THE IMPACT OF THE GEORGIAN REAL ESTATE INVESTMENT TRUST ON THE PERFORMANCE OF VARIOUS PORTFOLIOS

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Abstract

This study aims to explore the potential impact of the anticipated Georgian Real Estate Investment Trusts (REITs) on the performance of investment portfolios. Due to the absence of Georgian REITs, a simulated financial asset representing a Georgian Residential REIT was engineered. The study employed correlation analysis, portfolio analysis, Sharpe Ratio evaluation, and Efficient Frontier analysis. Portfolios in the study included various assets such as Georgian Commercial Banks USD Certificates of Deposits, Georgian Treasury Bonds, NASDAQ Index, and the Georgian Pension Fund Global Equity Portfolio. Monthly data from 2021-2023 were used to engineer Georgian REIT and estimate expected returns, volatility, Sharpe ratios, and correlation coefficients. The study concludes that incorporating a Georgian REIT into diversified investment portfolios can significantly enhance their attractiveness by improving the risk-return trade-off. The findings highlight the necessity for Georgian regulators and market participants to consider the introduction of REITs as a viable investment vehicle. Additionally, the research contributes to the limited scholarly literature on REITs' impact in emerging markets, offering a framework for future studies in similar contexts.

Keywords: Emerging financial markets, financial engineering, simulated REIT, Sharpe ratio maximisation, efficient frontier analysis

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JEL Classification: G11, G17, O16

1. Introduction

Many Investors try to diversify their holdings and/or seek new opportunities to increase their income. Innovations help them to achieve goals and may also contribute to the overall efficiency and stability of financial markets. Real Estate Investment Trust (REIT) is a good example of an innovative investment vehicle. REITs can play a significant role in the Georgian capital market. The development of REITs could be useful in enhancing the attractiveness and drive of Georgia's financial landscape. However, at the moment of current research (June 2024), no such instrument was introduced in Georgia.

According to the United States National Association of Real Estate Investment Trusts (NAREIT, no date), REITs are described as firms engaged in owning or financing property that yields income across multiple real estate sectors. REITs give investors access to the real estate sector without buying actual property assets. They are similar to mutual funds, but instead of holding stocks or bonds, REITs primarily own, operate, or finance income-generating real estate assets.

Today, REITs play a significant role in investment portfolios. By June 2024, the total equity market capitalisation of the Financial Times Stock Exchange (FTSE) Nareit All REITs Index is $1.328 trillion (NAREIT, 2024).

REITs play an important role in modern investment portfolios, offering consistent, predictable income from rental payments and a hedge against inflation. REITs stand out as a superior diversification tool because of their low correlation with other financial instruments (Imperiale, 2006).

Despite the recognised advantages and growing popularity, there is a noticeable gap in scholarly research regarding their impact within specific investment contexts, such as emerging markets like Georgia. This study is poised to fill this gap by providing an analysis of REITs' influence on portfolio diversification, risk characteristics, and return optimisation within typical Georgian investment portfolios and comparison with global benchmarks by employing key financial metrics (e.g. Sharpe ratio). To do so, because of the absence of Georgian REIT instruments, we employed a financial engineering approach and constructed a simulated financial asset. Furthermore, the framework of

the efficient frontier is used to examine the effects of diversification and the possibilities for enhancement that REITs might present in a diversified portfolio.

The research objectives of the study are:

1. Evaluate the impact of potential Georgian REIT on the performance of different types of portfolios. By examining a range of assets and portfolio types, this research intends to uncover the specific conditions under which REIT contributes most significantly to certain portfolio outcomes.

2. Analyse the role of potential Georgian REIT in portfolio diversification. Using quantitative methodologies, the study will examine correlation dynamics among different asset classes, with a particular focus on the constructed REIT. The goal is to understand how REIT can affect overall portfolio risk through low or negative correlations with other asset classes.

