



Sciro Publishers

International Journal of Business and Management Sciences

2026; 2(2): 01-06 | ISSN(O): 2693-3500

<https://scirojournals.com/index.php/ijbms>

DOI: 10.5281/zenodo.19602994

Risk Mitigation through Diversification: A Quantitative Analysis of Investment Portfolio Performance

Dr Dasari Rajesh Babu ^{1,*}, S.Umadevi ², T.Latha ³, B.Shreiya ⁴, S.Saireddy ⁵

¹ Associate Professor, School of Commerce and Management, Mohan Babu University, Tirupathi, Andhra Pradesh, India.

^{2,3,4,5} MBA Student of Mohan Babu University, Andhra Pradesh, India

Email address*: rajeshdasari100@gmail.com

Received:22.03.2026 | **Revised:** 21.04.2026 | **Accepted:**2.05.2026 |

Abstract: This paper examines diversification as an effective risk-reduction and long-term performance strategy. Although the phrase "not putting all eggs in one basket" is familiar, many investors continue to doubt the effectiveness of diversification in contemporary, volatile markets.

The research employs a quantitative method to analyses various asset classes over the last two years, using risk and return metrics that account for standard deviation and beta. By applying diversified portfolios with concentrated holdings through diversification, investors can balance risk and reward for their investments. Risk mitigation influences diversification, asset allocation, and hedging, thereby limiting exposure to volatility against systemic risk. Diversifying investments across assets, industries, and geographic areas, and applying derivatives enables the management of uncertainty and minimization of financial losses. Risk mitigation is a conceptual model and an applied approach to risk control that facilitates robust portfolios and guarantees long-term stability in turbulent markets, as emphasized in this paper.

Keywords: Diversification, Risk Mitigation, Portfolio Performance, Asset Allocation, Market Volatility.

1. Introduction

Investment decisions are intrinsically linked to risk, and successfully managing this risk has consistently been a problem for both investors and portfolio managers. In volatile, uncertain, and interdependent financial markets, the necessity for organized methodologies to mitigate risk while ensuring satisfactory returns becomes increasingly critical. Diversification, the allocation of investments across many assets to mitigate exposure to a singular risk source, is one of the most successful and commonly employed strategies for risk reduction.

The primary justification for diversification is based on the premise that assets do not fluctuate in perfect correlation. When one asset class falters, another may excel, thereby stabilizing the portfolio's overall performance. Investing in many asset classes, including equities, bonds, and commodities, enables investors to mitigate unsystematic risk associated with specific securities or sectors.

This study examines the quantitative relationship between diversification and portfolio performance. The analysis centers on assessing the performance of diversified portfolios relative to non-diversified or concentrated portfolios, employing risk-adjusted performance indicators such as the Sharpe Ratio, Beta, and Standard Deviation. The study seeks to experimentally evaluate if diversity effectively reduces risk without substantially diminishing rewards.

Objectives

- To analyses the impact of diversification on portfolio risk and return using quantitative techniques.
- To compare the performance of diversified and non-diversified portfolios based on statistical indicators such as Sharpe Ratio, Beta, and Standard Deviation.
- To examine the correlation between various asset classes and their influence on the level of risk mitigation.

2. Literature Review

Dziuba et al. (2022) examined international portfolio diversification using clustering techniques and found that spreading investments across global markets significantly improves the risk-return trade-off while reducing overall portfolio volatility.

Mehta and Yang (2022) emphasized the importance of maximum diversification strategies based on Value-at-Risk (VaR), concluding that such approaches are more effective at managing extreme risks than traditional variance-based models.

Smith and Lee (2023) proposed a hybrid risk-return diversification model, demonstrating that combining risk-based and return-based approaches yields superior portfolio performance.

Chen et al. (2025) highlighted the growing importance of ESG-based diversification, showing that incorporating environmental, social, and governance factors into investment portfolios enhances stability and reduces volatility during uncertain market conditions.

Huang et al. (2025) demonstrated that diversified portfolios outperform concentrated investments during financial crises, significantly reducing downside risk.

2.1. Theoretical Foundations of Diversification

Diversification was initially presented and theoretically codified by *Harry Markowitz* in his 1952 work, *Modern Portfolio Theory (MPT)*. *Markowitz* illustrated that an investor can create an efficient portfolio that maximizes returns for a given level of risk by combining assets with low or negative correlations. This represented a substantial progression in financial theory, transitioning the emphasis from individual asset performance to the comprehensive portfolio risk-return trade-off.

