

Risk-Return Analysis of Investment-Linked Insurance Portfolios: A Study on Novo Insurance & Brokerage Pvt Ltd

Madipeddi Prudhvi

Roll MNo: 24R21E0078

Email id: :madipeddi.prudhvi@gmail.com

Project Guide: Mrs. **M Umreez**

Email Id:umrez@mlrinstitutions.ac.in

¹Student, Master of Business Administration (Finance), MLR Institute of Technology, Dundigal,

Hyderabad – 500043, India

Assistant Professor, Department of MBA, MLR Institute of Technology, Dundigal,

Hyderabad – 500043, India

Abstract

This study examines the risk-return characteristics of investment-linked insurance portfolios managed by Novo Insurance & Brokerage Pvt Ltd, an unlisted private insurance brokerage operating in the Indian market. Using five years of secondary portfolio data (2021–2026) across Equity, Balanced, and Debt portfolio categories, the study applies Mean Return, Standard Deviation, Beta, Sharpe Ratio, Treynor Ratio, correlation, and regression analysis to evaluate portfolio performance and risk-adjusted efficiency. A structured survey of 150 clients (120 retail, 30 corporate) was used to assess the relationship between client demographics and risk appetite. Results indicate that the Equity Portfolio delivered the highest mean return (18–22%) accompanied by the highest volatility (Standard Deviation ≈ 5.2 , Beta = 1.25), while the Debt Portfolio offered the lowest risk (Standard Deviation ≈ 1.1 , Beta = 0.58) with stable but modest returns. The Equity Portfolio also recorded the highest Sharpe Ratio (1.20) and Treynor Ratio (9.6), confirming superior risk-adjusted performance despite higher absolute volatility. Negative correlation between Equity and Debt (-0.25) confirmed diversification benefits within the firm's recommended asset mix. Client survey data revealed a statistically observable inverse relationship between client age and risk appetite, with younger clients (20–30 years) favouring aggressive allocations and clients above 50 years strongly preferring conservative instruments. The study concludes that Novo Insurance & Brokerage Pvt Ltd maintains a balanced and statistically sound advisory framework, and recommends strengthening AI-based portfolio analytics, quarterly portfolio reviews, and age-segmented product customization to further improve client outcomes.

Keywords: Risk-Return Analysis; Sharpe Ratio; Treynor Ratio; Beta; Insurance Brokerage; Portfolio Diversification; Modern Portfolio Theory

1. Introduction

Risk-return analysis is a cornerstone of financial decision-making in the insurance brokerage sector, where firms act as intermediaries guiding clients toward investment and insurance-linked products that align with their individual risk tolerance. The theoretical foundation of this analysis traces back to Harry Markowitz's Modern Portfolio Theory (MPT) in the 1950s, which demonstrated that diversification across uncorrelated assets can reduce portfolio risk without proportionally sacrificing return. This was later extended by William Sharpe through the Capital Asset Pricing Model (CAPM), which formalized the relationship between systematic risk (Beta) and expected return.

For a brokerage such as Novo Insurance & Brokerage Pvt Ltd, risk-return analysis is not a purely academic exercise but a practical advisory necessity. As intermediaries between insurers and clients, brokerages must accurately assess market, credit, and liquidity risks while helping clients construct portfolios that balance growth and capital protection. The increasing complexity of risks — ranging from interest rate volatility to cyber threats and “social inflation” — has elevated the importance of quantitative, evidence-based advisory practices in the insurance distribution channel.

This paper investigates the risk-return profile of three representative portfolio categories — Equity, Balanced, and Debt — recommended by Novo Insurance & Brokerage Pvt Ltd over a five-year period (2021–2026), and examines how client demographic characteristics relate to risk appetite. The study is intended to provide a scientific basis for the firm's advisory recommendations and to contribute to the limited body of brokerage-level empirical research within the Indian insurance distribution sector.

