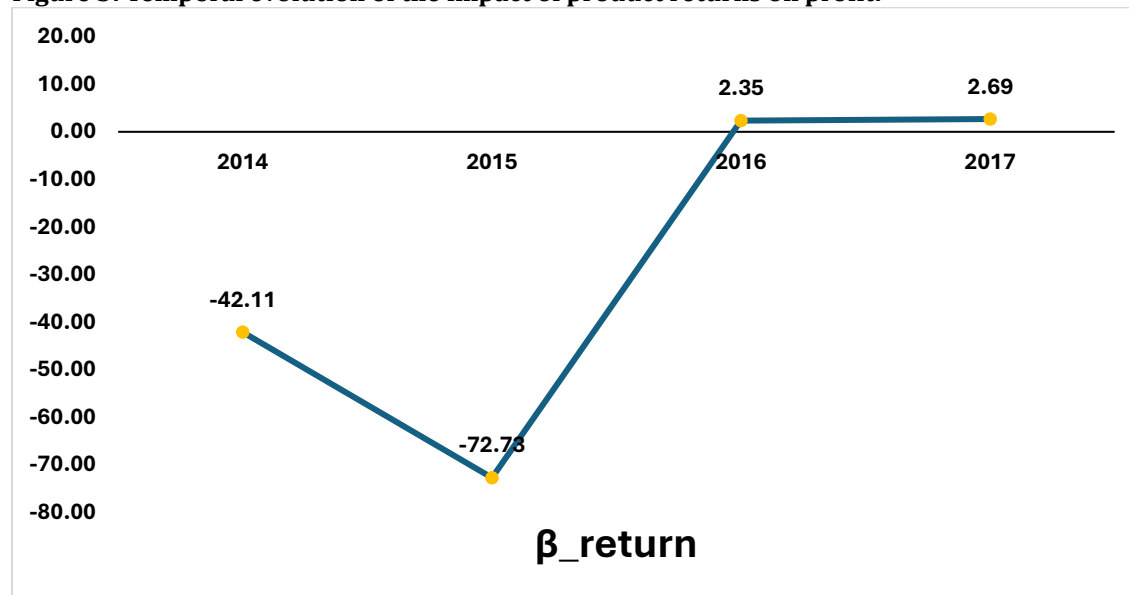
Table 5: Impact of product returns on profit by year.

Year	β_{return}	Standard error	p-value	n	R ²
2014	-42,11	15,66	0,007	6.009	0,073
2015	-72,73	9,62	< 0,001	6.372	0,27
2016	2,35	12,73	0,854	7.709	0,487
2017	2,69	15,51	0,862	9.820	0,331

Note: Coefficients represent the marginal effect of a return on profit per transaction. Regressions are estimated separately for each year, controlling for sales, discount, and quantity sold.

The results differ across years. In earlier periods, returns are associated with a negative effect on profit, while in later years the estimated effect becomes smaller and, in some cases, statistically insignificant. Figure 3 illustrates this change over time.

Figure 3: Temporal evolution of the impact of product returns on profit.



Together, the evidence from Table 5 and Figure 3 indicates that the financial impact of returns is dynamic rather than constant. Taken together, the results suggest that product returns do affect retail profitability, although not always in the same way or to the same extent. One of the clearest findings is that even relatively modest return rates can lead to small but consistent differences in measured margins. While these differences may seem minor at first, they can become relevant when aggregated across large volumes of transactions.

At the same time, the results make it clear that the impact of returns is not uniform. Some product categories appear to be more sensitive than others, which likely reflects differences in pricing, margins, and product characteristics. This also helps explain why aggregate indicators can sometimes hide underlying issues. The regression analysis adds another layer of evidence by showing that returns are linked to lower profitability even after accounting for basic transaction characteristics. Still, not all the variation is explained by the model, which suggests that other factors—such as product quality, customer behavior, or operational processes—may also be influencing the results.

Looking at the time dimension, the impact of returns seems to weaken in later years. One possible explanation is that firms gradually adjust their practices, either by improving return management or by adapting pricing and product strategies. However, this cannot be confirmed directly with the available data. From a practical point of view, the results highlight a simple issue: standard performance indicators do not always tell the full story. This may be particularly relevant in emerging retail environments, including many African contexts, where analytical systems are still developing and may rely heavily on aggregated metrics.

Beyond the descriptive interpretation of the results, several broader analytical implications emerge. From a performance measurement perspective, the findings highlight a systematic misalignment between reported financial indicators and realized economic outcomes. This interpretation aligns with accounting theory, which emphasizes that performance metrics should accurately reflect underlying transactions. When returns are not fully incorporated into profitability measures, managers may rely on indicators that overstate effective margins, potentially leading to suboptimal decision-making.

From a behavioral standpoint, the results also support insights from agency theory. If managerial performance is evaluated based on unadjusted sales or margin indicators, there may be incentives to prioritize strategies that increase nominal sales while disregarding return risk. This may help explain why categories with relatively high return sensitivity can still appear attractive in standard performance reports.

