White Paper: The Impact of Interest Rate Changes on Stock Market Returns and Real Estate Markets

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# Introduction

Interest rates play a crucial role in financial markets, affecting both stock prices and real estate values. This research project explores the relationship between Federal Reserve interest rate changes, stock market returns, and real estate markets in different states (e.g., Florida and Arizona).

# Research Questions

1. How do changes in Federal Reserve interest rates impact stock market returns across different sectors?
2. What is the relationship between interest rate changes and real estate markets, particularly in states with high population growth like Florida and Arizona?
3. How can financial mathematics concepts such as rate of return, net present value (NPV), and internal rate of return (IRR) be applied to analyze these relationships?

# Methodology & Financial Mathematics Concepts

## Stock Market Analysis

* Rate of Return Calculation:
  + Analyze how sector-specific stock returns (e.g., real estate, financials, and technology) react to interest rate hikes and cuts.
  + Use historical stock price data from major indices (e.g., S&P 500, Dow Jones).
  + Compute annualized returns and compare trends before and after rate changes.
* Net Present Value (NPV) and Internal Rate of Return (IRR):
  + Use NPV to determine whether stock valuations become more attractive when interest rates change.
  + Apply IRR to compare stock investments under different rate environments.

## Real Estate Market Analysis

* Mortgage Rate Trends & Home Prices:
  + Compare real estate price changes in Florida and Arizona using historical data on mortgage rates, home values, and sales volume.
  + Assess how different interest rate environments influence housing affordability and investment attractiveness in these states.
* Duration and Immunization in Real Estate Financing:
  + Apply duration and convexity concepts to assess how mortgage-backed securities (MBS) react to interest rate changes.

# Data Collection & Sources

* Stock Market Data: Yahoo Finance, FRED (Federal Reserve Economic Data)
* Real Estate Data: Zillow Research, National Association of Realtors, Federal Reserve data
* Interest Rate Data: Federal Reserve website (historical federal funds rate changes)

Expected Outcomes

* Sectors like financials and real estate will likely show stronger reactions to interest rate changes.
* Higher interest rates will correlate with slower real estate price growth, especially in high-demand states like Florida and Arizona.
* The application of rate of return, IRR, and NPV will provide deeper insights into stock and real estate investment decisions.

# Conclusion

This project will use financial mathematics methodologies to quantify how interest rate changes affect both stock market performance and real estate investment decisions. The findings will provide insight into how investors can adjust their portfolios based on interest rate expectations.