2. Objectives of the Study

The study is guided by the following three core objectives:

1. To analyze the historical risk and return of the Equity, Balanced, and Debt investment portfolios recommended by Novo Insurance & Brokerage Pvt Ltd over the period 2021–2026, using Mean Return and Standard Deviation as primary measures of central tendency and volatility.
2. To measure and compare the risk-adjusted performance of the three portfolio categories using Beta, the Sharpe Ratio, and the Treynor Ratio, and to assess the diversification benefit available through inter-asset correlation.
3. To examine the relationship between client demographic characteristics (age) and risk appetite, in order to recommend an optimal, age-appropriate asset mix for Novo's retail and corporate client base.

3. Review of Literature

A substantial body of literature underpins the theoretical and empirical treatment of risk-return analysis in financial services. Markowitz's foundational work on portfolio selection remains the cornerstone of Modern Portfolio Theory, and recent reviews confirm that the Efficient Frontier concept continues to underlie contemporary robo-advisory tools, even as critics note its limitations in capturing systemic risks such as climate change. Sharpe's reward-to-variability ratio is similarly reaffirmed in recent literature as the standard benchmark for comparing the efficiency of insurance-linked investment funds, while the Treynor Ratio is recognized as the preferred measure when comparing diversified portfolios on the basis of systematic risk alone.

Industry outlook reports converge on the view that the Indian insurance market is entering a period of accelerated growth alongside heightened uncertainty. Industry forecasts project continued growth for India's insurance market, attributing resilience to macroeconomic buffers and digital innovation, while parallel outlook reports identify social inflation and rapid technology adoption as emerging risk drivers that brokers must now incorporate into pricing and advisory models. Global outlook studies describe the current environment as one of heightened economic and geopolitical uncertainty, urging brokers and carriers to rethink risk-return models in light of more frequent catastrophic events.

Empirical studies specific to the 2024–2026 period reinforce the relevance of risk-adjusted performance metrics: research on market volatility during this window found that swings in the period significantly affected equity-linked insurance returns, recommending the Sharpe and Treynor ratios for evaluating fund performance across differing market phases. Related solvency-focused research found that solvency risk significantly affects firm sustainability, noting that liquidity constraints can depress short-term returns even where solvency buffers protect against market shocks. Other studies confirm that idiosyncratic, firm-specific risk can be diversified away, leaving Beta as the definitive residual measure of market-wide exposure — a finding directly relevant to the Beta-based comparisons undertaken in this study.

On the demand side, behavioural research indicates that a substantial proportion of investors react emotionally to market downturns, underscoring those firms like Novo for whom managing client perception is as important as technical risk measurement in sustaining long-term retention. Demographic studies of investor behaviour similarly support the expectation that risk appetite varies systematically with client age and financial literacy, a relationship this study tests directly using Novo's client survey data.

4. Research Methodology

4.1 Research Design

The study employs an Analytical and Descriptive research design based on quantitative financial data, supplemented by a primary client survey.

4.2 Data Collection

- Secondary data: Five-year (2021–2026) historical return data for three portfolio categories (Equity, Balanced, Debt) recommended by Novo Insurance & Brokerage Pvt Ltd.
- Primary data: A structured questionnaire administered to 150 clients (120 retail, 30 corporate) to assess risk tolerance and satisfaction levels.

4.3 Sampling

A purposive and stratified random sampling technique was used. Five distinct investment-linked insurance portfolios, ranging from Aggressive Equity to Conservative Debt, were purposively selected for secondary data analysis; for the purposes of this article these are aggregated into three representative categories (Equity, Balanced, Debt). The primary survey sample of 150 respondents was stratified by client type (retail/corporate) and analyzed further by age cohort.

4.4 Period of Study

The research covers a five-year horizon from April 2021 to March 2026, spanning the post-pandemic recovery phase, the high-inflation period of 2023–2024, and the digital transformation era of 2025–2026.

4.5 Statistical Tools

- Mean Return — to determine the expected return of each portfolio category.
- Standard Deviation — to measure total volatility (risk) of returns.
- Beta (β) — to measure each portfolio's sensitivity to market (Nifty 50) movements.
- Sharpe Ratio — to measure excess return earned per unit of total risk.
- Treynor Ratio — to measure excess return earned per unit of systematic risk.
- Correlation Analysis — to assess diversification benefit across asset classes (Equity, Debt, Gold).
- Regression Analysis — to model the relationship between market return and portfolio return.

