

Market Cap 458.635B
 52-Wk High 105.69
 52-Wk Low 62.41
 P/E Ratios 41.7

Novo Nordisk (A/S)

BUY: \$ 98.00

14th December 2023



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Company Description

Novo Nordisk is a global healthcare company, headquartered near Copenhagen, Denmark, stands as the undisputed global leader in insulin manufacturing and distribution, with a substantial market cap of 2.4 billion.

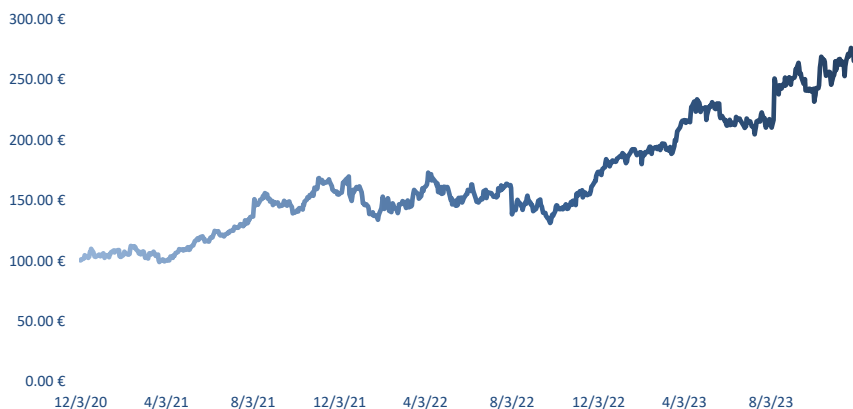
Founded in 1923, the company has been producing medications for a spectrum of chronic diseases, including diabetes, obesity, rare blood disorders, and endocrine conditions like hemophilia. Novo Nordisk is renowned for its expertise in crafting therapeutic solutions for growth disorders and hormone replacement therapy.

Going beyond a diverse product portfolio, Novo Nordisk remains committed to delivering accessible and affordable healthcare solutions for individuals grappling with chronic illnesses. The company's mission extends beyond treatment, actively engaging in preventive measures against conditions such as type 2 diabetes and obesity.

(\$million)	FY19A	FY20A	FY21A	FY22A
Gross profit	15,279	16,241	18,637	21,028
EBITDA	8,715	9,173	10,288	11,635
EBIT	7,867	8,292	9,330	10,592
Net Income	8,838	6,455	7,598	7,862
EBITDA Margin	0,476	0,471	0,459	0,464

(\$million)	FY19A	FY20A	FY21A	FY22A
Total Asset	18,829	22,202	30,946	34,162
Total Liabilities	10,196	12,500	19,690	22,340
Equity	8,633	9,702	11,256	11,822

3Y Returns of a 100\$ investment.



Industry Outlook

Novo Nordisk has always been known to produce insulin, but in recent times their in-house medicine “Ozempic”, is being used to lose weight. It has been so disruptive that has decisively shifted the focus of the company towards a future dominated by the obesity market.

Following the approval of “Wegovy”, the leading product exclusively designed for weight loss with a weekly dosage of 2.4 mg of *semaglutide*, both in Europe and the US as a therapy for treating obesity, there has been a substantial increase in demand for this groundbreaking medication... The surge is so significant that the company is currently facing challenges in keeping up with the supply. This prompts the crucial question of whether the company can sustain the heightened demand, especially as it appears to be expanding, with global obesity figures nearing the 1 billion marks. The challenge lies in maintaining a stable price and navigating the rigorous regulations of the pharmaceutical market.

Furthermore, the correlation of this medicine with cardiovascular benefits, beyond its impact on weight loss, suggests a potential application in combating cardiovascular diseases. With multiple endpoints and promising prospects, this product leaves us with huge expectation for the future.

In the meanwhile, competitors as Eli Lilly are working to keep up with this surge in demand, creating new solutions such as Mounjaro*, composed by tirzepatide, which seems more efficient than semaglutide in weight loss therapy and blood sugar control. Additionally, Eli Lilly is exploring the development of new medications with benefits extending to fat kidney and diabetes.

The market seems to have room for both companies and the rising competitiveness will surely accelerate the production of high-quality products.

Macrotrend obesity

In March 2023, the World Obesity Federation (WOF) released a report, projecting that by 2035, over 4 billion people, more than half of the world's population, will be dealing with obesity. This concerning trend is closely tied to an increased risk of conditions like type 2 diabetes, all stemming from obesity-related issues. Notably, no country has reported a decrease in obesity prevalence across their entire population.

The global obesity treatment market size is projected to grow from USD 12.6 billion in 2023 to USD 32.3 billion in 2032, exhibiting a compound annual growth rate CAGR of 16,8% during the forecast period.

Macrotrend diabetes

Currently, over half a billion people globally are grappling with diabetes, impacting individuals of all ages in every country.

According to projections by the International Diabetes Federation (IDF), by the year 2045, approximately 783 million adults, or 1 in 8, will be living with diabetes. This marks a significant surge of 46% compared to the present scenario. The projections underscore the urgent need for global attention and concerted efforts to address the escalating challenges posed by diabetes on a worldwide scale.

