

R&D Intensity and Financial Performance in the Pharmaceutical Industry: An Econometric Study of the Algerian Company Saidal and the Tunisian Company Adwya (2006–2022)

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Abstract

This study aims to examine the relationship between R&D intensity and the financial performance of the Algerian company Saidal and the Tunisian company Adwya. Both firms operate in the pharmaceutical industry. The study covers the period 2006–2022. Hierarchical linear regression was used to analyze the relationship between R&D intensity and financial performance. Financial performance was measured by return on equity (ROE), return on assets (ROA), and return on sales (ROS). Financial leverage was included as a control variable.

The empirical results revealed a negative relationship between R&D intensity and the financial performance indicators in both firms. The level of statistical significance varied by firm and by performance indicator. The inclusion of financial leverage increased the explanatory power of most models. Financial leverage was also negatively related to financial performance and was statistically significant in most models. The findings indicate that the high financial costs of R&D investment, together with the nature of this type of investment, may delay the emergence of positive effects on

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financial performance. The study also provides findings that may guide pharmaceutical firms in aligning their R&D strategies with firm objectives to achieve future financial returns.

Keywords: R&D intensity; financial performance; Saidal; Adwya.

JEL Classification: O32; L25; L65

1. Introduction

Firms operating in technology-based sectors face uncertain and competitive environments. They therefore need to improve their business performance to ensure their survival in the market. This requires the continuous introduction of new products and services. It also requires the development of new production methods to meet customer needs and achieve customer satisfaction.

Many large firms have recognized that sustaining competitive advantage requires the continued development of their businesses and products. Investment in R&D can enable firms to create unique, superior, competitive, and difficult-to-imitate products. It can also help them satisfy customer preferences. Several studies have shown that greater R&D spending is an effective strategy for improving firm performance and increasing long-term value.

This study empirically examines the relationship between R&D intensity and firm financial performance. Many previous studies have shown that industrial firms need to invest in R&D to strengthen their innovation capacity and improve financial performance. The present study tests the nature of this relationship in two pharmaceutical firms: Saidal in Algeria and Adwya in Tunisia. The sector in which the two firms operate faces increasing competitive pressure. R&D is therefore important for product development and for improving financial performance. The study covers the period 2006–2022.

The study seeks to answer the following research question:

Is there a relationship between R&D intensity and financial performance at Saidal in Algeria and Adwya in Tunisia during the period 2006–2022?

Study Hypotheses

The research question is addressed through the following hypotheses:

- There is a statistically significant relationship between R&D intensity and financial performance, measured by return on equity (ROE), at Saidal and Adwya.
- There is a statistically significant relationship between R&D intensity and financial performance, measured by return on assets (ROA), at Saidal and Adwya.
- There is a statistically significant relationship between R&D intensity and financial performance, measured by return on sales (ROS), at Saidal and Adwya.
- There is a statistically significant relationship between financial leverage and financial performance at Saidal and Adwya.

Study Methodology

This study tests and analyzes the relationship between R&D intensity and firm financial performance. Financial performance is measured by ROE, ROA, and ROS. A quantitative approach was adopted to

analyze the numerical data for the study variables. Hierarchical linear regression was used to test the relationship. The resulting findings were then discussed and analyzed.

Previous Studies

A number of previous studies were used to formulate the research problem. Some of the most relevant studies are presented below.

Wan et al. (2025) analyzed the effect of R&D investment on firm performance. Their sample included pharmaceutical manufacturing firms listed on the Shanghai and Shenzhen stock exchanges from 2012 to 2022. The study also examined the potential mediating role of corporate governance. The findings confirmed that R&D investment can enhance firm performance.

Arif and Lubor (2023) examined the relationship between the financial performance of pharmaceutical firms and pharmaceutical R&D investment in Europe. The study used regression analysis and considered the lagged effect of R&D expenditure on operating profit. The results showed a strong and positive relationship between R&D expenditure in the previous year and operating profit in the current year in European countries.