Subsequently, *Sharpe (1964)*, *Lintner (1965)*, and *Mossin (1966)* formulated the *Capital Asset Pricing Model (CAPM)*, which introduced the notions of systematic and unsystematic risk. The Capital Asset Pricing Model (CAPM) posits that diversification can eliminate unsystematic risk, but cannot mitigate systematic risk, which is inherent to the entire market. The Efficient Frontier, a fundamental concept in Modern Portfolio Theory, delineates the set of optimal portfolios that offer the highest expected return for each level of risk.

2.2. Empirical Evidence Regarding Diversification and Risk Mitigation

Initial empirical research corroborated *Markowitz's* theoretical claims. *Evans and Archer (1968)* discovered that maintaining a portfolio of roughly 10 to 15 stocks substantially mitigates unsystematic risk. Subsequently, *Elton and Gruber (1977)* determined that the advantages of diversity persist until approximately 30 securities are attained, beyond which incremental benefits decline. The principle of "diminishing returns to diversification" has informed actual portfolio construction since then.

Statman (1987) enhanced this understanding by demonstrating that even larger portfolios (50–100 stocks) could yield additional, if minimal, diversification benefits. *Goetzmann and Kumar (2008)* investigated investor behavior and discovered that several individual investors frequently under-diversify due to overconfidence or familiarity bias, resulting in inferior

portfolio performance.

Recent research indicates that asset correlations, market conditions, and economic cycles significantly influence the efficacy of diversification. In times of financial crisis or systemic stress, asset correlations typically increase, diminishing the advantages of diversification. *Longin and Solnik (2001)* found that international correlations rise during market declines, suggesting that global diversification may offer limited protection during volatile periods.

2.3. Contemporary Viewpoints and Evaluations

Traditional diversification models emphasize variance reduction, whereas contemporary research promotes risk-based and factor-based diversification strategies. *Choueifaty and Coignard (2008)* proposed the Diversification Ratio, highlighting the need to assess diversification based on the risk contribution of each asset rather than merely the number of holdings. *Clarke, de Silva, and Thorley (2011)* similarly presented minimum-variance portfolios that attain diversification independent of projected returns.

Critics contend that excessive diversification may lead to over-diversification, in which the inclusion of too many assets may diminish potential returns without a corresponding reduction in risk. *Bali, Cakici, and Levy (2008)* observed that portfolios containing an excessive number of securities tend to exhibit index-like behavior, thereby diminishing the benefits of active management.

In emerging markets such as India, *Bekaert and Harvey (2002)* and *Chakrabarti & Roll (2015)* discovered that diversification across sectors and asset classes can yield significant advantages due to diminished correlations and enhanced growth potential. Nonetheless, they warned that as markets increasingly merge worldwide, the advantages of foreign diversification may wane with time.

2.4. Summary of Literature

Overall, literature consistently affirms that diversification remains an effective tool for reducing unsystematic risk and stabilizing returns. The extent of advantage is contingent on factors such as asset correlation, portfolio composition, market volatility, and the economic backdrop. Despite a comprehensive study, there persists a necessity to empirically assess the quantitative effects of diversification in modern markets, especially given the growing accessibility of novel financial instruments and cross-market data.

3. Research Methodology

A total of 52 respondents participated in the study. Among them, 20 participants 38.5% were male, and 32 participants 61.5% were female. This indicates that female respondents constituted a majority of the sample. The gender distribution suggests a higher level of female participation than male.

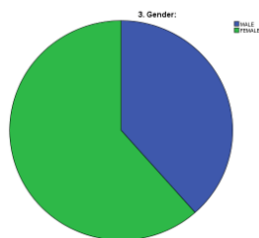


Figure 1: Gender.

Table 1: Current Ratio

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	20	38.5	38.5	38.5
Female	32	61.5	61.5	100
Total	52	100	100.0	

A total of 52 respondents participated in the study. Among them, 20 participants 38.5% were male, and 32 participants 61.5% were female. This indicates that female respondents constituted a majority of the sample. The gender distribution suggests a higher level of female participation than male.

Table 2: WPYTIPATE

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	3.8	3.8
	1	28	53.8	57.7
	2	11	21.2	78.8
	3	6	11.5	90.4
	4	4	7.7	98.1
	5	1	1.9	100.0
Above 80% of total	52	100.0	100.0	

A total of 52 respondents provided information regarding the percentage they typically allocate toward investments. The results reveal that more than half of the participants (28; 53.8%) allocate only 1% of their funds toward investment activities. Additionally, 11 (21.2%) respondents allocate 2%, and 6 (11.5%) allocate 3%. A smaller portion reported investment allocations of 4% (7.7%), and only one respondent (1.9%) reported allocating more than 80% of their funds.