The global diabetes drug market size was estimated at USD 61.87 billion in 2022 and is projected to hit 118 billion USD by 2032, growing at a CAGR of 6.67% during the forecast period 2023 to 2032.

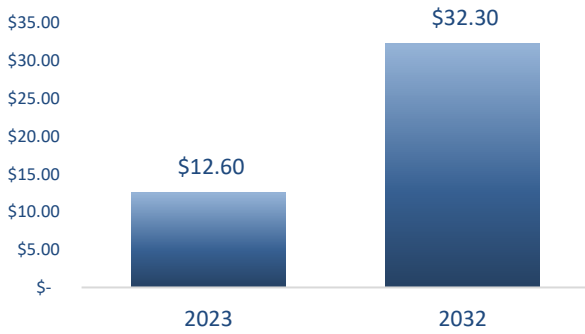


Figure. obesity market size 2023 – 2032 in USD Billion

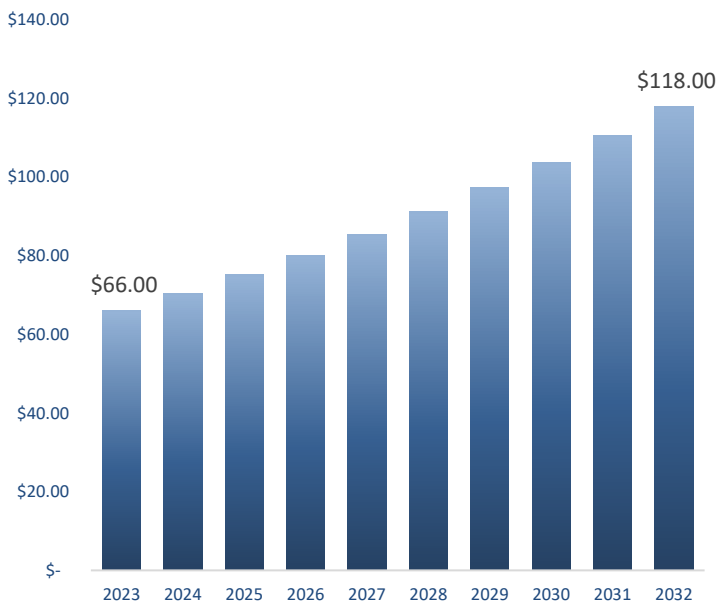


Figure. Diabetes Market Size in USD Billion:

	2020	2025	2030	2035
Number with overweight or obesity (BMI ≥ 25kg/m ²) (millions)	2,603	3,041	3,507	4,005
Number with obesity (BMI ≥ 30kg/m ²) (millions)	988	1,249	1,556	1,914
Proportion of the population with overweight or obesity (BMI ≥ 25kg/m ²) (millions)	38%	42%	46%	51%
Proportion of the population with obesity (BMI ≥ 30 kg/m ²) (millions)	14%	17%	20%	24%

Figure. Numbers of people (aged over 5 years) and percentage of the population with overweight or obesity:

SWOT Analysis

Strengths:

Continuous research and development:

Novo Nordisk heavily invests in research and development to maintain its position as a leader. It utilizes biotechnological methods based on advanced protein chemistry and protein engineering.

Sustainability

Works to create value in society with a strong sense of sustainability responsibility. Striving to integrate sustainable practices throughout the lifecycle of their products. Novo Nordisk has been awarded winner of Carnegie Sustainability Award 2023.

Wide range, quality and safety of products

Novo Nordisk produces medications for a vast spectrum of chronic disease and non, and covers various patient needs and preferences. They are renowned for their quality and safety of products and their high control standard.

Weaknesses:

Competitors pressure

Post-covid, companies are looking for new sources of income and seems like the rising obesity market will be their fray. There will be a strong competition in the upcoming years, to gain market shares.

Ex. Danish Zealand Pharma a biotech company is expected to release phase II results with the drug, “dapiglutide”, and phase I data for the obesity candidate.

Economic slowdown

Increasing pressure in public spending on healthcare due to economic slowdown and reduced payer ability and willingness to pay.

Opportunities:

Research and Development

Continued investments in research and development have the potential to unveil novel drugs and therapies, fostering a competitive advantage and addressing previously unmet medical needs.

Market Expansion

As the global diabetic and obesity markets expand, there's an opportunity for Novo Nordisk to capture a larger market share by introducing innovative and effective treatments. Develop a leading portfolio of superior treatment solutions for obesity.

New Market Opportunities

Establish presence in other serious chronic diseases focusing on CVD, NASH, and CKD.

Threats:

Dealing with market demand and controlling prices

With the expansion of the diabetic and obesity market, the potential scarcity of certain products could lead to surging prices. The primary concern would be that insurance companies may choose not to provide coverage for it. Medicines shortages could have potential implications for patients, could put patients' health and lives at risk and jeopardies reputation and license to operate if regulatory compliance is not ensured.

If this occurs, there is the possibility for other companies to set the price at a lower value, causing Novo Nordisk to lose market share.

All in all, this would have an adverse impact on sales, profits, and market position.

Delay or failure of projects related to research and/ or development.

The continued changes in governmental laws and related interpretation could cause, the interruptions of supplies and production and creating supply constraints.