Kruglov and Shaw (2024) examined the relationship between R&D intensity, as a measure of innovation, and the financial performance of S&P 500 firms over the period 1998–2023. The analysis identified varied associations between innovation and key financial indicators. These indicators included firm size, assets, earnings before interest and taxes, and tangibility. The findings emphasize the importance of innovation in strengthening firm competitiveness and market position.

2. Theoretical Framework of the Study

Since the 1960s, the global economy has experienced major changes and critical periods. These changes have resulted from intense competition among firms, globalization, the expansion of multinational companies, and rapid technological progress. Technological progress has increasingly focused on developing new products and services to meet market needs. This has increased the importance of investment in intellectual capital, which supports innovation and creativity. Within the firm, this is reflected in R&D activity. This section defines R&D and explains its importance. It then examines the relationship between the level of R&D expenditure and firm performance.

2.1 Basic Concepts

R&D undertaken in the field of technological innovation is an effort to create or develop new technologies that are better, more effective, and more efficient. It can enable firms to generate products or services that were not previously available. It can also improve existing products or services. In this way, R&D supports management policies aimed at competitiveness, business continuity, and growth.

2.1.1 Definition of Research and Development

The International Accounting Standards Board (IASB), in paragraph 8 of IAS 38 issued in 2009, defines research as planned research or original investigation undertaken to discover new knowledge and obtain future benefits. These benefits may arise from improving a new product or service or from achieving a substantial advance in an existing product or process. Development is defined as the translation or application of research results or knowledge into a plan, the design of a new product, a new process, or a substantial improvement in an existing product or service intended for sale or use. Development also

includes major design modifications, testing product alternatives, and producing prototypes or pilot processes (IASB, 2012, p. 1493).

According to the Frascati Manual, R&D includes creative work undertaken systematically to increase the stock of knowledge, including scientific and technological knowledge, and to use this knowledge for new applications (OECD, 2002). It includes basic research, applied research, and experimental development directed toward producing new materials, products, or devices, or establishing new processes and service systems (AASB, 2015). The same source excludes several activities from R&D. These include engineering follow-up at an early stage of commercial production, quality control during commercial production, routine product testing, and troubleshooting related to failures during commercial production.

According to Statement of Financial Accounting Standards No. 2 (FASB, 1974), R&D expenditure includes the following items:

- Salaries, wages, and other related costs of employees engaged in R&D activities.
- The cost of materials and services consumed in R&D activities.
- Depreciation of buildings, equipment, and facilities, together with amortization of other assets such as patents and licenses.
- Overhead costs related to R&D activities and payments to external bodies, such as research laboratories and universities, for R&D projects associated with the firm.
- Expenditure incurred to obtain patents for new products or processes.
- Other costs directly related to R&D activities that can be identified with specific projects.

Under IAS 38, R&D expenditure is, in some cases, recognized under the category of “intangible assets” (IFRS Foundation, 2024).

2.1.2 Measurement of Firm Financial Performance

Performance measurement helps a firm shape its future by comparing actual results with strategic objectives. Lebas (1995) defines performance as the achievement of stated objectives on time and within the firm’s constraints. Neely et al. (1995) relate performance to the efficiency and effectiveness of the actions taken by the firm. Performance measurement can therefore be defined as the set of measures used to determine the efficiency and effectiveness of those actions.

Firm performance is often assessed through simple outcome-based financial indicators. These indicators are assumed to reflect the achievement of the firm’s economic objectives. This is known as financial performance. It is examined through indicators such as sales growth and profitability. Profitability is reflected in ratios such as return on investment, return on sales, return on equity, and return on assets.

These indicators are accounting-based measures that rely mainly on information reported in financial statements. Lebas (1995) argues that they provide historical information that can help anticipate the future under similar conditions. This differs from the broader concept of performance. Under that view, a high-performing firm is one that will achieve its future objectives, rather than one that has merely achieved its past objectives. This perspective encouraged the use of market-based and value-based measures. Examples include earnings per share, Tobin’s Q, and the market-to-book ratio (Venkatraman & Ramanujam, 1986).