In addition, the observed heterogeneity across product subcategories is consistent with contingency theory, suggesting that the impact of returns depends on contextual factors such as product characteristics, pricing structures, and demand uncertainty. This reinforces the idea that uniform performance metrics may not adequately capture category-specific risks.

The temporal variation observed in the results may also reflect processes of organizational adaptation. Over time, firms may adjust pricing strategies, improve product information, or refine return management practices, thereby reducing the negative financial impact of returns. Although this mechanism cannot be directly tested within the present study, it provides a plausible explanation for the diminishing effect observed in later periods. Overall, these interpretations suggest that product returns should be understood not only as operational events but as economically relevant factors that influence both measurement accuracy and managerial behavior within retail organizations.

These considerations may be particularly relevant in developing retail environments, where analytical capabilities and access to detailed data are often more limited. In such contexts, the use of simplified performance indicators without appropriate adjustments may lead to greater distortions in profitability assessment.

5. Conclusion, Recommendations and Policy Implications

This study examined the impact of product returns on profitability measurement in retail environments and proposed a return-adjusted analytical framework based on transaction-level data. The findings demonstrate

that ignoring returned transactions leads to systematic overestimation of profitability, even when overall return rates appear relatively moderate. This suggests that conventional accounting-based indicators may not fully reflect realized economic performance when transaction reversals are not explicitly incorporated.

The empirical results further show that the financial impact of product returns is heterogeneous across product subcategories and evolves. In several categories, returns significantly reduce transaction-level profitability even after controlling for key commercial variables such as sales value, discount intensity, and quantity sold. The temporal analysis indicates that the negative effect of returns may decline over time, potentially reflecting organizational learning and operational adaptation.

These findings highlight the importance of aligning performance measurement systems with underlying transactional realities. In retail environments characterized by high transaction volumes and competitive pricing structures, even small distortions in margin indicators may translate into substantial financial implications. This is particularly relevant in retail environments where performance measurement practices are still evolving and may rely on simplified reporting structures.

At the same time, the results should be interpreted with some caution. The magnitude of the observed effects is not uniform, and in some cases, relatively modest, which suggests that the economic relevance of returns may depend on specific operational contexts. From a practical perspective, the study provides a simple and implementable framework for improving profitability assessment. By incorporating return-adjusted indicators into routine financial reporting, retail managers can obtain a more accurate representation of economic performance and reduce measurement bias. This, in turn, supports more informed decision-making regarding pricing strategies, promotional policies, and assortment planning.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

First, retail organizations should integrate return-adjusted profitability indicators into their standard performance measurement systems. Managers should complement conventional sales and margin metrics with adjusted measures that explicitly exclude or account for returned transactions.

Second, category-level analysis should be prioritized. Given the heterogeneity observed across product subcategories, retailers should monitor return-adjusted margins at a disaggregated level to identify segments that are particularly vulnerable to return-related profit erosion.

Third, pricing and promotional strategies should be aligned with return behavior. In categories with high return sensitivity, retailers may consider adjusting pricing structures, limiting excessive discounting, or improving product information to reduce avoidable returns.

Fourth, retail firms should invest in improving data systems and analytical capabilities. Even in resource-constrained environments, the use of transaction-level data and basic analytical tools can significantly enhance the accuracy of financial reporting and managerial decision-making.

Fifth, policymakers and stakeholders in emerging retail markets, particularly in African economies, should support the adoption of data-driven performance measurement practices. Strengthening analytical capabilities within retail sectors can contribute to improved financial transparency, more efficient resource allocation, and overall sector development.

In conclusion, product returns should not be treated merely as operational events but as measurable determinants of financial performance. Incorporating return-adjusted indicators into routine performance evaluation systems represents a practical and effective step towards improving profitability measurement and strengthening managerial decision-making in modern retail environments.

Finally, continuous monitoring is essential. Return behavior and profitability dynamics may evolve due to changes in consumer preferences, competitive conditions, or operational improvements. Periodic recalculation

of return-adjusted metrics ensures that performance measurement systems remain aligned with economic realities.

Importantly, the proposed framework does not require sophisticated analytical infrastructure. The necessary data elements—sales value, profit, quantity, discount, and return status—are typically available in standard retail databases. Implementation can therefore be achieved using commonly available business intelligence tools or spreadsheet-based reporting systems.

By embedding return-aware metrics into routine financial monitoring, retail organizations can enhance transparency, reduce measurement bias, and support more informed managerial decision-making. The framework presented here demonstrates that improving profitability assessment does not necessarily require complex modelling, but rather systematic utilization of existing transactional information.

Although the empirical analysis is based on a generic retail dataset, the proposed framework is especially relevant for developing retail systems, including those in African economies, where improving the accuracy of performance measurement can contribute to more effective decision-making and sector development.

Policy Implications

The findings of this study have several implications for policymakers and stakeholders involved in the development of retail sectors, particularly in environments where analytical capabilities are still evolving.