Reputation Damage

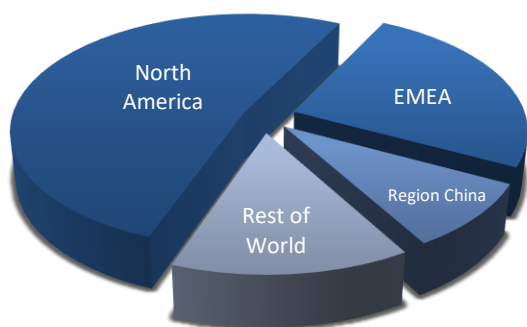
The company can face lawsuits in various markets given different laws and continuous fluctuations regarding product standards in those markets.

Novo Nordisk is currently defending fourteen lawsuits, including three putative class actions, relating to the pricing of diabetes medicines. Four of these cases are pending in New Jersey federal court; four are pending in federal courts in Mississippi, Arkansas, Montana, and New York and the remaining six are pending in state courts in Kansas, Illinois, Kentucky, California, Missouri, and Puerto Rico.

*All pending matters also name as defendants Eli Lilly and Company and Sanofi, while certain matters also name Pharmacy Benefit Managers (PBMs) and related entities.

Emerging Technology

The rapid development of the obesity and diabetic market will cause an increase in competitiveness, and it may require quick adaptability for securing the current market share.



Where it operates geographically:

Novo Nordisk operates globally, with a strong presence in various regions such as North America, Europe, Asia-Pacific, and Latin America. The company's headquarters are in Bagsværd, Denmark.

Novo Nordisk seals its products in more than 169 locations and has its offices, production, and research facilities in more than 80 countries.

Competitors:

Novo Nordisk operates within the pharmaceutical sector, concentrating specifically on diabetes care. As a global leader in this domain, the company contends with several major rivals:

Eli Lilly and Company: Eli Lilly, headquartered in the United States, stands as one of Novo Nordisk's primary competitors. Offering a diverse array of diabetes medications, including insulin and oral anti-diabetic drugs, Eli Lilly features popular products such as Humalog and Trulicity.

Sanofi: A French multinational pharmaceutical company. With a significant presence in the diabetes care market, Sanofi's product lineup includes items like Lantus and Toujeo, and the company also maintains a diverse portfolio across various pharmaceutical domains.

Merck & Co., Inc.: Globally recognized as MSD outside of the United States and Canada, Merck is a major player in the pharmaceutical industry. Although not exclusively dedicated to diabetes care.

Merck provides several medications for diabetes management, such as Januvia and Janumet, covering a broad spectrum of therapeutic areas.

Dexcom: Specializing in continuous glucose monitoring (CGM) systems, Dexcom offers innovative technology for real-time glucose monitoring in individuals with diabetes.

Insulet Corporation: Renowned for its Omnipod Insulin Management System, a tubeless insulin pump, Insulet Corporation delivers a convenient automated insulin delivery system, offering an alternative to traditional insulin pens or injections for individuals with diabetes.

Medtronic: As a medical technology company, Medtronic contributes to diabetes management with a range of products, including insulin pumps and continuous glucose monitoring systems. Focused on enhancing the precision and ease of insulin delivery, Medtronic aims to improve the quality of life for individuals with diabetes.

Market share:

In 2022 its market share increased by 1.8 percentage points to 31.9%.

DKK million	2022	2021
Sales by business segment		
Diabetes and Obesity care	142,413	112,347
Rare disease	243	206
Total sales	142,656	112,553
Sales by geographical segment		
North America operations	79,953	57,654
International operations		
EMEA	32,789	27,124
China	14,412	15,608
Rest of World	15,502	12,167
Total sales	142,656	112,553

Financial Analysis

Introduction

To measure the success of a company and monitor the best practices, financial KPIs (Key Performance Indicators) are very useful. They are directly tied to the financial values of a company, and their usage depends on the industry, goals, and business model. Generally, a firm uses both profitability measures (such as gross and net profit) and liquidity measures (such as current ratios).

Novo Nordisk's data is expressed in DKK (Danish Kroner). Nevertheless, for an understanding purpose, in this analysis we will express the values in USD with the exchange rate set on 2nd December 2023.

Shares for Novo Nordisk

In the writing of this article, the share was evaluated at 100.40 USD in the NYSE and at 698.70 DKK in the Nasdaq Copenhagen.

Indeed, Novo Nordisk is listed on 2 markets while maintaining ratio of shares 1:1:

Novo Nordisk's B shares are listed on Nasdaq Copenhagen (in Danish Krone) and on the New York Stock Exchange as American Depositary Receipts (in US Dollar). (American Depositary Receipts, or ADRs, allow Americans to invest in foreign companies. Although these companies do not ordinarily trade on the U.S. stock market, an ADR allows an investor to buy these stocks as easily as they would invest in any domestic stock.)

To secure liquidity for both B shares and ADRs, the BoD has decided to split the trading units in a two for one ratio. The trading unit of the Novo Nordisk B shares listed on NASDAQ Copenhagen was changed from DKK 0.20 to DKK 0.10 as of 13 September 2023.