Despite the criticism directed at financial measures, most performance studies continue to rely on them. Return on equity (ROE), return on assets (ROA), and return on sales (ROS) are commonly used to measure firm growth and profitability. Additional measures related to firm R&D activities may also be included to assess innovation effectiveness.

2.1.3 Measurement of R&D Intensity

R&D intensity refers to the scale of investment in research and development. It may be measured as the ratio of R&D expenditure to total sales (Chen et al., 2019).

R&D investment is closely related to a firm's ability to innovate, survive, and remain in the market. Firms therefore need methods to track and monitor the changes and improvements generated by R&D activities. They also need to evaluate the effectiveness of their R&D programs. A major challenge is to align R&D measures used at different levels and functions of the R&D department with the performance measures used by senior executives. For example, a laboratory researcher may use the number of patents as an indicator of achievement. Such an indicator should have a corresponding financial interpretation for the chief executive (Schwartz et al., 2011).

In the early 1970s, R&D performance measures focused on three main elements (Kulatunga et al., 2006):

- The number of purely technical outputs, such as patents, technical publications, or citations to technical publications.
- Financial returns attributable to R&D, including profits and sales.
- Reports on the success of individual R&D projects.

Although there is a growing need to use non-financial indicators to measure performance in firms and project management, firms still rely on financial indicators to evaluate R&D performance. Non-financial approaches include balanced scorecard dimensions that focus on the firm's strategic objectives. These measures are influenced by factors such as competition, industry type and characteristics, and firm size (Ojanen & Vuola, 2003).

2.2 Relationship Between R&D Intensity and Financial Performance

Researchers have conducted many empirical studies on the relationship between R&D intensity and firm financial performance. Early studies mainly examined firms in developed economies, such as the United States and the European Union. Griliches (1998), in a series of studies conducted during the 1980s and 1990s, found a strong positive relationship between R&D expenditure and financial performance. Apergis and Sorros (2014) examined U.S. energy firms over the period 1990–2011. They found that R&D expenditure had a stronger effect on profitability, particularly among firms producing renewable energy. Pourkarimi and Kam (2022) reached a similar conclusion using a sample of 150 manufacturing and non-manufacturing firms in the U.S. information and communications technology sector over ten years. Their quantitative results showed a substantial positive effect of R&D on firm performance. Revenue increased by 22% for each dollar invested in R&D. Arif and Lubor (2023) also found a strong and positive relationship between prior-year R&D expenditure and current-year operating profit among European pharmaceutical firms. They indicated that this effect would become more visible in subsequent years. González-Tejero et al. (2025) analyzed 296 observations from 80 global pharmaceutical companies over

the period 2011–2022. They found that increased R&D investment significantly enhanced company performance.

The positive relationship between R&D intensity and financial performance reported in many empirical studies does not exclude the opposite view. The relationship may be negative in the short term. This negative effect may continue in subsequent years because R&D costs are high, particularly in firms with low levels of innovation. Several empirical studies have documented this negative effect (Zhu & Huang, 2012). Tahinakis and Samarinas (2012), for example, examined a large sample of Greek firms over the period 2005–2010. They found a strong negative relationship between R&D intensity and firm growth, future development, and market value. The authors linked this negative relationship to the severe economic crisis in Greece. They also argued that investors may regard R&D spending as an additional expense when firms are unable to convert its outcomes into innovation and growth in the near term and in the future.

He and Estébanez (2023) reported similar findings for firms operating in the information and communications technology services industry in China over the period 2011–2020. Their empirical results showed that R&D expenditure negatively affected firm performance and current market value. The sampled firms were small and medium-sized enterprises. These firms may require more time than large firms in developed economies to convert R&D investment into growth in market value. Eldawayaty (2020) also found a negative relationship between R&D intensity, financial performance indicators, and firm value among pharmaceutical companies listed on the Egyptian Stock Exchange. The study attributed this relationship to the relatively long period required before the positive outcomes of R&D investment become visible. The positive effects of R&D intensity may therefore emerge only in the long term. A time gap may exist between R&D investment and the return on that investment because some R&D outputs are slow to materialize and may only be used after a relatively long period. This may be particularly relevant for small and medium-sized firms operating in highly competitive environments.

