A Moderated Mediation Analysis of the Relationship between Fixed Assets and Sales Value of the Largest Retailers in Romania

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Please cite this paper as:
Tziner, A., Vasiliu, C., Dinu, V. and Tăchiciu, L.,2025. A moderated mediation analysis of the relationship between fixed assets and sales value of the largest retailers in Romania. In: C. Vasiliu, D.C. Dabija, A. Tziner, D. Pleșea, V. Dinu eds. 2025. *11th BASIQ International Conference on New Trends in Sustainable Business and Consumption.* Oradea, Romania, 26-28 June 2025. Bucharest: Editura ASE, pp. 277-284
DOI: 10.24818/BASIQ/2025/11/001

Abstract

Driven by economic changes, digitalization, and evolving consumer preferences, the Romanian retail sector has experienced significant transformations and substantial revenue growth, despite fluctuations in the number of companies. Existing research largely concentrates on consumer behavior and market trends, leaving the economic determinants of retail performance less understood. To fill this void, this study quantitatively examines the impact of key financial indicators—fixed assets, inventories, receivables, and employee count—on the sales value of the largest Romanian retailers. Through hierarchical regression and mediation-moderation techniques, it aims to identify the relationships between financial structure and business outcomes.

Our findings reveal that fixed assets initially show a strong positive correlation with sales; however, this impact lessens when other factors are taken into account. Notably, inventories and receivables are crucial for driving sales performance, and the number of employees acts as a mediator in the relationship between asset investments and revenue generation. This article offers originality through its theoretical contributions, highlighting the interplay of financial and operational variables in retail success, as well as its practical implications, providing business managers and policymakers with actionable insights for optimizing investment strategies, enhancing workforce efficiency, and improving financial management to maintain a competitive edge.

Keywords

Retail, sales value, performance, mediation analysis, moderated analysis.

DOI: 10.24818/BASIQ/2025/11/001

Introduction

The Romanian retail sector has experienced substantial transformations in recent years due to economic dynamics, digitalization, and particularly, evolving consumer preferences. In an increasingly competitive environment among major retailers, understanding the drivers of sales performance is crucial for companies seeking to sustain and expand their market share (Hategan et al., 2021).

While current research often emphasizes consumer behavior and market trends (Busu, Vargas and Gherasim, 2020), a significant gap exists in the economic analysis of retail company performance. This study intends to address this by investigating the impact of key economic indicators—fixed assets, inventories, receivables, and employee numbers—on the revenues of Romania's leading retail firms (Ilie and Vasiu, 2022).

The significance of this study lies in its capacity to illuminate the impact of various economic factors on retail performance. The findings contribute to the academic understanding of retail success and offer practical insights for managers and decision-makers. By elucidating the relationship between asset management and sales growth, this research can guide companies in optimizing investments, refining operational processes, and enhancing profitability within an increasingly competitive market. As the Romanian retail sector navigates technological advancements and economic uncertainties, this study identifies crucial elements for developing sustainable business strategies, thereby providing a foundation for future research and strategic decisions in a dynamic retail landscape.

1. Review of the scientific literature

Current research on the Romanian retail sector predominantly investigates consumer behavior and market dynamics, with fewer studies exploring the relationship between economic performance and asset structure. Existing literature has examined various facets of the industry, including the impact of external factors, financial performance, and consumer preferences. Notably, one significant research initiative analyzes the effects of the COVID-19 pandemic on retail, emphasizing shifts in consumer demand and disruptions to supply chains (Savan, Gica and Sofica, 2022). Another study explores retailers' perceptions of safety measures and their influence on shopping behavior (Stanca, Dabija and Câmpian, 2023). Additionally, research has categorized consumers into four distinct types based on their adaptability and shopping inclinations (Stanca, Dabija and Câmpian, 2025).

Studies on the financial aspects of Romanian retail have shown an inverse relationship between capital structure and profitability in B2C e-commerce, alongside overall sector improvements in 2020 compared to 2019 (Duguleană, Duguleană and Deszke, 2024) and, conversely, a positive correlation between capital structure and profitability in other Romanian retail firms (Maxim, 2023). Research on digital food retail identifies consumer segments focused on convenience versus local and sustainable options (Alfnes, Ardebili and Viciunaite, 2024). Strategic aspects like retail network expansion in emerging economies (Teixeira et al., 2022) and the growing importance of sustainable consumer behavior in Romania within the EU Green Deal (Purcărea et al., 2022) have also been explored. A comparative analysis of Romania and Hungary highlights differences in supermarket concentration, economic indicators, and liquidity (Harangi-Rákos and Fenyves, 2021).