3. Find portfolio structures that maximize the Sharpe ratio. Through the examination of various portfolio configurations, this objective seeks to clarify the influence of REIT on the Sharpe ratio.

The National Bank of Georgia, in collaboration with capital market participants, is engaging in efforts to establish REITs as an investment asset in the Georgian market. Furthermore, the project funded by the United States Agency for International Development and Deloitte Consulting LLP explored the global landscape, examined the regulatory frameworks and offered recommendations for the Georgian government's consideration (USAID, 2023). Therefore, studying REITs as an asset class for the Georgian market is significant and well-timed.

Based on objectives, four research questions are formulated:

1. How may Georgian REIT correlate with different types of assets in investment portfolios?

2. How may Georgian REIT impact portfolio diversification?

3. What impact may Georgian REIT have on the Sharpe ratio of typical investment portfolios?

4. How may Georgian REIT affect the risk-return profile of various investment portfolios?

2. Literature review

Nowadays, investors have access to several types of REITs, like equity, mortgage, and hybrid REITs. The most common type of REITs, known as Equity REITs, specialises in acquiring, managing, and generating earnings from real estate properties. They cover various sectors, including retail, healthcare, commercial, and residential properties. Investors in REITs benefit from direct earnings from real estate, such as rental income, making these REITs attractive for those seeking regular income streams (Krewson-Kelly and Thomas, 2016).

REITs offer an attractive option over direct investments in real estate due to several significant benefits. According to NAREIT (NAREIT; no date), these include competitive long-term performance, stable dividend yields, transparency and liquidity, and portfolio diversification.

Liang and McIntosh (1998) offer a comprehensive study of REITs. Utilising Sharpe's Ratio analysis model, the authors assess the performance of REITs from March 1984 to December 1997. The authors' research incorporates the total returns of various market indices, including the S&P 500, S&P MidCap 400, S&P SmallCap 600, government bonds, and Treasury bills. Their research identifies that while equity REITs aligned closely with their respective investment benchmarks before 1994, their performance surged past these benchmarks after 1994. The evidence of REITs' outperformance post-1994 suggests that these instruments became increasingly relevant for investors seeking diversification benefits and potentially possibly superior returns relative to traditional stocks and bonds (Liang and McIntosh, 1998).

Waggle and Agrrawal (2006) investigate the interactions between Real Estate Investment Trusts and stocks, focusing on how differences in risk and the relationship between these asset classes can provide the most suitable portfolio mix for investors. According to the research, there is a significant influence of anticipated REIT returns on optimal asset allocation decisions.

Lee (2010) offers an analysis of the value of REITs relative to traditional investment assets. Drawing on the analytical framework developed by Liang and McIntosh (1998), which evaluates investments based on their risk-adjusted performance, Lee examines REITs' contributions across various market conditions. His analysis

distinguishes the dual benefits of REITs, diversification and return, particularly highlighting their superior performance compared to corporate and government bonds in varying economic landscapes (Lee, 2010).

Lee and Stevenson (2005) highlight the dual functionality of REITs in investment portfolios. Two critical factors that underpin the advantageous position of REITs within mixed-asset portfolios are low correlations and the specific place of REITs at the midpoint of the equity and fixed-income markets. The study demonstrates that REITs act as a tool for return enhancement in lower-risk settings and as a risk reduction tool as the portfolio moves towards higher risk and return configurations (Lee and Stevenson, 2005).

Wong et al. (2012) conducted a comprehensive analysis of Singapore REITs within multi-asset portfolios, focusing on their diversification benefits and performance improvement potential. The study employs Markowitz's (1987) mean-variance optimisation, the Capital Asset Pricing Model, and the Black-Litterman (1992) model to assess the role and performance of Singapore REITs relative to other primary asset categories, including stocks, government securities, and publicly traded real estate firms. The study constructed efficient frontiers for portfolios containing stocks, government securities, and Singapore REITs to evaluate the diversification benefits of incorporating the latter. The research used traditional Markowitz's mean-variance optimisation to graph how the asset allocation changes with different levels of historical returns. The summary of the statistics included mean monthly returns, standard deviation of returns, variance, and Sharpe ratios to compare their risk-adjusted performance. The study shows that REITs from Singapore offer considerable diversification advantages in a multi-asset portfolio (Wong, Tong and Keow, 2012).