3. Empirical Study

One of the main objectives of this study is to identify the nature of the relationship between R&D intensity and firm financial performance. To achieve this objective, the empirical analysis focuses on two firms operating in the pharmaceutical industry. Saidal is an Algerian company engaged in the manufacture and marketing of pharmaceutical products. Adwya is a Tunisian company operating in the same field. The study covers the period 2006–2022.

3.1 Description of the Study Method

This study tests the nature of the relationship between R&D investment and financial performance at Saidal and Adwya. R&D investment is represented by R&D intensity as the independent variable. Financial performance is represented by return on equity (ROE), return on assets (ROA), and return on sales (ROS) as the dependent variables. Financial leverage is included as a control variable. It reflects the extent to which financial performance may be affected by the firm's obligations and, consequently, the level of risk the firm may face (Chao-Hung Wang, 2011).

The study uses time-series data covering the period 2006–2022.

The data presented in Table 1 were obtained from the annual reports of Saidal and Adwya available on the two companies' websites.

Table 1. Definition and Measurement of the Study Variables

Variable code	Variable	Unit / operational definition
ROE	Return on equity (%)	(Net income / total equity) $\times$ 100
ROA	Return on assets (%)	(Net income / total assets) $\times$ 100
ROS	Return on sales (%)	(Net income / total sales) $\times$ 100
RD	R&D intensity (%)	(Intangible assets / total sales) $\times$ 100
LEV	Financial leverage (%)	(Total debt / total assets) $\times$ 100

Source: Authors' compilation based on previous references and the financial reports of the firms under study.

Intangible assets were used as a proxy for the scale of R&D investment. The annual financial reports of the two firms indicate that intangible assets consist mainly of development costs, concessions, patents, licenses, and trademarks (SAIDAL, 2018; ADWYA, 2018).

3.2 Econometric Model Specification

To examine the relationship between R&D intensity and financial performance, the study uses a hierarchical linear regression model. Financial performance is the dependent variable and is represented by ROE, ROA, and ROS. R&D intensity is the independent variable, while financial leverage is included as a control variable.

The following models were estimated:

$$ROE_t = \alpha + \beta_1 RD_t + \beta_2 LEV_t + \varepsilon_t$$

$$ROA_t = \alpha + \beta_1 RD_t + \beta_2 LEV_t + \varepsilon_t$$

$$ROS_t = \alpha + \beta_1 RD_t + \beta_2 LEV_t + \varepsilon_t$$

Where:

α : constant term.

β : regression coefficients.

ε : random error term.

4. Results of the Empirical Study

The descriptive results show the level of R&D intensity at Saidal in Algeria and Adwya in Tunisia. Multiple linear regression is then used to examine the relationship between the independent variable, R&D intensity, and the dependent variables, represented by the financial performance indicators, for the two firms.

4.1 Analysis of the Evolution of R&D Intensity in the Two Firms Under Study

Saidal is an Algerian company specializing in the production of generic medicines and antibiotics, as well as the development, production, and marketing of pharmaceutical products. Adwya is a Tunisian company operating in various areas of pharmaceutical manufacturing under licenses and partnerships

with international pharmaceutical laboratories. It also carries out development, production, wholesale distribution, and distribution activities.

Table 2 presents the descriptive statistics for the independent variable, R&D intensity, and the dependent variables, represented by the financial performance indicators, at Saidal and Adwya over the period 2006–2022.