These findings indicate that the majority of respondents allocate only small proportions of their available financial resources, suggesting low investment intensity among participants.

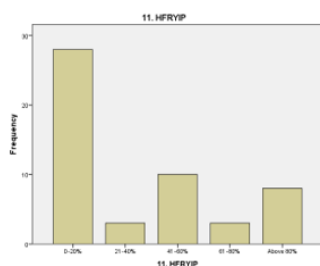


Figure 2: HFRYIP.

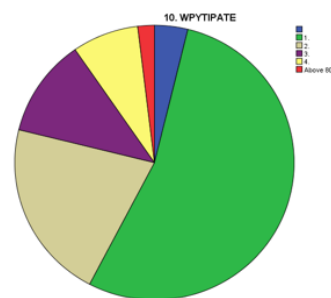


Figure 3: WPYTIPATE.

Table 3: HFRYIP

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20%	28	53.8	53.8
	21-40%	3	5.8	59.6
	41-60%	10	19.2	78.8
	61-80%	3	5.8	84.6
	Above 80%	8	15.4	100.0
Total	52	100.0	100.0	

A total of 52 respondents indicated the proportion of their income allocated toward investments. The results show that more than half of the participants (28; 53.8%) invest only 0-20% of their income, indicating a relatively low investment commitment. A further 10 respondents (19.2%) invest between 41% and 60%, whereas eight respondents (15.4%) reported investing more than 80% of their income. Very few allocate 21-40% (5.8%) or 61-80% (5.8%).

Overall, the distribution suggests that while the majority maintain conservative investment behavior, a notable minority exhibits very high levels of income investment (above 80%), reflecting a mixed but polarized investment strategy among the respondents.

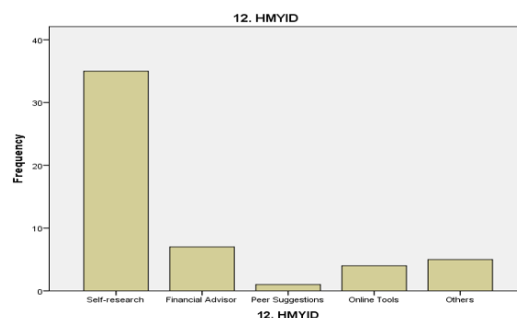


Figure 4: HFRYIP.

The majority of respondents (35, 67.3%) reported relying on self-research while making investment decisions. A smaller portion used financial advisors (7; 13.5%) and online tools (4; 7.7%). Peer suggestions (1; 1.9%) were the least-preferred decision-making source, while 9.6% (n = 5) indicated other sources.

These results highlight self-directed decision-making among most investors in the sample.

Table 4: HMYID

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Self-research	35	67.3	67.3	67.3
	Financial Advisor	7	13.5	13.5	80.8
	Peer Suggestions	1	1.9	1.9	82.7
	Online Tools	4	7.7	7.7	90.4
	Others	5	9.6	9.6	100.0
	Total	52	100.0	100.0	

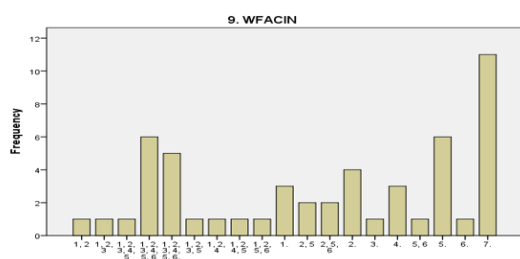


Figure 5: HFRYIP.

Table 5: HMYID

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1, 2	1	1.9	1.9	1.9
	1, 2, 3	1	1.9	1.9	3.8
	1, 2, 3, 4, 5	1	1.9	1.9	5.8
	1, 2, 3, 4, 5, 6	6	11.5	11.5	17.3
	1, 2, 3, 4, 5, 6, 7	5	9.6	9.6	26.9
	1, 2, 3, 5	1	1.9	1.9	28.8
	1, 2, 4	1	1.9	1.9	30.8
	1, 2, 4, 5	1	1.9	1.9	32.7
	1, 2, 5, 6	1	1.9	1.9	34.6
	1.	3	5.8	5.8	40.4
	2, 5	2	3.8	3.8	44.2
	2, 5, 6	2	3.8	3.8	48.1
	2.	4	7.7	7.7	55.8
	3.	1	1.9	1.9	57.7
	4.	3	5.8	5.8	63.5
	5, 6	1	1.9	1.9	65.4
	5.	6	11.5	11.5	76.9
	6.	1	1.9	1.9	78.8
	7.	11	21.2	21.2	100.0
	Total	52	100.0	100.0	