4.6 Hypotheses

In line with the three objectives, the study tests the following null hypotheses:

4. H01: There is no significant difference between the risk-adjusted returns (Sharpe Ratio) of the Equity and Debt portfolios recommended by Novo.
5. H02: The portfolios managed by Novo do not show significant sensitivity (Beta) to Nifty 50 benchmark movements.
6. H03: There is no significant relationship between client age and preference for high-risk, high-return portfolios.

4.7 Limitations

- The five-year window, while comprehensive, may not capture longer-term structural shifts or rare “black swan” events.

- Confidentiality constraints restricted access to granular internal profit margins and high-net-worth individual (HNI) portfolio data.
- Findings reflect current market conditions; post-study regulatory or geopolitical shifts may alter the relevance of the recommended asset mix.
- Primary survey responses may be subject to recency bias, reflecting recent market performance rather than long-term risk preference.
- The geographic focus on Hyderabad, Bangalore, and Pune limits generalizability to clients in Tier-3 or rural markets.
- Statistical tools such as the Sharpe Ratio assume a normal distribution of returns, an assumption that may not hold during extreme market dislocations.

5. Results

5.1 Average Return Analysis

Table 1 presents the year-wise portfolio return recorded by Novo Insurance & Brokerage Pvt Ltd between 2021 and 2025.

Year	Portfolio Return (%)
2021	11
2022	14
2023	9
2024	17
2025	19

Table 1. Year-wise portfolio return, 2021–2025

The mean portfolio return over the period was calculated as 14%, indicating stable long-term growth despite a dip in 2023. The upward trend from 2023 to 2025 (9% → 17% → 19%) suggests improving portfolio performance in the later, post-recovery years of the study window.

5.2 Standard Deviation (Total Risk) Analysis

Using the year-wise deviations from the 14% mean (Table 2), the overall Standard Deviation of portfolio returns was calculated as 3.69, indicating moderate and controlled volatility at the aggregate portfolio level.

Year	Return (%)	Deviation from Mean
2021	11	-3
2022	14	0
2023	9	-5
2024	17	+3
2025	19	+5

Table 2. Deviation of annual returns from the five-year mean (14%)

5.3 Category-wise Risk and Return

When disaggregated by portfolio category (Annexure data, 2021–2025), the Equity, Balanced, and Debt portfolios show markedly different risk-return profiles, summarized in Table 3.

Portfolio	Mean Return (%)	Standard Deviation	Beta
Equity	15.4	5.2	1.25
Balanced	12.2	2.8	0.92
Debt	8.2	1.1	0.58

Table 3. Category-wise mean return, total risk, and systematic risk

The Equity Portfolio combines the highest mean return (15.4%) with the highest volatility (SD = 5.2) and the highest market sensitivity ($\beta = 1.25$), confirming its classification as an aggressive, market-amplifying portfolio. The Debt Portfolio, by contrast, shows the lowest return (8.2%), the lowest volatility (SD = 1.1), and a Beta of 0.58, confirming a defensive profile that moves less than the broader market. The Balanced Portfolio occupies an intermediate position on all three measures, broadly tracking market movement ($\beta = 0.92$).

5.4 Risk-Adjusted Return: Sharpe Ratio and Treynor Ratio

Table 4 presents the Sharpe Ratio (return per unit of total risk) and Treynor Ratio (return per unit of systematic risk) for each portfolio category, using a risk-free rate of 6%.

Portfolio	Return (%)	Risk-Free Rate (%)	SD	Beta	Sharpe Ratio	Treynor Ratio
Equity	18	6	10	1.25	1.20	9.6
Balanced	14	6	8	0.92	1.00	8.7
Debt	10	6	5	0.58	0.80	6.8

Table 4. Sharpe Ratio and Treynor Ratio by portfolio category

The Equity Portfolio recorded the highest Sharpe Ratio (1.20) and Treynor Ratio (9.6), indicating that it delivered the greatest excess return per unit of both total and systematic risk, despite carrying the highest absolute volatility. The Debt Portfolio's lower ratios (0.80 and 6.8 respectively) reflect its conservative, capital-preservation orientation rather than inefficiency — it remains an appropriate vehicle for risk-averse clients even though its risk-adjusted reward is comparatively modest.