With Romania's retail sector on a continued growth path, projected to exceed 4.5 million sqm of modern retail space by 2024, and despite a 20% decrease in the number of retailers since 2008, the industry has seen a remarkable 216% revenue increase to 354 billion RON. Key players include Lidl and Kaufland in groceries, eMAG in e-commerce, and Profi in store network size. While e-commerce sales reached €6.3 billion in 2022, 2023 saw inflation driving price increases (+6.2%, with food at +13.9%), contrasting with a strong 25% growth in cosmetics sales.

Against this backdrop, the present study seeks to identify which factors, frequently cited in the literature as impacting firm sales performance, influence the sales value of the largest Romanian retail firms. Specifically, we examine fixed assets, inventories, receivables, liabilities, capital, expenses, and employee numbers. Our primary prediction is that each of these factors will positively and significantly correlate with sales performance, and their combined effect will be even stronger. Furthermore, we aim to investigate potential moderating and mediating effects involving fixed assets, receivables, employee numbers, and sales value.

2. Research methodology

Employing a quantitative methodology, this study investigates the key determinants of revenue among Romania's leading retail firms. The research leverages economic data obtained from industry reports, company financial statements, and public databases (Top Firme, 2024). The study uses hierarchical regression analysis via SPSS and Macro Process to explore the impact of different business metrics on company performance. A significance level of $p < 0.05$ was applied, and statistical significance was evaluated using 95% confidence intervals.

3. Results and discussions

Our analysis incorporated several variables, including sales value (SV), expenses (E), capital (C), fixed assets (FA), inventories (I), receivables (R), liabilities (L), and the number of employees (NoE), as detailed

in Table 1. We observed significant positive correlations ($p < 0.01$) among the majority of these variables. Interestingly, specific pairs—capital and receivables, fixed assets and receivables, inventories and receivables, and receivables with the number of employees—showed negligible bilateral correlation, which is consistent with our expectations. For the hierarchical regression analysis, where sales value was the dependent variable, we removed expenses due to a very strong correlation with sales value ($r = 0.997$, $p < 0.01$), as this presented a substantial multicollinearity concern.

Table no. 1. Correlations between variables

Variables	Pearson's correlation							
Sales value	1	,997**	,662**	,661**	,746**	,529**	,823**	,898**
Expenses		1	,630**	,644**	,743**	,528**	,839**	,886**
Capital			1	,960**	,528**	,133	,511**	,730**
FA				1	,573**	,042	,587**	,742**
Inventory					1	,379	,810**	,731**
Receivables						1	,664**	,318
Liabilities							1	,705**
NoE								1

** Correlation is significant at the 0.01 level (2-tailed).**
* Correlation is significant at the 0.05 level (2-tailed).*

Regression analysis was used to determine the factors influencing the sales value of the largest retail firms in Romania. Sales value served as the dependent variable, while fixed assets, inventories, receivables, and number of employees were the independent variables. The results of the hierarchical regression model are detailed in Table 2.

Table no. 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,661[a]	,437	,413	4,28315	,437	18,613	1	24	,000
2	,798[b]	,637	,605	3,51372	,200	12,662	1	23	,002
3	,868[c]	,754	,721	2,95535	,117	10,512	1	22	,004
4	,939[d]	,882	,859	2,09671	,128	22,708	1	21	,000

a. Predictors: (Constant), Fixed Assets
b. Predictors: (Constant), Fixed Assets, Inventory
c. Predictors: (Constant), Fixed Assets, Inventory, Receivables
d. Predictors: (Constant), Fixed Assets, Inventory, Receivables, Number of Employees

As shown in Table 3, the Analysis of Variance (ANOVA) demonstrates that all four models achieved a high level of statistical significance ($p < 0.001$). The F-test results confirm this, with significance coefficients (sig.) consistently below 0.001 for the different degrees of freedom tested ($df = 1, 24$ to $df = 4, 21$).