First, promoting the adoption of data-driven performance measurement systems can improve financial transparency and resource allocation within retail markets. Encouraging firms to integrate return-adjusted indicators into standard reporting practices may lead to more accurate assessments of economic performance. Second, supporting the development of logistics infrastructure and return management systems can help reduce the operational costs associated with product returns. Investments in supply chain efficiency and reverse logistics capabilities may therefore contribute to improved profitability and sector competitiveness.

Third, policymakers may consider fostering better consumer information standards and product quality regulations. Reducing uncertainty in purchasing decisions can lower return rates and improve overall market efficiency.

Overall, integrating return-aware performance metrics into both managerial and policy frameworks can support more sustainable development of retail systems.

Limitations and Future Research

Despite the practical contributions of this study, several limitations should be acknowledged.

First, the empirical analysis is based on a single retail transaction dataset covering a specific period and a particular retail context. Although the dataset includes multiple product categories and a substantial number of transactions, the findings may not be directly generalizable to all retail environments. Retail sectors differ significantly in terms of product characteristics, return policies, cost structures, and customer behavior. Future research could apply the return-adjusted profitability framework to alternative retail settings, including online-only retailers, omnichannel systems, or industries with structurally higher return rates, such as fashion or electronics.

Second, the profitability measures employed in this study rely on recorded transaction-level profit and exclude additional indirect costs associated with reverse logistics. The analysis focuses primarily on revenue reversals and reported profit adjustments. However, returns may generate further economic consequences, including inspection costs, repackaging, transportation, inventory holding, depreciation, or disposal expenses. Incorporating detailed reverse logistics cost data could provide a more comprehensive assessment of the total financial impact of returns. Future studies may extend the proposed framework by integrating such cost components into profitability calculations.

This limitation also implies that the empirical results presented in this study may underestimate the total financial impact of product returns. Consequently, the observed effects should be interpreted as a lower bound

of the true economic impact, reinforcing the importance of incorporating more comprehensive cost structures in future research.

Third, the regression analysis identifies statistical associations between returns and profitability while controlling for observable transaction characteristics. However, the design does not establish causal relationships. Returns may be influenced by unobserved variables such as product quality variations, customer characteristics, or marketing strategies that are not fully captured in the dataset. Future research could employ quasi-experimental designs, natural experiments, or policy changes to explore causal mechanisms more rigorously.

Fourth, the temporal analysis suggests a decline in the marginal profitability impact of returns over time, which may indicate organizational adaptation. Nevertheless, the present study does not directly examine the managerial actions or operational changes responsible for this trend. Qualitative research or mixed-method approaches could provide deeper insight into how retailers modify processes, pricing strategies, or return policies in response to return behavior.

Fifth, the study focuses on transaction-level profitability rather than customer-level profitability. Returns may affect customer lifetime value, retention rates, and long-term purchasing behavior. Some customers who frequently return products may still generate substantial lifetime revenue, while others may erode profitability. Future research could integrate customer-level analytics to explore the interaction between return behavior and long-term financial performance.

Finally, the proposed framework is deliberately simple and designed for practical implementation. While this simplicity enhances managerial applicability, more advanced modelling approaches may uncover additional nuances. For example, machine learning techniques or predictive analytics could be employed to forecast return likelihood and incorporate expected return-adjusted margins into forward-looking performance dashboards.

Overall, these limitations provide opportunities for further research aimed at deepening the understanding of the financial implications of product returns. Expanding the analytical scope across sectors, incorporating richer cost data, and exploring dynamic and customer-level effects would contribute to a more comprehensive assessment of return-related profitability in retail environments.

References

- Bower, A. B., & Maxham, J. G. (2023). Consumer returns and firm profitability: Implications for retail strategy. *Journal of Retailing and Consumer Services*, 71, 103214.
- Griffis, S. E., Rao, S., Goldsby, T. J., & Niranjana, T. T. (2012). The customer consequences of returns in online retailing: An empirical analysis. *Journal of Operations Management*, 30(4), 282–294.
- Hübner, A., Holzapfel, A., & Kuhn, H. (2023). Managing returns in omnichannel retailing: Challenges and performance implications. *International Journal of Retail & Distribution Management*, 51(2), 173–192.
- Petersen, J. A., & Kumar, V. (2009). Are product returns a necessary evil? Antecedents and consequences. *Journal of Marketing*, 73(3), 35–51.
- Rogers, D. S., & Tibben-Lembke, R. (2001). An examination of reverse logistics practices. *Journal of Business Logistics*, 22(2), 129–148.
- Stock, J. R., Speh, T. W., & Shear, H. (2002). Many happy (product) returns. *Harvard Business Review*, 80(7), 16–17.
- Zhang, Y., Ren, J., & Li, H. (2024). Return policies and retail performance: Evidence from multi-channel retail environments. *Journal of Retailing and Consumer Services*, 76, 103540.

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