Bhuyan et al. (2014) show that under certain conditions investors of all risk profiles would benefit from a significant allocation towards REITs. Research suggests that REITs play a substantial role in enhancing portfolio diversification and optimising return for given levels of risk.

Other researches proving REITs valuableness in portfolio management for diversification or performance in various setups and environments include Chandrashekaran (1999) and Coskun et al. (2017).

More recent studies indicate that even during severe economic conditions, like during the COVID-19 pandemic, REIT can demonstrate stable performance and may outperform other assets as an effective hedge instrument. Victor et al. (2023) examined the performance of Asian REITs before and during COVID-19. The study concluded that REIT markets in Asia were efficient, with no significant differences in returns or volatility due to the pandemic. Damani et al. (2024) explored the impact of COVID-19 on US REITs, finding reduced performance without significant changes in risk profiles. Sümer (2023) analysed the hedging abilities of various assets, including REITs, during the COVID-19 pandemic in Turkey. The study found that a small subset of REITs offered inflation protection while other assets, like gold and stock indices, did not.

The real estate industry in Georgia is fast-growing and a significant sector within the economy. According to statistical data provided by the National Statistics Office of Georgia, from 2018 to 2022, the number of registered and operational real estate companies rose, especially within the construction industry. 6.5% of Georgia's GDP as of 2022 derived from real estate-related activities.

The Financial Stability Report of the National Bank of Georgia (2023) highlights that post-pandemic recovery and increased migration to the country have significantly boosted real estate demand, leading to an increase in rental prices. The National Bank of Georgia anticipates further growth as the country transitions back to office work from remote working, forecasting that prices will not fall below pre-pandemic levels in the long term (National Bank of Georgia, 2023). Growth is driven by factors such as tourism expansion, easier access to mortgage loans, and urbanisation trends exhibiting interesting opportunities for the REIT market (Skhirtladze and Nakashidze, 2021).

TBC Capital's Report (TBC Capital, 2023) points out that commercial sector rents are predominantly dollarised, with mechanisms often included in lease agreements to hedge currency risk. 77% of the rent is in USD, 15% in GEL, and 7% in EUR.

Galt and Taggart (2024) predict a 4.2% annual increase in apartment sales in Tbilisi for 2023, suggesting a strong demand in the city's real estate market. This trend extends to the secondary market as well.

Several seminal works establish a theoretical framework for the current study. A special place should be assigned to the Modern Portfolio Theory (MPT) introduced by Harry M. Markowitz (1952),

which underscores diversification's role in portfolio selection, advocating for a mix of assets to mitigate risk and optimise returns. Markowitz further elaborated on this topic in his book "Portfolio Selection: Efficient Diversification of Investments" (Markowitz, 1959).

Within the context of Modern Portfolio Theory, the variability of investment returns is quantified using standard deviation as a metric. An increased standard deviation indicates an increased level of risk or uncertainty. Utilising this parameter allows investors to quantitatively assess the risk and construct a portfolio with the objective of optimizing returns for a set risk level. Correlation among portfolio assets is utilized to achieve effective diversification.

Utilising the Efficient Frontier (Markowitz, 1952) allows for a quantitative assessment of the risk-return trade-off, ensuring that portfolios are optimised for the best possible returns at various risk levels. This methodology enables the examination of different investment approaches, asset distributions, or specific asset categories (like REITs), in terms of their impact on a portfolio's overall efficacy.