Novo Nordisk's total share capital of 65,845,188 USD (451,000,000 DKK) is divided into:

- A share capital of nominally 15,692,937 USD (107,487,200 DKK)
- B share capital of nominally 50,152,250 USD (343,512,800 DKK)

Where A and B shares represent different classes of shares, each with its own set of rights and privileges. (e.g.: voting rights; the A shares carries 100 votes while B shares carries only 10)

Gross profit margin

The gross profit margin measures the profitability of the company's core business, in our case the sale of pharmaceutical products. This measure is the percentage of gross profit divided by net sales and in 2022 it was 83.9%. It highlights a marginal increase in sales as it stays in line with the past years' results (84.2% in 2018, 83.5% in 2019 and 2020, 83.2% in 2021).

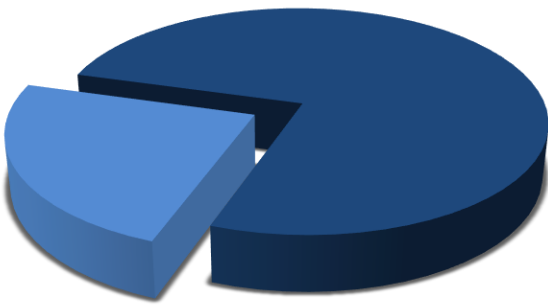


Figure: Total share

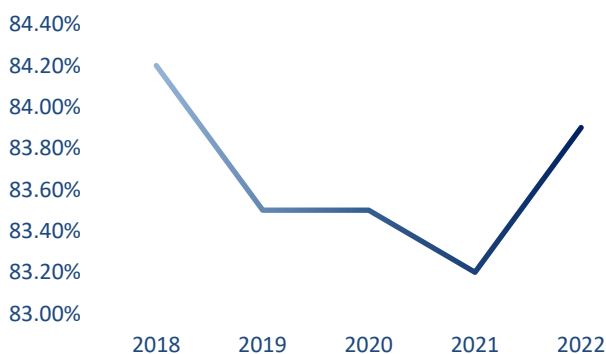


Figure: Gross profit margin

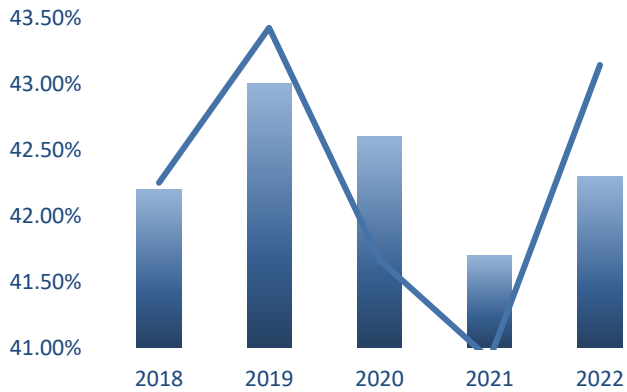


Figure: Operating margin

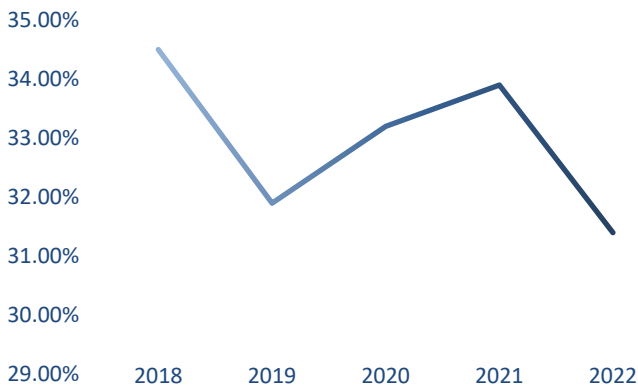


Figure: Net profit margin

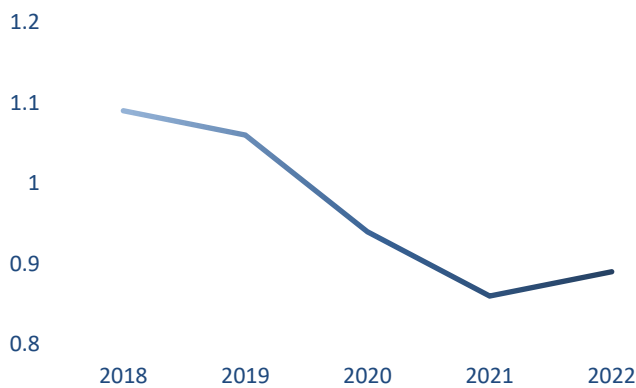


Figure: Current Ratio

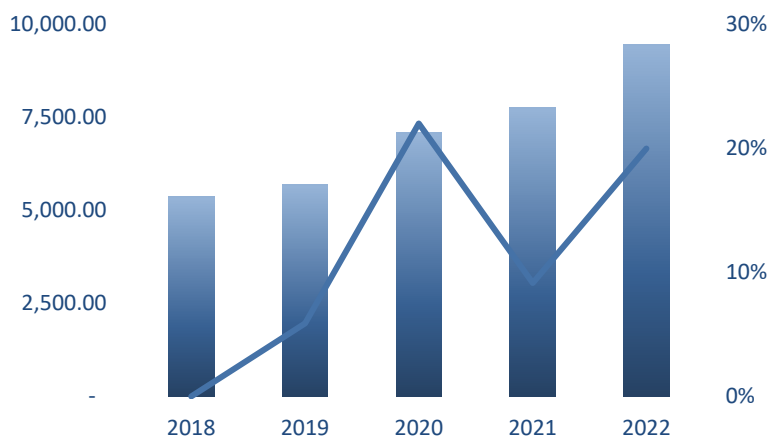


Figure: Free Cash Flow (Usd)