Table no. 3. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	341,460	1	341,460	18,613	,000[b]
	Residual	440,290	24	18,345		
	Total	781,749	25			
2	Regression	497,787	2	248,893	20,160	,000[c]
	Residual	283,963	23	12,346		
	Total	781,749	25			
3	Regression	589,599	3	196,533	22,502	,000[d]
	Residual	192,150	22	8,734		
	Total	781,749	25			
4	Regression	689,430	4	172,357	39,206	,000[e]
	Residual	92,320	21	4,396		
	Total	781,749	25			

a. Dependent Variable: Sales value
b. Predictors: (Constant), Fixed Assets
c. Predictors: (Constant), Fixed Assets, Inventory
d. Predictors: (Constant), Fixed Assets, Inventory, Receivables
e. Predictors: (Constant), Fixed Assets, Inventory, Receivables, Number of Employees

Table 4 provides a concise overview of the regression analysis coefficients. Furthermore, a collinearity analysis, examining tolerance and VIF values, indicated no significant multicollinearity among the variables. Notably, with the exception of the t-test results for fixed assets and inventories in Model 4, all other variable coefficients showed statistical significance.

Table no. 4. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3,828	1,000		3,830	,001	1,765	5,891		
	FA	1,585	,367	,661	4,314	,000	,827	2,344	1,000	1,000
2	(Constant)	1,099	1,123		,979	,338	-1,224	3,422		
	FA	,835	,368	,348	2,268	,033	,073	1,596	,671	1,490
	I	5,732	1,611	,546	3,558	,002	2,400	9,065	,671	1,490
3	(Constant)	1,100	,944		1,164	,257	-,859	3,058		
	FA	1,071	,318	,446	3,367	,003	,411	1,730	,636	1,572
	I	3,638	1,501	,346	2,424	,024	,525	6,751	,547	1,829
	R	2,427	,748	,380	3,242	,004	,874	3,979	,813	1,229
4	(Constant)	-,286	,730		-,392	,699	-1,805	1,233		
	FA	,241	,285	,100	,846	,407	-,352	,834	,399	2,509
	I	1,045	1,196	,100	,874	,392	-1,441	3,532	,434	2,306
	R	1,768	,549	,277	3,222	,004	,627	2,909	,762	1,313
	NoE	,941	,197	,663	4,765	,000	,530	1,351	,291	3,438

a. Dependent Variable: SV

The hierarchical regression analysis (Table 5) revealed the incremental impact of each variable on sales value. Initially, fixed assets alone explained a significant 44% of the variance in sales value ($R2 = 0.44$, $\Delta R2 = 0.44$, $F(1,24) = 18,61$, $p < .001$), demonstrating a significant positive effect ($\beta = 0.66$, CI = 0.83, 2.34, $p < .001$), thus confirming our initial prediction.

Subsequently, including inventory in the Model 2 significantly increased the explained variance to 64% ($R2 = 0.64$, $\Delta R2 = 0.20$, $F(2,23) = 12,66$, $p < .01$), with inventory also significantly predicting sales value ($\beta = 0.55$, CI = 2.40, 9.07, $p < .01$), supporting our prediction for this variable as well.

The addition of receivables to the model (Model 3) further improved the prediction of sales value, accounting for 75% of the variance ($R2 = 0.75$, $\Delta R2 = 0.12$, $F(3,22) = 10.51$, $p < .01$). Receivables also significantly predicted sales value ($\beta = 0.38$, CI = 0.87, 3.98, $p < .01$), indicating a significant association as predicted.

Finally, the introduction of the number of employees in Model 4 led to the largest increase in explained variance, reaching 88% ($R2 = 0.88$, $\Delta R2 = 0.13$, $F(4,21) = 22.71$, $p < .001$). The number of employees also significantly predicted sales value ($\beta = 0.66$, CI = 0.53, 1.35, $p < .001$), corroborating our prediction for this final factor.

Tabel no. 5. Results of the hierarchical regression analysis

Variables	Model 1		Model 2		Model 3		Model 4	
	β	CI: 95%	*β*	CI: 95%	*β*	CI: 95%	*β*	CI: 95%
Fixed Assets	0.66***	0.83, 2.34	0.35*	0.07, 1.60	0.45**	0.41, 1.73	0.1	-0,35, 0,83
Inventory			0.55**	2.40, 9.07	0.35*	0.53, 6.75	0.1	-1,44, 3,53
Receivables					0.38**	0.87, 3.98	0.28**	0,63, 2,91
Number of employees							0.66***	0,53, 1,35
Model fit statistics								
F-value	18.61***		12.66**		10.51**		22.71***	
R^2	.44		.64		.75		.88	
ΔR^2	.44		.20		.12		.13	

To explore the potential mediating role of the number of employees in the relationship between fixed assets and sales value, we analyzed the data presented in Tables 6 and 7 and Figure 1. The results suggest that there is no significant direct link between fixed assets and sales value (β = - 0.01, sig = 0.941). However, significant indirect effects were observed, indicating that the number of employees fully mediates the relationship between these two variables.