Another tool used for portfolio evaluation is the Sharpe ratio, introduced by William F. Sharpe (1966). It measures an investment's performance relative to a risk-free asset, adjusting for the investment's risk. This ratio is widely used in finance to assess the additional return an investment provides for each unit of risk.

$$Sharpe\ Ratio = \frac{r_p - r_f}{\sigma_p} \tag{1}$$

Where:
1. r_p is the expected return of the portfolio,
2. r_f is the risk-free rate of return,
3. σ_p is the standard deviation of the portfolio's excess return.

Fundamentally, among two investments yielding the same return, a higher Sharpe ratio offers a greater outcome. In this research, applying the Sharpe ratio can help identify which investments or assets allocation in a portfolio provide the best compensation for their risk, supporting more informed investment decisions.

The general hypothesis of this research can be formulated as follows: "Incorporating Georgian Real Estate Investment Trust into diversified investment portfolios enhances their attractiveness by

positively improving the risk-return trade-off". This enhancement is believed to be reflected in improved diversification benefits and a more favourable risk-adjusted return profile as measured by the Sharpe ratio and assessed by efficient frontier analysis. The hypothesis is tested by a comparative analysis of portfolios' performance with and without REIT.

3. Research methodology and data

In the context of Georgia, where Real Estate Investment Trusts are currently not presented, this study undertakes the innovative approach of constructing a simulated Georgian Residential REIT. The financial instrument is constructed based on Tbilisi residential real estate information.

Quantitative methods are used to analyze the performance of portfolios with different types of assets with and without constructed REIT using statistical techniques and financial methods such as:

- Correlation Analysis, which assess the degree of linear relationship between the returns of REIT and other portfolio assets, providing insights into possible diversification.
- Modern Portfolio Theory. MPT principles will guide the optimization process, aiming to construct portfolios that maximize returns at specific risk levels or, alternatively, minimize risk for a designated expected return.
- Sharpe Ratio Evaluation. By calculating the Sharpe ratio, this study will measure the performance of portfolios adjusted for risk, enabling a comparison of the efficiency of portfolios with and without REIT inclusion.
- Efficient Frontier Analysis. The construction of the Efficient Frontier will allow to identify the optimal portfolios that provide the maximum expected return for a set level of risk, highlighting the contribution of REIT to portfolio efficiency.

The current study utilises secondary data collected from reputable financial databases, industry reports, and academic journals. These sources include the National Bank of Georgia, the National Statistics Office of Georgia, TBC Capital, Galt & Taggart, Bloomberg L.P., Colliers, Georgian Pension Agency, and several academic journals studied in the literature review section.

For creating a simulated Georgian Residential REIT, information was obtained from reports provided by TBC Capital.

Monthly information for 2021-2023 was used. Monthly average sale prices of Tbilisi residential real estate area were used to estimate REIT's value, and monthly rental prices, after deducting estimated costs and expenses, were used to estimate REIT's incomes. Both provided estimates of monthly yields and return variability.

To estimate REIT's appropriate management costs and expenses, information was collected from the report published by the USAID Economic Governance Program and Deloitte (USAID, 2023). Based on the report, the management cost of REIT was set to 1.5% of the value (market sales price of real estate area) of residential real estate per annum. Maintenance cost of residential property was set to 5% of monthly rental price, and insurance costs were estimated as 0.2% of the value of residential real estate per annum.

The following financial assets were used in the study:

1. Georgian Commercial Banks USD Certificate of Deposits (CD) – data is obtained from the National Bank of Georgia.

2. Georgian Treasury Bonds GEORG 2 ¾ 04/22/26 – data is collected from Bloomberg L.P.

3. NASDAQ Index – data is collected from Bloomberg L.P.

4. Georgian Pension Fund Global Equity Portfolio – data is collected from the monthly statements of the pension agency's investment portfolio.