Operating margin

The operating margin, or return on sales, looks at how well the company turns revenue into profits. Operating profit means the total profit on sales revenue after deducting the costs of goods sold, which increased by 20%, and operating expenses such as distribution costs and sales which increased by 25% also due to generalized inflationary impacts. With an operating profit of USD 10,920,374.11 (DKK 74,809 million) Novo Nordisk had a 2022 final result of 42.3% again close to past years results, peaking in 2019 with 43% and hitting the bottom in 2021 with 41.7%

Net profit margin

The net profit margin accounts for the profit a company makes after accounting for all the expenses, so we divide net profit by revenues. The net profit was USD 8,105,358.62 (DKK 55,525 million) and the net profit margin was 31.4%. Although in the past years net profits were significantly lower than the one recorded in 2022, the net profit margins have always been spacing between 34.5% in 2018 and 33.9% in 2021. This can be explained by looking at the revenues: indeed, the ratio between the two factors was always around 3:1 e.g., net sales in 2020 amounted to USD 18.531.163,53 (DKK 126,946 million) and net profits of USD 6,151,167.97 (DKK 42,138 million).

Current ratio

The current ratio shows a company's short-term liquidity by comparing current assets to current liabilities. For the Danish company the ratio in 2022 resulted to be 0.89, which is very low compared to the past years, being 1.09 in 2018 and 1.06 in 2019. However, in the last 3 years we see a gradual decrease in value with 0.94 in 2020 and 0.86 in 2021. The values below 1 may be a sign that the company wouldn't have enough assets to meet their obligation.

Free cash flow

Free cash flow in 2022 was USD 9.45B supporting the goal of providing attractive capital allocation to shareholders. The dividend policy remains competitive in the industry; indeed, the Board of Directors suggested a final dividend of DKK 8.15 in 2021, but the final reach in 2022 was 12.40 dividend per share, which, with a total dividend of 27,950 the dividend pay-out ratio amounted to 50.3%.

Valuation

Let's delve into the details of the inputs used for this valuation:

First, revenues were extracted directly from the Income Statement. The revenue figures provide a foundational understanding of the company's top-line performance, a critical aspect of any valuation.

The operating income was also sourced from the Income Statement. Operating income represents the company's profitability after deducting operating expenses. This metric offers insights into the operational efficiency of Novo Nordisk.

For Interest Expenses a more precise approach was taken by referencing the breakdown of financial obligations in the notes to the financial statements.

The Book Value of equity was extracted from the Balance Sheet. It forms the basis for understanding the company's net worth. This is a crucial metric for determining the intrinsic value of the business.

For Debt (Book Value), I have considered only interest-bearing debt.

So, provisions, accruals, and other non-interest-bearing liabilities were excluded. This aligns with common valuation practices that focus specifically on the debt incurring interest.

Cash and Marketable Securities: Sourced from the Balance Sheet, the Book Value of cash and marketable securities was considered in the valuation. While market value could have been an alternative, the conservative approach was taken to maintain coherence with the rest of the valuation.

Cross Holdings: Like cash and marketable securities, the Book Value of cross holdings was utilized in the valuation, ensuring consistency with the approach taken for other financial instruments.

Number of Shares Outstanding: The count of outstanding shares was derived directly from the company's 2022 financial statements to maintain consistency with the valuation timeline and data sources.

Effective Tax Rate: Calculated as taxes paid divided by pre-tax income, the effective tax rate offers insights into the company's tax efficiency.

Marginal Tax Rate: Sourced externally, the marginal tax rate specific to Denmark was utilized, recognizing the jurisdictional nuances that impact the company's tax obligations.

Industry (Global)	Drugs (Pharmaceutical)	Last 10K
Revenues	\$ 176.954,00	\$ 140.800,00
Operating income or EBIT	\$ 74.809,00	\$ 58.644,00
Interest expense	\$ 378,00	\$ 289,00
Book value of equity	\$ 83.486,00	\$ 70.746,00
Book value of debt	\$ 72.930,00	\$ 60.413,00
Cash and Marketable Securities	\$ 23.574,00	\$ 17.485,00
Cross holdings and other non-operating assets	\$ 327,00	\$ 525,00
Minority interests	\$ -	\$ -
Number of shares outstanding =	2.265,32	

Effective tax rate =	19,60%
Marginal tax rate =	22,00%

Revenue growth rate for next year	33,00%
Operating Margin for next year	24,00%
Compounded annual revenue growth rate	9,60%
Target pre-tax operating margin =	43,57%
Year of convergence for margin	5,00
Sales to capital ratio (for years 1-5)	1,89
Sales to capital ratio (for years 6-10)	1,95

Revenue Growth Rate, and Operating Margin for Next Year: Forward-looking estimates based on historical trends and investor projections were used.

CAGR (Compound Annual Growth Rate): A projected growth rate of 9.6%, offering a longer-term perspective on the company's potential expansion.

Sales to Capital: Industry standards for the pharmaceutical sector were adopted to benchmark Novo Nordisk's sales efficiency relative to its capital base.