A multiple-response question was used to identify factors influencing respondents' investment decisions. The results indicated high variability in the combination of influencing factors, suggesting that investors often consider multiple factors simultaneously rather than relying on a single determinant. Among the respondents, the most frequent response pattern included all seven listed factors ($n = 11$; 21.2%), followed by selection of factors 1 and 2 only ($n = 6$; 11.5%), and selection of factor 5 alone ($n = 6$; 11.5%). Several other combinations were reported, but with lower frequencies (9.6%).

Overall, the findings suggest that investment decisions are multi factorial, with respondents often integrating diverse considerations rather than depending on a single investment criterion.

Table 6: Chi Square test frequencies

	Observed N	Expected N	Residential
1	52	52	0
Toatl	52 ^a		

Table 7: Chi Square test frequencies

	Observed N	Expected N	Residual
Self-research	35	10.4	24.6
Financial Advisor	7	10.4	-3.4
Peer Suggestions	1	10.4	-9.4
Online Tools	4	10.4	-6.4
Others	5	10.4	-5.4
Total	52		

Table 8: Test Statistics

	HMYID
Chi-Square	74.538a
df	4
Asymp. Sig.	.000

- 0 cells (0.0%) have expected frequencies less than 5.
- The minimum expected cell frequency is 10.4.

Hypotheses

- H_0 (Null Hypothesis): There is no significant difference in the frequency of various investment decision sources among respondents.
- H_1 (Alternative Hypothesis): There is a significant difference in the frequency of various investment decision sources

Table 9: Chi Square test frequencies

Statistic	Value
χ^2	74.538
df	4
p-value	.000

A chi-square goodness-of-fit test was conducted to determine whether there were differences in the sources of information used for investment decisions. The result was statistically significant,

$$\chi^2(4, N = 52) = 74.54, p \leq .001 \quad (1)$$

indicating that respondents differed significantly in their preference for investment information sources.

Most respondents reported self-research as their primary decision source (67.3%), which occurred more frequently than expected, whereas reliance on peer suggestions and online tools was less frequent.

Thus, the null hypothesis is rejected, and the results support that investment decisions are predominantly self-driven among participants.

4. Findings

- A majority of the respondents were female (61.5%), indicating higher female participation in the study.
- The age variable showed no variation, as all respondents fell under a single age category.
- Investors considered multiple factors simultaneously while making investment decisions, indicating that investment behaviour is multifactorial.
- More than half of the respondents (53.8%) typically invested only 1
- Over half of the respondents (53.8%) invested 0–20
- Self-research was the dominant source of investment decision-making (67.3%), suggesting strong independent and self-directed investment behaviour.
- Reliance on peer suggestions (1.9%) and online tools (7.7%) was minimal, demonstrating limited dependence on social or digital decision support.
- There was a statistically significant difference in the preference for investment decision sources,
- $\chi^2(4, N = 52) = 74.54, p \leq .001$, leading to the rejection of the null hypothesis.
- Findings indicate that although respondents are confident in making their own financial decisions, they still allocate only a small proportion of their income and savings.