The Pension Fund Global Equity Portfolio (Pension Fund) consists of various Exchange Traded Funds (ETFs), with each component's weight in the Global Equity Portfolio indicated as follows: Vanguard FTSE Emerging Markets ETF at 28.5%, Vanguard FTSE Europe ETF at 24.2%, Vanguard FTSE Pacific ETF at 23.9%, SPDR S&P 500 ETF Trust at 19.0%, iShares Latin America 40 ETF at 3.6%, and Franklin FTSE Canada ETF at 0.8%. These percentages represent the proportionate investment in each ETF relative to the Pension Fund Global Equity Portfolio value as of January 31, 2024 (Georgian Pension Agency, 2024).

In portfolio analysis, CDs and GEO Bonds represent presumably low-risk assets, NASDAQ Index represents Equity market performance and was selected based on broadness and high market capitalisation. The Pension Fund represents a High-Risk Investment Portfolio.

For each of the asset classes, monthly data of the years 2021-2023 are used to calculate the expected return, volatility, Sharpe ratio, and correlation coefficients.

For the risk-free rate factor, 3 Month US Treasury Bill (B 0 01/23/24 Govt.) yield as of December 29, 2023 has been used. The risk-free rate stands at 5.2750%. The data was obtained from Bloomberg L.P.

Four distinct portfolios were constructed for examination of diversification strategies and risk-return dynamics in the study. These portfolios are:

1. Portfolio 1 (low risk): Certificates of Deposit, Georgian Bond, and REIT.
2. Portfolio 2 (equity market): NASDAQ index and REIT.
3. Portfolio 3 (higher risk): Pension Fund and REIT.
4. Portfolio 4 (diversified): A diversified mix including CDs, Georgian Bond, NASDAQ, Pension Fund, and REIT.

For each portfolio configuration, the Sharpe ratio is calculated both in the absence and presence of REIT with different weights to determine the impact of REIT inclusion on portfolio performance. This analysis reveals the optimal asset allocations that maximize the Sharpe ratio, thus improving the portfolio's risk-return framework.

The final part of this research involves the development of the Efficient Frontier for portfolios. This segment clarifies the superior risk-return trade-offs achievable through strategic asset allocation. By constructing and comparing distinct graphs that visualize portfolio performance, it is offering clear insights into the value added by REIT in portfolio diversification. Python code and MS Excel were used for Sharpe ration maximization calculations and efficient frontier construction and analysis.

Research has several limitations. Firstly, the study has a limited scope. It uses the constructed Georgian REIT, which is a simulated investment instrument compared to other financial vehicles that already exist on the market. Performance of a constructed Georgian REIT may diverge from the actual one when it is introduced to the market. Secondly, the study does not include commercial REITs due to the lack of availability of reliable data. Thirdly, external factors, like changes in interest rates, economic conditions, and regulatory requirements at the moment of introduction of Georgian REIT, can have a significant impact on the performance of portfolios.

4. Results and analysis

Research findings show that constructed Georgian residential REIT have the highest expected return (23.46%) for the examined years (2021-2023) among the studied assets. However, the relatively high standard deviation (11.44%) suggests that REIT comes with considerable risk. This makes REIT suitable for investors seeking higher returns and comfortable with significant risk. Results are in Table 1.

Table 1

Expected Return and Standard Deviation of Assets

Asset	Expected Return	Standard Deviation
REIT	23.46%	11.44%
CD	3.45%	0.28%
GEO Bond	5.44%	2.00%
NASDAQ	6.07%	21.84%
Pension Fund	2.84%	16.31%

Source: own study

CDs offer the lowest expected return (3.45%). The low standard deviation of 0.28% reflects the stability and predictability of returns from CDs, but their attractiveness for conservative investors is under question since risk is above zero and yield is lower than that of US Treasury bills. GEO Bond provides a moderate expected return of 5.44% with relatively low risk. The standard deviation of 2.00% indicates low volatility and a more or less stable return. Investing in the NASDAQ offers a moderate expected return of 6.07% but comes with the highest risk, as shown by the standard deviation of 21.84%. The Georgian Pension Fund Global Equity Portfolio (Pension Fund) has the lowest expected return of 2.84%. Despite the low return, the risk level (16.31%) suggests a potential mismatch for conservative investors.