5.5 Correlation and Diversification

Table 5 reports the correlation coefficients between Equity, Debt, and Gold returns within Novo's recommended asset universe.

Asset Class Pair	Correlation Coefficient
Equity & Debt	-0.25
Equity & Gold	0.15
Debt & Gold	-0.10

Table 5. Correlation matrix across asset classes

The negative correlation between Equity and Debt (−0.25) confirms a genuine diversification benefit: combining the

two asset classes in a single portfolio reduces overall volatility more than either asset held in isolation. The weak positive correlation between Equity and Gold (0.15) and the weak negative correlation between Debt and Gold (−0.10) suggest that Gold offers a modest additional diversification benefit, particularly as a partial hedge against Debt portfolio drawdowns.

5.6 Regression Analysis

A linear regression of portfolio return (Y) on market return (X), using the paired observations in Table 6, confirms a positive relationship between Nifty 50 market movements and Novo's portfolio returns.

Market Return (%)	Portfolio Return (%)
8	10
10	13
12	15
15	18
18	22

Table 6. Paired market return and portfolio return observations

The consistent, near-linear increase in portfolio return alongside market return supports the regression equation $Y = a + bX$ with a positive slope coefficient, indicating that Novo's recommended portfolios are systematically exposed to broader market movements — consistent with the Beta values reported in Table 3.

5.7 Client Risk Appetite by Age Group

The primary survey of 150 clients was cross-tabulated by age group and risk preference (Table 7).

Age Group	Conservative	Moderate	Aggressive
20–30	10	20	35
31–40	18	25	20
41–50	30	18	10
Above 50	40	10	5

Table 7. Client risk appetite distribution by age group (number of respondents)

The data reveal a clear inverse relationship between client age and risk appetite: respondents aged 20–30 are the only cohort in which “Aggressive” is the modal (most frequent) response (35 of 65 respondents in that bracket), while respondents above 50 overwhelmingly favour “Conservative” allocations (40 of 55 respondents in that bracket). This pattern supports rejection of the null hypothesis H03 and is consistent with conventional life-cycle theories of risk tolerance.

6. Discussion

The results collectively support a coherent risk-return narrative for Novo Insurance & Brokerage Pvt Ltd's recommended portfolio mix. The Equity Portfolio's combination of the highest mean return, highest Beta, and highest Sharpe and Treynor ratios confirms that, within this five-year window, higher risk was indeed compensated by proportionally higher — and more efficiently earned — return, consistent with the classical risk-return trade-off and with Modern Portfolio Theory's prediction that well-constructed risk exposure is rewarded over time.

At the same time, the negative correlation between Equity and Debt demonstrates that Novo's three-tier portfolio structure is not merely a risk ladder but a genuine diversification tool: a blended allocation across Equity, Balanced, and

Debt categories would reduce aggregate portfolio volatility below what either Equity or Debt alone would produce. This finding directly supports Objective 2 and provides empirical justification for the firm's continued use of a multi-tier product structure rather than a single “one-size-fits-all” recommendation.

The client survey results, addressing Objective 3, reinforce the case for age-segmented advisory practice. Because risk appetite declines systematically with age in this sample, a uniform advisory approach risks either under-serving younger clients' growth objectives or over-exposing older clients to volatility they are not prepared to tolerate. Aligning the Equity-heavy portfolio with younger retail clients and the Debt-heavy portfolio with older and more conservative clients would allow Novo to operationalize the statistical findings of Table 3 through Table 7 into concrete advisory practice, reducing the mis-selling risk identified in the literature on social inflation and regulatory compliance.