References

- Allen, D. E., McAleer, M., Powell, R. J., & Singh, A. K. (2016). Downside risk metrics as portfolio diversification strategies across the Global Financial Crisis. *Journal of Risk and Financial Management*, 9(2), 6. <https://www.mdpi.com/1911-8074/9/2/6>
- Álvarez-Pérez, H., Díaz-Crespo, R., & Torres, M. (2024). ESG investing versus the market: Returns and risk analysis and portfolio diversification in Latin America. *Academia Revista Latinoamericana de Administración*, 37(1), 87–104. <https://doi.org/10.1108/ARLA-07-2023-0189>
- Babu, D. R. (2020). Behavioural finance heuristic-driven factors impact on Indian stock market investors' investment decisions: A review. *Asia Pacific Journal of Research*, 1(CXIV), 16–19. <https://www.academia.edu>
- Babu, D. R., Sreenivas, T., Kumar, N. H., Panda, H. K., & Reddy, B. R. (2025). Behavioural biases and the diversification puzzle: Why investors fail to build optimal portfolios. *International Journal of Business and Management Sciences (IJBMS)*, 1(1), 23–26. <https://scholar.google.com>
- Bakri, A. (2015). Portfolio diversification strategy and the impacts on the Middle East real estate investment decision. *International Journal of Economics and Finance*, 6(2), 62. <https://doi.org/10.5539/ijef.v6n2p62>
- Bousslama, O., & Ouda, O. (2015). International portfolio diversification benefits: The relevance of emerging markets. *International Journal of Economics and Finance*.
- Bukar, A. A., & Ibrahim, U. A. (2021). Investigating the impact of risk management on project performance in the construction industry: Evidence from Nigeria. *Journal of Business and Management*, 23(5), 45–56. <https://pdfs.semanticscholar.org/>
- Cai, X. (2022). Portfolio optimization for extreme risks with maximum diversification: An empirical analysis. *Risks*, 10(5), 101. <https://doi.org/10.3390/risks10050101>
- Delpini, D., Battiston, S., Caldarelli, G., & Riccaboni, M. (2018). The network of U.S. mutual fund investments: Diversification, similarity and fragility throughout the Global Financial Crisis [Working paper]. arXiv.
- Evaluating the efficiency of alternative investment vehicles. (n.d.). *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*. <https://www.ijraset.com/research-paper/evaluating-the-efficiency-of-alternative-investment-vehicles>
- Ferretti, S. (2022). On the modelling and simulation of portfolio allocation schemes: An approach based on network community detection [Preprint]. arXiv. <https://arxiv.org/abs/2203.11780>
- Fung, W., & Hsieh, D. A. (2000). Performance characteristics of hedge funds and commodity funds: Natural vs spurious biases. *Journal of Financial and Quantitative Analysis*, 35(3), 291–307. <https://doi.org/10.2307/2676205>
- Hasan, M. F., Cavaliere, L. P., Keswani, S., Kumar, S., Mathew, S., & Das, S. (2021). The impact of portfolio diversification on risk management practices [PDF]. ResearchGate. <https://www.researchgate.net/publication/356715774>
- Ibragimov, R. (2024). Portfolio diversification and Value-at-Risk under thick-tailedness [Working paper]. Harvard Scholar.
- Jayeola, D., Ismail, Z., & Sufahani, S. F. (2024). Effects of diversification on optimizing a portfolio's risk. *Malaysian Journal of Fundamental and Applied Sciences*. <https://doi.org/10.11113/mjfas.v0n0.567>
- Jiao, H. (2025). Research on diversification of asset allocation and risk management in the context of globalization. *Education, Science, Technology, Innovation and Life*. <https://doi.org/10.23977/ferm.2025.080205>
- Jin, K.-Y. (2019). The myth of diversification: The destabilizing impact of diversification on financial institutions. *Journal of Financial Regulation*, 5(2), 179–219. <https://doi.org/10.1093/jfr/fjz007>
- Kolm, P. N., Tütüncü, R., & Fabozzi, F. J. (2014). 60 years of portfolio optimization: Practical challenges and current trends. *European Journal of Operational Research*, 234(2), 356–371. <https://doi.org/10.1016/j.ejor.2013.10.060>
- Koumou, G. B. (2016). Risk reduction and diversification within Markowitz's mean-variance model: A theoretical revisit [Working paper]. arXiv. <https://arxiv.org/abs/1608.05024>
- Lan, H., Wang, L., Li, M., Xiong, Y., & Li, Y. (2025). Network centrality, diversification, and portfolio returns: Economic insights from the blockchain industry. *Economic Modelling*, 132, 106–129. <https://doi.org/10.1016/j.econmod.2025.106129>
- Liu, L., & Clarkson, P. (2025). Asset allocation, diversification, and co-movement effects: A global analysis of bonds and equities issued by the same firm. *Journal of Asset Management*, 26, 615–641.