Table no. 6. Summary of the regression analysis and its coefficients

Path	*β*	SE	Sig
X → M	0.74	0.27	.000
X → Y (total)	0.66	0.31	.000
X → Y (direct)	-.01	0.39	.941
M → Y	0.91	0.32	.000

Legend:
- X = Fixed Assets
- Y = Sales value
- M = Number of employees

Table no. 7. Indirect (mediation) effect analysis

Path	Effect	SE	$LL_{95\%}$	$UL_{95\%}$
X → M → Y	0.67	0.16	0.36	1.05

Notes. LL = lower limit of a 95% confidence interval. UL = upper limit of 95% confidence interval.

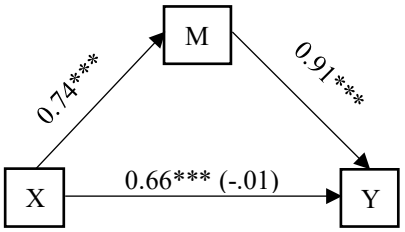

Figure no. 1. The mediation of number of employees between fixed assets and sales value

*Notes. *p < .05, **p < .01, ***p < .001. Standardized coefficients are used.*
The coefficient in parentheses reflects the direct effect (with the mediator included).

Although our analysis did not find a significant effect of receivables on the number of employees, we investigated the potential moderating role of receivables in the relationship between the number of employees and sales value. Table 8 reveals a significant interaction between the number of employees and receivables in predicting sales value, a finding visually supported by Figure 2. This indicates that receivables strengthen the positive relationship between the number of employees and sales value, with higher levels of receivables leading to a stronger association.

Table no. 8. Summary of the regression analysis and its coefficients

Predictor	*b*	SE	Sig
Number of employees	1.19	0.09	.000
Receivables	0.53	0.61	.387
Interaction	0.28	0.10	.008

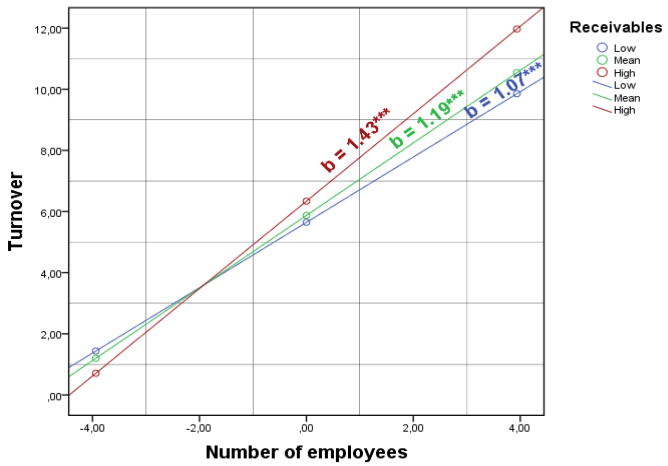

Figure no. 2. Relation between number of employees and sales value moderated by receivables

To understand a more complex relationship, we examined a moderation-mediation model where the effect of fixed assets on sales value is mediated by the number of employees and moderated by receivables (Figure 3, Tables 9 and 10). The results reveal that receivables significantly moderate the relationship between fixed assets and the number of employees. This is evidenced by a significant and negative interaction effect between fixed assets and receivables (b = -6.71, sig. = 0.000).

Table no. 9. Summary of the regression analysis and its coefficients

Predictor	*b*	SE	Sig
Fixed assets	0.11	0.23	0.64
Receivables	0.87	0.34	0.02
Interaction	-6.71	1.11	0.00

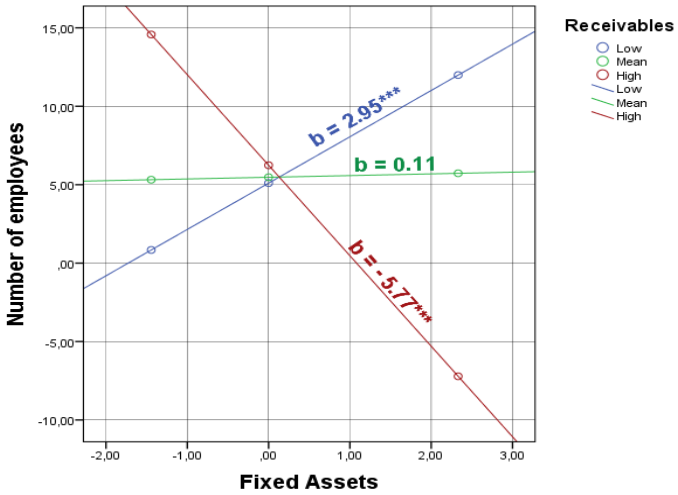

Figure no. 3. Relation between fixed assets and number of employees moderated by receivables