Year of Convergence for Margin: The standard assumption of 5 years was maintained, representing the convergence period for operating margins.

Risk-Free Rate: The 10-year Treasury bond interest rate was chosen as the risk-free rate, assuming minimal default risk for the United States.

Finally, computed as a weighted average with Book Values of equity and debt, the WACC was determined to be 6.43%, providing a holistic view of the cost of capital.

In conclusion, the valuation of Novo Nordisk yields a per-share value of \$75.04 vs \$69,38 (01/01/23).

DKK (million)	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		33,00%	9,60%	9,60%	9,60%	9,60%	0,08524	7,45%	6,37%	5,30%	4,22%	4,22%
Revenues	176.954,00	235.348,82	257.942,31	282.704,77	309.844,43	339.589,49	368.536,10	395.984,67	421.216,81	443.524,45	462.241,18	481.747,76
EBIT (Operating) margin	42,28%	24,00%	31,83%	35,74%	39,66%	43,57%	43,57%	43,57%	43,57%	43,57%	43,57%	43,57%
EBIT (Operating income)	74.809,00	56.483,72	82.097,88	101.044,34	122.871,91	147.959,14	160.571,18	172.530,52	183.524,16	193.243,60	201.398,48	150.000,00
Tax rate	19,60%	19,60%	19,60%	19,60%	19,60%	19,60%	20,08%	20,56%	21,04%	21,52%	22,00%	22,00%
EBIT(1-t)	60.145,52	45.412,21	66.005,69	81.238,41	98.787,50	118.957,33	128.326,91	137.056,97	144.909,78	151.657,11	157.090,82	117.000,00
- Reinvestment		11.978,53	13.128,47	14.388,81	15.770,13	14.844,41	14.076,19	12.939,56	11.439,82	9.598,32	10.003,37	20.000,00
FCFF		33.433,68	52.877,21	66.849,60	83.017,37	104.112,92	114.250,72	124.117,41	133.469,96	142.058,78	147.087,44	97.000,00
NOL	-	-	-	-	-	-	-	-	-	-	-	-
Cost of capital		11,43%	11,43%	11,43%	11,43%	11,43%	10,99%	10,55%	10,10%	9,66%	9,22%	9,22%
Cumulated discount factor		0,8974	0,8054	0,7228	0,6486	0,5821	0,5245	0,4744	0,4309	0,3929	0,3598	
PV(FCFF)		30.004,20	42.585,75	48.316,16	53.846,87	60.602,98	59.920,06	58.884,77	57.510,97	55.818,62	52.915,69	

Terminal cash flow	97.000,00
Terminal cost of capital	9,22%
Terminal value	1.940.000,00
PV(Terminal value)	697.927,95
PV (CF over next 10 years)	520.406,08
Sum of PV	1.218.334,02
Probability of failure =	0,00%
Proceeds if firm fails =	609.167,01
Value of operating assets =	1.218.334,02
- Debt	72.930,00
- Minority interests	-
+ Cash	23.574,00
+ Non-operating assets	327,00
Value of equity	1.169.305,02
- Value of options	-
Value of equity in common stock	1.169.305,02
Number of shares	2.265,00
Estimated value /share	516,25
Estimated value /share (\$)	75,04
Price	-
Price as % of value	-

VaR analysis

Value at Risk (VaR) is a statistical measure that quantifies the potential loss in the value of a portfolio or investment over a specific time period, at a certain level of confidence. In other words, VaR estimates the maximum amount of loss that a portfolio could suffer within a given time frame and probability.

Different are the way to calculate the Var, we decided to obtain it using Montcarlo method.

We considered a portfolio of \$1,000,000 totally in Nvidia shares, and an expected volatility obtained by the Garch (1,1) method.

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2$$

The risk-free rate used for this calculation is the EURIBOR (13th Dec 23).

Our calculation represents both 95% and 99% interval of confidence.

This means that on our 5000 simulations, we expect that 5% and 1% of the observations exceed the expectation estimated by the VaR.

This means that our potential loss could be at least \$136.602,87 with an interval of confidence of 95%, and \$189.340,75 with an interval of confidence of 99%.

Portfolio value	1.000.000,00
Weight NOVO-B	100%
Expected volatility	31,91%
Risk free rate	3,833%