Correlation analysis (Table 2) between these financial instruments is noteworthy. Between NASDAQ index and Pension Fund is a strong positive correlation (0.8058). Positive correlation demonstrates NASDAQ and CDs as well (0.1690), although the coefficient is not high. A positive relationship is shown by Pension Fund and CDs (0.1719) with a low coefficient. But, more interestingly, some assets demonstrate a negative correlation. There is a slight negative

correlation between NASDAQ and REIT (-0.2144), a slight negative correlation is between NASDAQ and GEO Bond (-0.1226), a moderate negative correlation exists between REIT and CD (-0.3274), Pension Fund has a slight negative correlation with REIT (-0.1936) and GEO Bond (-0.1219), and a strong negative correlation demonstrates CDs and GEO Bond (-0.7329).

Table 2

Correlation Matrix

	NASDAQ	**Pension Fund**	**REIT**	**CD**	**GEO Bond**
NASDAQ	1	0.8058	-0.2144	0.1690	-0.1226
Pension Fund	0.8058	1	-0.1936	0.1719	-0.1219
REIT	-0.2144	-0.1936	1	-0.3274	0.1728
CD	0.1690	0.1719	-0.3274	1	-0.7329
GEO Bond	-0.1226	-0.1219	0.1728	-0.7329	1

Source: own study

According to these results, the answer to the first research question will be that REIT exhibits varying degrees of correlation with different types of assets. The correlations range from slight to moderate and include both positive and, more importantly, negative relationships. These correlations suggest that REIT may be appealing for investment portfolios.

The next step considered the calculation of the Sharpe ratios for these selected investment instruments. Results are presented in Table 3.

Table 3

Sharpe Ratio of Assets

Asset	**Sharpe Ratio**
REIT	1.59
CD	-6.43
GEO Bond	0.08
NASDAQ	0.04
Pension Fund	-0.15

Source: own study

REIT demonstrated a Sharpe ratio of 1.5899, showing a strong risk-adjusted return. This implies that REIT has returns that reward for the risk. The Sharpe ratio of CD is highly negative (-6.4267), indicating a very poor performance. The Pension Fund also has a negative Sharpe ratio of -0.1492. The GEO Bond shows the Sharpe ratio of 0.08, indicating a modest risk-adjusted return. NASDAQ index with a Sharpe ratio of 0.0365 shows a very low positive risk-adjusted return.

According to the Sharpe ratios, the REIT presents the most attractive risk-adjusted return, making it potentially the best standalone option for investors seeking to maximise returns for a given level of risk.

Furthermore, REIT shows its benefits for creating portfolios and optimising the weights to maximise its Sharpe ratio (Table 4 and Table 5, respectively).

Table 4

Key Performance Metrics of Different Portfolios

Portfolio Composition	Key Performance Metrics		
	Return (%)	Standard Deviation (%)	Sharpe Ratio
CD + Geo Bond	5.44	2.00	0.08
CD + Geo Bond + REIT	23.46	11.44	1.59
NASDAQ	6.07	21.84	0.04
NASDAQ + REIT	21.55	9.95	1.64
Pension Fund	2.84	16.31	-0.15
Pension Fund + REIT	22.09	10.52	1.60
CD + Geo Bond + NASDAQ + Pension Fund + REIT	21.55	9.95	1.64

Source: own study

According to the calculations, the optimal weight of CDs in the CD-Bond portfolio is 0. The result is expected based on the very pure performance of CDs. The optimal portfolio of these two assets is comprised only of Geo Bonds and, obviously, has characteristics of the latter.