Table 2. Descriptive Statistics for R&D Intensity and Financial Performance Indicators at Saidal in Algeria and Adwya in Tunisia, 2006–2022

Variable	N	Min Saidal	Min Adwya	Max Saidal	Max Adwya	Mean Saidal	Mean Adwya	SD Saidal	SD Adwya
R&D intensity (%)	17	0.02	2.92	1.85	4.22	0.46	3.48	0.55	0.38
ROE (%)	17	-14.61	-19.40	34.23	32.83	9.46	15.64	10.40	13.63
ROA (%)	17	-6.79	-5.90	12.39	14.92	4.04	6.25	4.16	5.33
ROS (%)	17	-19.28	-6.43	23.19	10.76	10.86	5.05	9.68	0.38

Source: Authors' calculations based on SPSS v27 output.

Table 2 shows the following:

R&D intensity:

At Saidal, mean R&D intensity was 0.46%, with a standard deviation of 0.55. The minimum value was 0.02%, and the maximum value was 1.85%.

At Adwya, mean R&D intensity was 3.48%, with a standard deviation of 0.38. The minimum value was 2.92%, and the maximum value was 4.22%.

For comparison, Sertkaya et al. (2024) reported an average R&D intensity of 18.4% among large U.S. pharmaceutical companies during 2008–2019. Across global pharmaceutical firms, the average ranged from 12% to 16% during 2012–2019. This level was very high compared with spending in other vital and technology-related sectors (Keelara et al., 2023). Global pharmaceutical R&D intensity reached 30% in 2021 during the COVID-19 pandemic (IFPMA, 2024). These figures show that R&D intensity at Saidal and Adwya, at 0.46% and 3.48%, respectively, was low. It was particularly low at Saidal.

Financial performance indicators:

At Saidal, mean ROE was 9.46% and mean ROA was 4.04%. Mean ROS was 10.86% over the period 2006–2022. The minimum values of these indicators were -14.61%, -6.79%, and -19.28%, respectively. The company's annual financial reports indicate that all three return measures declined gradually during 2019–2022. The year 2022 was the worst financial year, with negative net profit of DZD 2,815.03 million.

At Adwya, mean ROE was 15.64% and mean ROA was 6.25%. Mean ROS was 5.05% over the period 2006–2022.

A comparison of the return measures for Saidal and Adwya with the average return measures of firms in the global pharmaceutical industry shows the following:

The global average ROE fluctuated over time. This reflects differences in profitability, R&D costs, and market conditions across periods. ROE levels also vary across regions and markets because firm size, financing structure, and competitive conditions differ. Nevertheless, the global pharmaceutical industry remains profitable (OECD, 2018). ROE reached its lowest level, 8.02%, in 2019 and its highest level, 16.90%, in 2013. The average was 11.83% over the period 2012–2023 (Damodaran, 2025). In European pharmaceutical firms, ROE was low at 6.1% during 2019–2024 (Statista Research Department, 2025). In the United States, the rate was stable at 12.49% during 2012–2023.

Compared with this average, Sidal's mean ROE of 9.46% was below the global sector average calculated for the period, while Adwya's mean ROE of 15.64% was above it.

The average global ROA for pharmaceutical firms during 2012–2022 was estimated at 5.57%. A negative value of -7% was recorded in 2015. The highest value, 19.9%, was recorded in 2016 (Damodaran, 2025). The study notes that Sidal's ROA was lower than the global average by approximately half.

Compared with this average, Sidal's mean ROA of 4.04% was below the sector reference level, while Adwya's mean ROA of 6.25% was above it.

For ROS, the global average in the pharmaceutical industry was 12.88% during 2012–2023 (Damodaran, 2025). The indicator reached its highest levels in 2015 and 2022, at 16.10% and 15.04%, respectively. Each time, however, it returned to more stable and lower levels because of high R&D costs.

Compared with this average, Sidal's mean ROS of 10.86% was below the sector average, while Adwya's mean ROS of 5.05% was substantially lower.

4.2 Analysis of Correlations Among the Study Variables

Pearson's correlation coefficient was used as a parametric test to measure the correlations among the study variables. The analysis was conducted using SPSS v27. The results are presented in Table 3.

Table 3. Correlation Coefficients Between R&D Intensity and the Study Variables

Firm	RD/ROE	RD/ROA	RD/ROS	RD/Leverage
Sidal	-0.464*	-0.485**	-0.411	0.145
Adwya	-0.482**	-0.481*	-0.481*	0.440

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on SPSS v27 output.