Our findings indicate that the level of receivables significantly influences the relationship between fixed assets and the number of employees. When receivables are low, fixed assets have a positive and significant impact on the number of employees. Conversely, high receivables are associated with a strong negative and significant effect of fixed assets on the number of employees. At the average level of receivables, the effect of fixed assets on the number of employees becomes small and statistically insignificant.

Table 10 provides a concise overview of the moderated-mediation relationship where fixed assets influence sales value through the number of employees, with receivables acting as a moderator. Regarding direct effects, we found a significant positive relationship between the number of employees and sales value, and a significant negative relationship between the interaction of fixed assets and receivables on the number of employees. However, the direct effects of fixed assets on both the number of employees and sales value were not significant. Examining indirect effects, neither the direct nor indirect paths between fixed assets,

the number of employees, and sales value were significant. The analysis of indirectly moderated relationships revealed a significant positive relationship at low levels of receivables and a non-significant strong negative relationship at high levels of receivables. The moderated mediation index was significantly negative. In conclusion, our findings suggest that the interplay of the number of employees and receivables significantly influences the relationship between fixed assets and sales value.

Table no. 10. Reporting Moderated Mediation

Direct relationships	**Unstandardized coefficient**	**t-values**	**Sig.**
Fixed assets → Number of employees	0.108	0.474	0.640
Number of employees → Sales value	1.288	4.076	0.001
Fixed assets → Sales value	-0.029	-0.075	0.941
Fixed assets x Receivables → Number of employees	-6.714	-6.040	0.000
Indirect relationships	**Direct effect**	**Indirect effect (SE)**	**Confidence interval**
Fixed assets → Number of employees → Sales value	-0.029	0.139 (1.21)	-0.83, 0.78
Probing moderated indirect relationships	**Effect**	**SE**	**Confidence interval**
Low level of Receivables	3.80	1.26	1.66, 6.49
High level of Receivables	-7.43	3.95	-13.25, 4.27
Index of moderated mediation	-8.65	3.56	-14.62, -0.001

Conclusions

To summarize, we found evidence of a moderated-mediation relationship where the effect of fixed assets (including stores, warehouses, and essential physical and online operational equipment) on sales value is contingent on both the number of employees and the level of receivables in the analyzed firms. This relationship is negative, suggesting that higher levels of employees and receivables amplify the negative impact of increased fixed assets on sales value.

This research investigated the key drivers of revenue for Romania's leading retail firms, focusing on fixed assets, inventories, receivables, and employee numbers. The findings reveal that these factors significantly account for differences in sales value, each with a distinct impact. Specifically, fixed assets initially show a strong positive effect on revenue, although this effect diminishes with the inclusion of other variables.

The study also highlights the importance of stock levels and receivables, underscoring the critical role of efficient inventory management and supporting financial liquidity for retail success. Furthermore, the number of employees acts as a mediating factor, suggesting that effective workforce management amplifies the benefits of asset utilization.

The moderated mediation analysis provides a critical insight: the level of receivables enhances the positive impact of employee numbers on sales value. This highlights the importance of maintaining financial stability as a driver of business growth. These conclusions carry notable ramifications for both theoretical models of retail performance and practical management strategies.

From a theoretical standpoint, this study contributes to the existing knowledge of retail performance by illuminating the dynamic interaction between financial and operational factors. For practitioners, it provides crucial insights for optimizing asset allocation, refining inventory control strategies, and enhancing workforce capabilities. Given the growth of the Romanian retail sector and the need to navigate economic hurdles, digitalization, and changing consumer demands, future research should prioritize investigations into digitalization's impact, evolving consumer behavior, and the influence of macroeconomic variables on retail. Sustainable growth and competitiveness in this sector depend on a holistic strategy that integrates effective asset management, human resource development, and sound financial planning.

Acknowledgement(s):

„This paper was co-financed by The Bucharest University of Economic Studies"

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