Table 5

Optimal Weights of Assets for Maximizing Portfolio Sharpe Ratios

Portfolio Composition	Weights of Assets				
	CD	Geo Bond	REIT	NASDAQ	Pension Fund
CD + Geo Bond	0%	100%	N/A	N/A	N/A
CD + Geo Bond + REIT	0%	0%	100%	N/A	N/A
NASDAQ + REIT	N/A	N/A	88.99%	11.01%	N/A
Pension Fund + REIT	N/A	N/A	93.35%	N/A	6.65%
CD + Geo Bond + NASDAQ + Pension Fund + REIT	0%	0%	88.99%	11.01%	0%

Source: own study

The optimal allocation in the portfolio of CDs, Geo Bond and REIT is 100% of the latter. Again, this indicates that CDs and Bond are underperforming.

The NASDAQ+REIT portfolio showcased a return of 21.55%. Its standard deviation is 9.95%, suggesting a lower risk than a standalone REIT or NASDAQ. This portfolio achieved the highest Sharpe ratio among the strategies at 1.64. This performance underscores the benefits of diversifying with equities and REIT, balancing risk while enhancing returns. This strategy presents a diversified approach, allocating 88.99% to REIT and 11.01% to NASDAQ.

The combination of the Pension Fund with REIT resulted in a return of 22.09%, positioning it above the standalone Pension Fund but below REIT. With a standard deviation of 10.52%, the risk level is lower than such of the mentioned standalone assets, indicating a diversification effect. The Sharpe ratio is 1.60 - close to the NASDAQ-REIT portfolio and higher than standalone REIT or Pension assets have. This indicates that mixing Pension Fund assets with REIT can achieve a better performance. The allocation of REIT is 93.35% with a modest share in the Pension Fund of 6.65%.

The portfolio with the greatest diversification, which included CDs, Bond, NASDAQ, Pension Fund, and REIT demonstrated expected allocation result. Weights of CD, Bond and Pension Fund are 0%, and composition is the same as in the NASDAQ-REIT portfolio.

Obviously, portfolio properties are the same (21.55% return, 9.95% standard deviation, and 1.64 Sharpe ratio).

Research reveals that incorporating REIT can significantly enhance risk-adjusted returns. Portfolios that effectively mix asset types not only yield higher returns but also maintain managed levels of risk, demonstrating higher Sharpe ratios.

In the final stage, to assess portfolio risk-return trade-off and also for the graphical representations of portfolio performance, an efficient frontier analysis was conducted. Since the effective composition of Portfolio 1 (CD + GEO Bond + REIT) demonstrated 100% REIT allocation, it is meaningless to analyse it. Portfolio 2 (NASDAQ + REIT) and Portfolio 4 (CD + Geo Bond + NASDAQ + Pension + REIT) have the same effective composition (0% in CDs, GEO Bonds, and Pension assets, 88.99% in REIT and 11.01% in NASDAQ), there is no reason to conduct separate analysis for them; thus, Portfolio 4 was not assessed.

In Figures 1 and 2, portfolios represented by yellow dots represent efficient frontiers. This boundary includes the optimal portfolios, meaning that no additional expected return is attainable without a corresponding increase in risk. Any other allocations either provide less return for the same level of risk (below the line) or have a higher risk for the same level of return (righter of the line). On the contrary, the blue/green dots represent portfolios with the worst risk/return relationship.

Figure 1

Efficient Frontier of Portfolio 2: NASDAQ + REIT
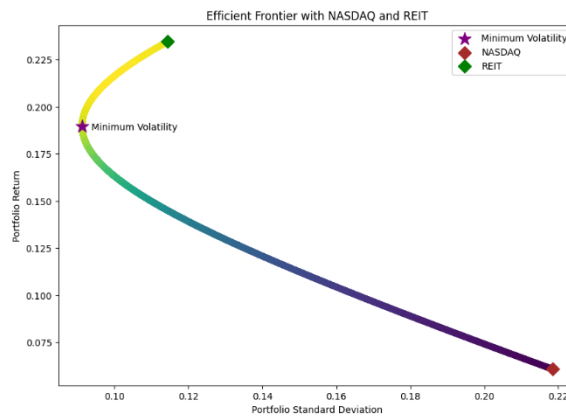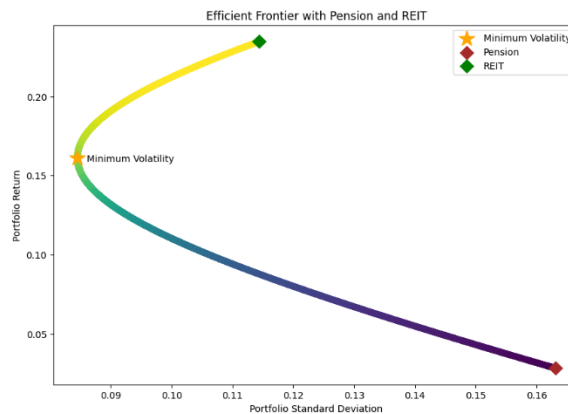