The results indicate negative correlations between R&D intensity and the financial performance indicators in both firms, although the level of statistical significance varies. There was no statistically significant correlation between R&D intensity and financial leverage.

4.3 Analysis of the Hierarchical Linear Regression Results

Hierarchical linear regression was used to test the hypotheses for the two firms and to assess the effect of the independent variable on the dependent variables. The results showed no multicollinearity problem. VIF values ranged from 1.022 to 1.240, which are low. Residual plots supported the assumptions of residual normality and homoscedasticity. The analysis could therefore proceed to estimation of the hierarchical linear regression models. Durbin-Watson statistics ranged from 0.775 to 1.745 across the estimated models.

Table 4 presents the hierarchical multiple regression results for Saidal in Algeria. It shows the effect of the independent variable on the dependent variables before and after the control variable is included.

Table 4. Hierarchical Regression Coefficients for the Effect of R&D Intensity on Financial Performance Indicators at Saidal, 2006–2022

Dependent variable	Model	R ²	ΔR^2	β RD	Sig.	β Leverage	Sig.
ROE	1	0.216	–	-0.464	0.060*	–	–
	2	0.432	0.216	-0.396	0.072*	-0.470	0.037**
ROA	1	0.235	–	-0.485	0.049**	–	–
	2	0.542	0.307	-0.403	0.045**	-0.560	0.008**
ROS	1	0.169	–	-0.411	0.102	–	–
	2	0.710	0.541	-0.303	0.056*	-0.744	<0.001***

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on SPSS v27 output.

The hierarchical regression results for the period 2006–2022, presented in Table 4, are as follows:

Return on equity (ROE): In Model 1, R&D intensity had a negative and statistically significant effect at the 10% level. The coefficient of determination was $R^2 = 0.216$. This indicates that 21.6% of the change in ROE can be explained by R&D intensity. After financial leverage was included, the explanatory power of the model increased to 43.2%. The negative effect of R&D intensity remained significant at the 10% level. Financial leverage also had a negative effect and was significant at the 5% level.

Return on assets (ROA): In Model 1, R&D intensity had a negative and statistically significant effect at the 5% level. This effect explained 23.5% of the change in ROA. After financial leverage was included, the explanatory power increased to 54.2%. The negative and significant effects of both R&D intensity and financial leverage remained at the 5% level.

Return on sales (ROS): Model 1 had an explanatory power of 16.9%, but the effect of R&D intensity was not statistically significant. After financial leverage was included in Model 2, the explanatory power increased to 71.0%. The effect of R&D intensity became negative and statistically significant at the 10% level. Financial leverage had a negative effect and was significant at the 1% level.

These results indicate that R&D intensity was negatively related to all three financial performance indicators at Saidal. The level of statistical significance varied across indicators. The inclusion of financial leverage clearly increased the explanatory power of the models.

Table 5 presents the hierarchical multiple regression results for Adwya in Tunisia. It shows the effect of the independent variable on the dependent variables before and after the control variable is included.

Table 5. Hierarchical Regression Coefficients for the Effect of R&D Intensity on Financial Performance Indicators at Adwya, 2006–2022

Dependent variable	Model	R ²	ΔR^2	β RD	Sig.	β Leverage	Sig.
ROE	1	0.233	–	-0.482	0.050**	–	–
	2	0.356	0.123	-0.311	0.214	-0.391	0.124

ROA	1	0.231	–	-0.481	0.051*	–	–
	2	0.401	0.170	-0.279	0.246	-0.459	0.066*
ROS	1	0.232	–	-0.481	0.051*	–	–
	2	0.374	0.142	-0.297	0.228	-0.420	0.096*

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on SPSS v27 output.

The hierarchical regression results for the period 2006–2022, presented in Table 5, are as follows:

Return on equity (ROE): In Model 1, R&D intensity had a negative and statistically significant effect at the 5% level. The coefficient of determination was $R^2 = 0.233$. This indicates that 23.3% of the change in ROE can be explained by R&D intensity. After financial leverage was included, the explanatory power increased to 35.6%. However, the effects of both R&D intensity and financial leverage became statistically non-significant.