- <https://doi.org/10.1057/s41260-025-00422-2>
22. Magar, R. R., & B. K., G. B. (2025). An empirical analysis of the effect of stock diversification on portfolio risk optimization: Evidence from the Nepalese share market. *Journal of Advanced Academic Research*, 12(1), 75–85. <https://doi.org/10.3126/jaar.v12i1.85148>
23. Martínez-Nieto, B., et al. (2024). Evaluation of strategy portfolios. *Computational Management Science*, 21, Article 17. <https://doi.org/10.1007/s10287-023-00497-5>
24. Medo, M., Yeung, C. H., & Zhang, Y.-C. (2009). How to quantify the influence of correlations on investment diversification. *International Review of Financial Analysis*, 18(1–2), 34–39. <https://ideas.repec.org/a/eee/finana/v18y2009i1-2p34-39.html>
25. Mohseni, S. F., Arian, H. R., & Bégin, J.-F. (2024). The lexical ratio: A new perspective on portfolio diversification [Preprint]. arXiv. <https://arxiv.org/abs/2411.06080>
26. Munizu, M., Mulyati, S., & Zikirullaeva, N. (2024). Portfolio diversification strategy and its influence on investment risk and return in the capital market. *Multifinance*, 1(3), 211–220. <https://doi.org/10.61397/mfc.v1i3.117>
27. Novel risk measures for portfolio optimization using an equal-correlation portfolio strategy. (n.d.). [Preprint]. arXiv. <https://arxiv.org/abs/2508.03704>
28. Palich, L. E., Cardinal, L. B., & Miller, C. C. (2000). Curvilinearity in the diversification–performance linkage: An examination of over three decades of research. *Strategic Management Journal*, 21(2), 155–174. [https://doi.org/10.1002/\(SICI\)1097-0266\(200002\)21:2<155::AID-SMJ82>3.0.CO;2-U](https://doi.org/10.1002/(SICI)1097-0266(200002)21:2<155::AID-SMJ82>3.0.CO;2-U)
29. Parsaei, M., Askarany, D., Maleki, M., & Rahmani, A. (2024). Risk management in product diversification: The role of managerial overconfidence in cost stickiness—Evidence from Iran. *Risks*, 12(2), 45. <https://doi.org/10.3390/risks12020045>
30. Platen, E., & Rendek, R. (2012). Approximating the numéraire portfolio by naive diversification. *Journal of Asset Management*, 13(1), 34–50. <https://doi.org/10.1057/jam.2011.36>
31. Rehman, Z. U., Muhammad, N., Sarwar, B., & Raz, M. A. (2019). Impact of risk management strategies on the credit risk faced by commercial banks in Balochistan. *Financial Innovation*, 5(1), 1–18. <https://doi.org/10.1186/s40854-019-0142-3>
32. Samuels, J., et al. (2024). Enhancing investment management strategies: A comprehensive analysis of financial instruments and risk mitigation techniques [PDF]. ResearchGate. <https://www.researchgate.net/publication/378592563>
33. Sharma, P. (2023). Evaluating the effectiveness of international portfolio diversification strategies in mitigating risks and enhancing returns. *European Economic Letters*, 13(5), 2084–2100. <https://doi.org/10.52783/eel.v13i5.2851>
34. Soremekun, Y. M., Udeh, C. A., Oyegbade, I. K., Igwe, A. N., & Ofodile, O. C. (2024). Strategic conceptual framework for SME lending: Balancing risk mitigation and economic development. *International Journal of Multidisciplinary Research and Growth Evaluation*, 5(1), 1056–1063. <https://doi.org/10.54660/IJMRGE.2024.5.1.1056>
35. Statman, M. (1987). How many stocks make a diversified portfolio? *Journal of Financial and Quantitative Analysis*, 22(3), 353–363. <https://doi.org/10.1017/S0022109000013839>
36. Tjiwidjaja, H. (2025). Optimization of investment portfolio returns through an integrated risk management approach. *The Journal of Academic Science*, 2(3). <https://doi.org/10.59613/avhndf66>
37. Van Mieghem, J. A. (2007). Risk mitigation in newsvendor networks: Resource diversification, flexibility, sharing, and hedging. *Management Science*, 53(8), 1269–1288. <https://doi.org/10.1287/mnsc.1060.0674>
38. Vara Lakshmi, T., & Reddy, M. K. (2024). Diversification: A strategic approach towards risk mitigation of select stocks. *International Research Journal on Advanced Engineering and Management (IRJAEM)*, 2(5). <https://doi.org/10.47392/IRJAEM.2024.0252>
39. Vasuki, M., Celestin, M., Boakye, M. M., & Dinesh Kumar, A. (2025). Evaluating the efficiency of portfolio diversification strategies using statistical correlation metrics. *Brainae Journal of Business, Sciences & Technology*, 9(2), 160–170. <https://doi.org/10.5281/zenodo.14880876>
40. Zaimović, A. (2021). How many stocks are sufficient for an equity portfolio? *Journal of Risk and Financial Management*, 14(11), 551. <https://www.mdpi.com/1911-8074/14/11/551>