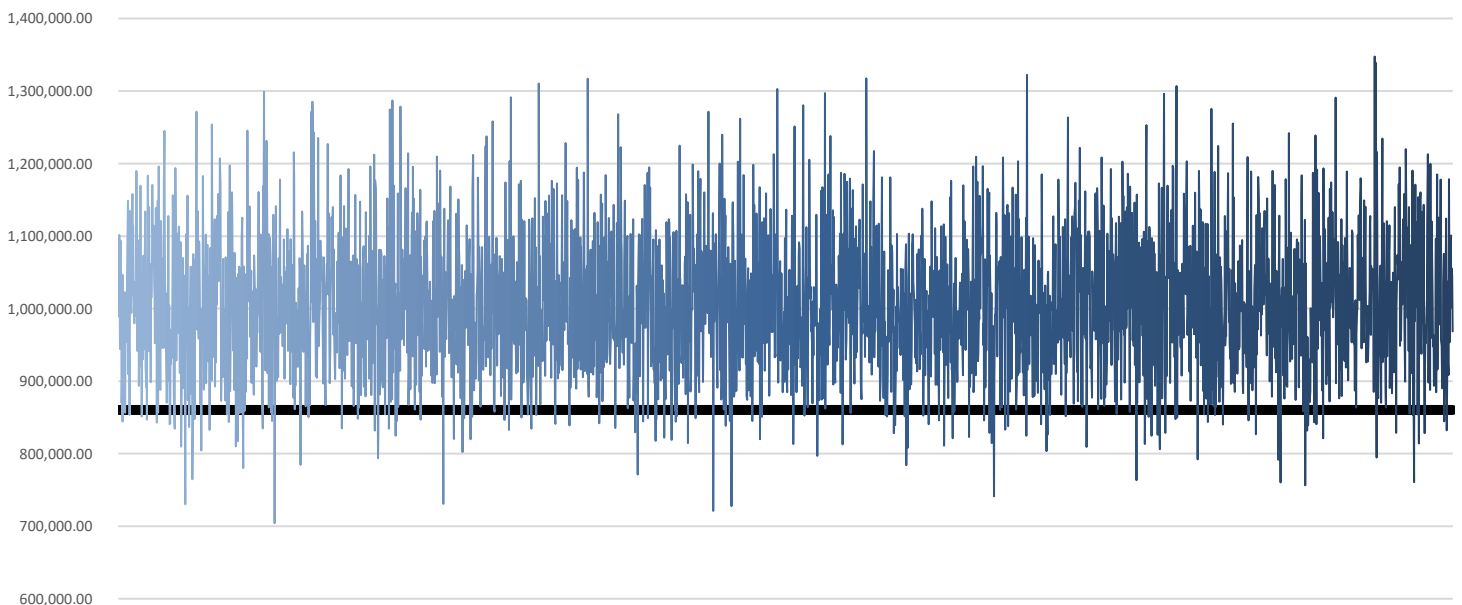
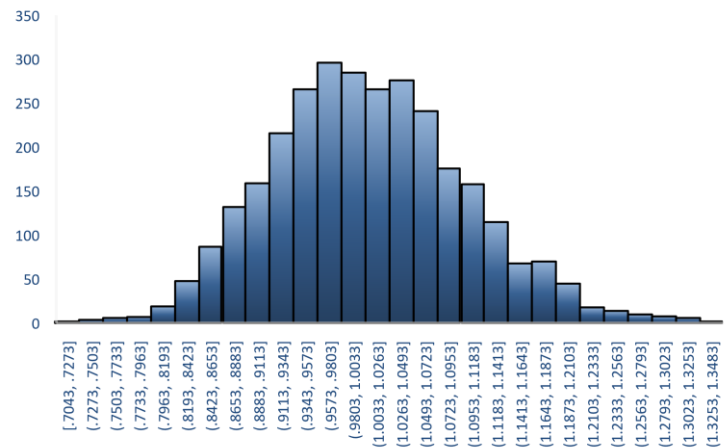


Figure. Var Simulation

VaR Montecarlo	Percent Loss	Absolute Loss
95%	13,7%	136.602,87
99%	18,9%	189.340,75

Option Pricing

This section is devoted to option pricing and the different strategies that can be generated through the purchase of European call and put options.

The options that we choose are the ones with the highest volume.

For this reason, we choose: As of December 4 03:56 PM, EST

- Call **NVO240119C00105000** Vol 2,043
- Put **NVO240119P00095000** Vol 2,253

The formula used for option pricing on EU options is the Black-Scholes and Merton formula.

$$c = S_0 N(d_1) - K e^{-rT} N(d_2)$$

$$p = K e^{-rT} N(-d_2) - S_0 N(-d_1)$$

$$\text{where } d_1 = \frac{\ln(S_0 / K) + (r + \sigma^2 / 2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln(S_0 / K) + (r - \sigma^2 / 2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

This represents the best way to price non-Path-dependent options like, in this case, Europeans.

The different strategies represented are:

- Buy/Sell Call (+/- c)
- Buy/Sell Put (+/- p)

The R code for the option pricing is the following:

```
# Option parameters
S <- 100.92 # Underlying
K <- 105 # Strike
r <- 0.431 # Risk-Free (Sofr 1m)
T <- 0.13 # Expiry
sigma <- 0.2788 # Volatility
q <- 0.175. #Dividend yield

# Calcola il prezzo dell'opzione call utilizzando il modello Black-Scholes
d1 <- (log(S / K) + (r + (sigma^2) / 2) * T) / (sigma * sqrt(T))
d2 <- d1 - sigma * sqrt(T)
call_price <- S * pnorm(d1) - K * exp(-r * T) * pnorm(d2)
put_price <- K * exp(-r * T) * pnorm(-d2) - S * pnorm(-d1)
```

The interest rate used is the SOFR (Secured Overnight Financing Rate), which is a board measure of the cost of borrowing cash overnight collateralized by Treasury securities (4,31%).

The strikes chosen are those of the most traded options (Bloomberg), namely 105 for the call and 95 for the put.

The volatility is the implied volatility, that is the one obtained from option prices (27,88%).

The prices obtained are respectively 2,53 USD (call) and 1,57 USD (put).