Return on assets (ROA): In Model 1, R&D intensity had a negative and statistically significant effect at the 10% level. The coefficient of determination was $R^2 = 0.231$. This indicates that 23.1% of the change in ROA can be explained by R&D intensity. After financial leverage was included, the explanatory power increased to 40.1%. The effect of R&D intensity became statistically non-significant. Financial leverage showed a negative and significant effect at the 10% level.

Return on sales (ROS): In Model 1, R&D intensity had a negative and statistically significant effect at the 10% level. The coefficient of determination was $R^2 = 0.232$. This indicates that 23.2% of the change in ROS can be explained by R&D intensity. After financial leverage was included, the explanatory power increased to 37.4%. The effect of R&D intensity became statistically non-significant. Financial leverage had a negative and significant effect at the 10% level.

A comparison of Saidal and Adwya shows a negative relationship between R&D intensity and the financial performance indicators in both firms. This relationship was more evident in terms of statistical significance at Saidal, especially after financial leverage was included. The explanatory power of the models increased in both firms after financial leverage was introduced. At Adwya, however, the relationship became statistically non-significant.

5. Discussion

This study shows a negative relationship between R&D intensity and the financial performance indicators at Saidal and Adwya. The level of statistical significance differs by firm and by financial performance indicator. These findings are consistent with several previous studies, including Eldawayaty (2020), Zhu and Huang (2012), and Tahinakis and Samarinas (2012). Some studies attribute the negative relationship to the relatively long period required before R&D investment produces positive results. Others attribute it to the high costs of research and experimentation, which some firms may be unable to bear. These costs may therefore negatively affect current financial results. By contrast, other studies report a positive relationship between R&D investment and firm financial performance. González-Tejero et al. (2025), for example, reported that increased R&D investment significantly enhances company performance. Arif and Lubor (2023) suggested that this positive effect may emerge quickly and continue for several subsequent years.

At Saidal and Adwya, R&D intensity was low, particularly at Saidal. The average was 0.46% at Saidal, compared with 3.48% at Adwya. These levels are low and may limit the ability of both firms to generate financial returns from R&D investment.

The results also show that the inclusion of financial leverage increased the explanatory power of the models. Financial leverage had a negative and statistically significant relationship with financial performance in several models. This finding indicates the importance of financial structure in explaining variation in the financial performance of the two firms.

The study hypotheses can therefore be addressed as follows:

The relationship between R&D intensity and financial performance was negative, but its statistical significance varied by firm and performance indicator. Some results were also affected by the inclusion of financial leverage. The first three hypotheses are therefore partially supported.

For the fourth hypothesis, financial leverage was negatively and significantly related to all three financial performance indicators at Saidal. At Adwya, it was negatively and significantly related to ROA and ROS, but was not statistically significant in relation to ROE. The fourth hypothesis is therefore partially supported.

6. Conclusion

This study aimed to analyze the relationship between R&D intensity and financial performance, measured by return on equity (ROE), return on assets (ROA), and return on sales (ROS), at Saidal in Algeria and Adwya in Tunisia. Both firms specialize in the production and marketing of pharmaceutical products. The analysis used data from the annual reports issued by the two firms over the period 2006–2022. The main findings are presented below:

- R&D intensity was negatively related to the performance indicators in both firms, Saidal and Adwya. The level of statistical significance differed by firm and by financial performance indicator. Financial leverage improved the explanatory power of most models and showed a negative relationship in several models.
- The negative relationship between R&D intensity and financial performance may be due to the nature of this type of investment, which is characterized by high financial costs. R&D may consume a greater share of the firm's limited financial resources. Its positive effects may not become visible until many years later.
- The study recommends strengthening R&D investment to create genuine innovation opportunities that can generate revenue and profits over the long term in a highly competitive pharmaceutical sector.

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