Source: own study

The curve in Figure 1 represents the efficient frontier, indicating the maximum expected return for a given level of risk across various portfolio compositions of NASDAQ and REIT investments.

Marked by a star on the graph is the "Minimum Volatility" point, which represents the portfolio with the lowest standard deviation. For investors with high-risk aversion, this specific portfolio composition is of great interest, as it represents the most stable investment within the given asset pool. Portfolio's minimum standard deviation is 9.13% and Portfolio Expected Return at this point is 18.90%. The NASDAQ's weight in the minimum risk portfolio is 26.26% and, accordingly, the REIT weight is 73.74%. The highlighted weight acts as a key threshold, the upper part of the chart (yellow curve) shows that portfolios with REIT have a better risk-return trade-off.

The presented curve in Figure 2 shows the efficient frontier for a portfolio combining Pension Fund and REIT. At the "Minimum Volatility" point (indicated by a star), the Pension Fund's weight in the portfolio is 35.35% (REIT's - 64.65%). The portfolio's minimum standard deviation is 8.45%, and the expected return at this point is 16.17%.

Figure 2
Efficient Frontier of Portfolio 3: Pension + REIT

Source: own study

Rightward from the star along the efficient frontier (yellow curve), each point represents a gradual increase in the REIT's weight and expected return, accompanied by an increase in the level of the risk.

5. Conclusion

The study explored the impact of the constructed Georgian residential Real Estate Investment Trust on the performance of diversified investment portfolios, guided by the hypothesis that incorporating REIT enhances portfolio attractiveness by improving the risk-return trade-off. Through the examination of REIT's correlation with various asset classes, this study indicates that REIT exhibits diverse correlations with other asset types, ranging from slight to moderate, including both positive and negative relationships (question 1). These correlations suggest that REIT may play a significant role in investment portfolios by enabling diversification. Diversity underscores the importance of considering REIT in diversified investment strategies, as they offer the potential for higher returns compared to standalone CD, GEO Bond, the NASDAQ index, and the Georgian Pension Fund (question 2).

Moreover, the analysis of Sharpe ratios of standalone assets revealed that REIT presents the most attractive risk-adjusted return among the selected financial instruments, suggesting that it offers a return that compensates well for its risk level, making it an attractive option for investors.

The study further highlights the significant benefits of incorporating REIT into portfolios. Portfolios that included REIT not only yielded higher returns but also demonstrated lower risk levels, as evidenced by their Sharpe ratios (question 3). This demonstrates that strategic asset allocation, involving a mix of REIT with other investment vehicles, can substantially enhance risk-adjusted returns.

Finally, efficient frontier analysis of the portfolios makes clear that REIT can improve the efficient frontier across different investment scenarios and allow to achieve diversified, better balanced, and more profitable investment outcomes (question 4).

The study demonstrates that the creation of the Georgian REIT may be beneficial for the market and investors, including such institutional investors as the Georgian Pension Agency.

In conclusion, the findings of this study confirm the hypothesis that incorporating REIT into diversified investment portfolios enhances their attractiveness by positively improving the risk-return trade-off. REIT contributes to portfolio diversification, offers attractive risk-adjusted returns, and influences the overall performance of investment portfolios positively.

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