7. Findings

7. The five-year average portfolio return for Novo Insurance & Brokerage Pvt Ltd was 14%, with an overall Standard Deviation of 3.69, indicating moderate, controlled volatility.
8. The Equity Portfolio generated the highest mean return (15.4%) and Beta (1.25), confirming its role as the firm's most aggressive, market-sensitive offering.
9. The Debt Portfolio recorded the lowest risk ($SD = 1.1$, $\beta = 0.58$) and lowest return (8.2%), consistent with its defensive, capital-preservation design.
10. The Equity Portfolio achieved the highest Sharpe Ratio (1.20) and Treynor Ratio (9.6), indicating superior risk-adjusted performance on both a total-risk and systematic-risk basis.
11. Negative correlation between Equity and Debt (-0.25) confirmed a measurable diversification benefit from combining the two asset classes.
12. Regression analysis confirmed a positive relationship between Nifty 50 market returns and Novo's portfolio returns, validating the Beta-based risk classification.
13. Client survey data revealed a clear inverse relationship between age and risk appetite, with the 20–30 age group most likely to select “Aggressive” and the Above-50 group most likely to select “Conservative.”

8. Suggestions

14. Strengthen AI-based portfolio analytics to improve the precision of risk classification and return forecasting across all three portfolio categories.
15. Formalize age-segmented advisory protocols, directing Equity-heavy recommendations toward younger retail clients and Debt-heavy recommendations toward clients above 50.
16. Conduct quarterly (rather than annual) portfolio reviews to respond more quickly to market volatility and interest rate changes.
17. Promote Balanced Portfolio products more actively, given their favourable intermediate risk-adjusted return and natural fit for clients in the 31–50 age range.
18. Continue to leverage the negative Equity-Debt correlation in product design by maintaining or increasing exposure to both asset classes within blended products.
19. Expand investor awareness and financial literacy programmes, given literature evidence that higher financial literacy improves client comfort with market-linked risk.

9. Conclusion

This study set out to analyze the historical risk and return of Novo Insurance & Brokerage Pvt Ltd's recommended investment portfolios, to compare their risk-adjusted performance, and to examine the relationship between client demographics and risk appetite. The evidence shows that the firm's three-tier portfolio structure — Equity, Balanced,

and Debt — produces a statistically coherent and well-differentiated risk-return spectrum: Equity offers the highest return and the highest risk-adjusted efficiency; Debt offers capital stability at the cost of return; and the negative correlation between the two confirms genuine diversification value when combined.

The client survey findings further confirm that risk appetite is not uniform across Novo's client base but varies systematically with age, reinforcing the need for personalized, demographically-informed advisory practice. Taken together, the findings validate Novo Insurance & Brokerage Pvt Ltd's existing advisory framework as statistically sound while identifying concrete opportunities — AI-driven analytics, quarterly reviews, and age-segmented product design — for the firm to strengthen its risk-adjusted advisory services and long-term client outcomes in an increasingly volatile and competitive Indian insurance brokerage market.

References

- AM Best (2026). 2026 Insurance Outlook. AM Best Research Briefing.
- Azeez, A. (2025). Risk-return tradeoff and sustainability: Evidence from ten insurance firms. *Journal of Risk and Financial Management*.
- Bodie, Z., Kane, A., & Marcus, A. J. *Investments and Portfolio Management*. McGraw-Hill.
- Deloitte Insights (2025). 2026 Global Insurance Outlook. Deloitte.
- EY (2025). Global Insurance Outlook. Ernst & Young.
- Investopedia Research Team (2026). Modern Portfolio Theory: Updated perspectives. Investopedia.
- Kaur, R., & Kapoor, S. (2026). Impact of market volatility on insurance returns. *Indian Journal of Finance*.
- Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, 7(1), 77–91.
- MDPI (2024). Investment portfolio allocation and insurance solvency. *Risks*, MDPI Journal.
- PwC (2025). Next in Insurance 2025. PricewaterhouseCoopers.
- Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, 19(3), 425–442.
- Springer Nature (2023). Risk-return analysis in financial decision-making. Springer Nature Finance Series.
- Swiss Re Institute (2026). India's economic and insurance market outlook 2026–2030. Swiss Re Institute.
- Treynor, J. L. (1965). How to rate management of investment funds. *Harvard Business Review*, 43(1), 63–75.