The payoff of the different strategies depends, obviously, on the underlying spot price.

Today expectations on this underlying are more bullish than bearish and this is represented by a montecarlo simulation with a dev.st of and an average of (last 180gg)

Using it to estimate the price on 19/Jan/2024 we obtain a price of USD 108,69.

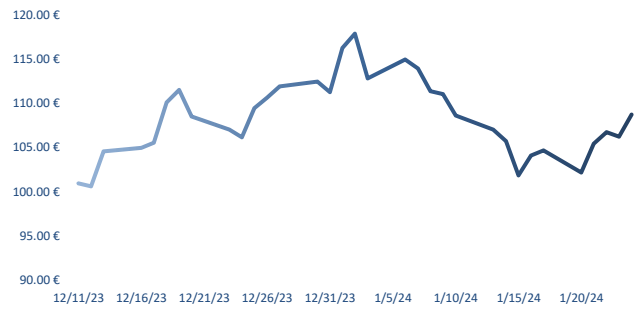


Figure. Montecarlo Simulation

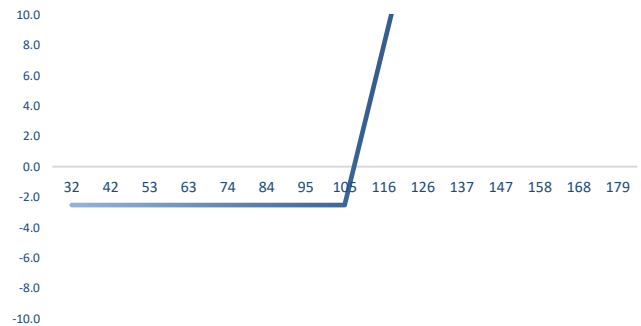


Figure. Long Call payoff strategy

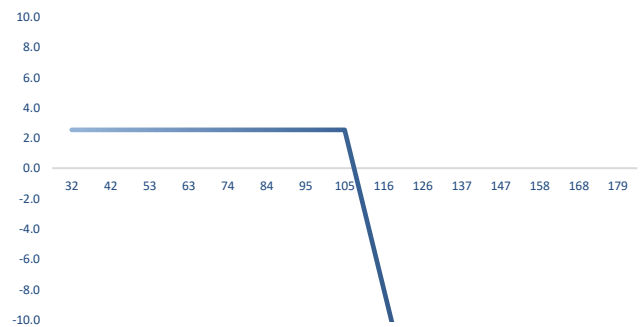


Figure. Short Call payoff strategy

The payoffs we would get from the four different strategies, if the price at expiration is equal to the estimated price, would be:

- + c : $\text{Max}(108,69-105; 0) - 2,53 : 1,16$
- - c : $\text{Min}(105-108,69; 0) + 2,53 : -1,16$
- + p : $\text{Max}(95-108,69; 0) - 1,57 : -1,57$
- - p : $\text{Min}(108,69-95; 0) + 1,57 : 1,57$

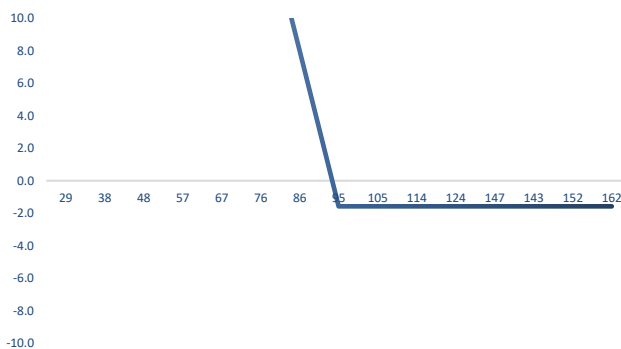


Figure. Long Put payoff strategy

Greeks have also been estimated.

Among several, we emphasize the importance of delta, from it we can derive the exact number of options to buy or sell to hedge the risk of our portfolio.

For example: in this case we see a delta of 0.378 for the call, which means that we could instantly make our portfolio, characterized by one Novo Nordisk stock, risk-free if we buy 0.378 call options on the same underlying.

The same conditioning could be done with puts (short)

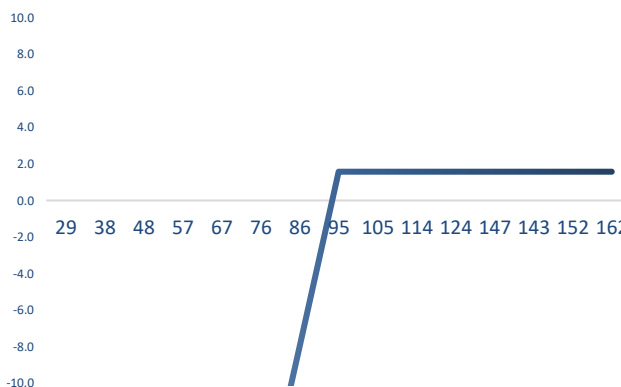


Figure. Short Put payoff strategy

Greeks (c)		Greeks (p)	
Delta	0,378	Delta	-0,247
Gamma	0,041	Gamma	0,049
Theta	-17,100	Theta	-18,829
Vega	15,247	Vega	18,352
Rho	4,661	Rho	-3,468

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