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Statement of integrity: By typing the names of all group members in the text boxes below, you confirm that the assignment submitted is original work produced by the group (excluding any non-contributing members identified with an “X” above).

Team member 1	Dung T Nguyen (Scenario 1 and 5)
Team member 2	Gaurav Kumar (Scenario 2 and 4)
Team member 3	Bright Effah (Scenario 3 and 6)

Use the box below to explain any attempts to reach out to a non-contributing member. Type (N/A) if all members contributed.

Note: You may be required to provide proof of your outreach to non-contributing members upon request.

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A. Step 1: Magnifying Risks

	Leverage Challenges	Non-Linearities Challenges
Scenario 1: Money at a fixed rate for an unsecured purchase (e.g., credit card) for an individual	<p>High-Interest Rates: Credit card debt often comes with high-interest rates, resulting in quick debt buildup and increased leverage.</p> <p>No Collateral: Because the acquisition is unsecured, there is no collateral to recoup in the event of a default, increasing the lender's risk.</p> <p>Increase in Credit Limits: Increasing credit limits without equivalent increases in income might result in increased leverage for the borrower.</p>	<p>Compound Interest: Accumulated interest on delinquent balances leads to non-linear development of the outstanding debt, substantially increasing the amount owed over time.</p> <p>Late Payment Penalties: Late payment penalties create non-linearities by adding abrupt increases to the total amount owed, thereby affecting the borrower disproportionately.</p>
Scenario 2: Money at a floating rate for a secured purchase (e.g., home or automobile) for an individual	<p>Requirement for a Down Payment: A higher down payment reduces leverage and provides a cushion against potential losses. In contrast, leverage is increased by lower down payments.</p> <p>Loan-to-Value Ratio: Higher loan-to-value ratios indicate higher leverage, magnifying the risk for both the borrower and the lender if the property value decreases.</p>	<p>Interest Rate Sensitivity: Modest changes in interest rates result in nonlinear modifications to monthly payments. For instance, a minor increase in interest rates could result in a substantial increase in monthly payments, affecting the borrower disproportionately.</p> <p>Volatility of the Housing Market: Rapid price fluctuations on the housing market generate nonlinearities. Even a modest decline in property values can cause a disproportionately large number of submerged mortgages, in which the loan balance exceeds the property's value.</p>

Scenario 3: Money at a fixed rate for a business for a construction loan	High Loan Amounts: Construction loans frequently involve large sums of money, resulting in a high degree of business leverage. Collateral Requirements: Businesses may be required to provide precious assets as collateral to increase their leverage. In the event that the construction project fails, the collateral may be seized to cover the loan.	Construction Delays: Delays in construction can result in non-linear cost increases. Due to protracted labor, equipment, and administrative expenses, even minor delays may incur substantial additional expenses. Market Conditions: Economic downturns can cause nonlinear declines in property values, impacting the project's profitability. A minor decrease in property value can have a disproportionately large impact on the project's return on investment.
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<p>Scenario 4: Publicly traded Equity (e.g., common stock)</p>	<p>Trading on Margin: Using margin facility, investors/traders take leveraged positions which increase potential of gain or loss. Hence, increasing the risk.</p> <p>Derivatives Trading: Stock options and derivatives both offer the concept of leverage, which means that investors can control a greater number of shares with the same level of initial capital investment. A very minor shift in the price of the underlying stock might result in large profits or losses for derivative investments.</p>	<p>Stock price volatility: Non-linear movements in stock prices can occur as a result of market sentiment, earnings reporting, or geopolitical events. A little news event can cause a disproportionately significant price change.</p> <p>Earnings Surprises: When a company's actual earnings diverge considerably from market expectations, stock prices fluctuate in a non-linear fashion. A little change in earnings can cause a significant change in stock value.</p>
<p>Scenario 5: Publicly traded bond (e.g., treasury bond, corporate bond)</p>	<p>Leveraged Funds: Investors frequently use leverage to buy bonds, magnifying both possible gains and losses. This is a regular occurrence in hedge funds and other leveraged investment vehicles.</p> <p>Interest Rate Sensitivity: Bond prices are extremely sensitive to fluctuations in interest rates. If investors borrow to buy bonds, even a minor shift in interest rates can result in substantial leveraged profits or losses.</p>	<p>Interest Rate Fluctuations: Changes in interest rates induce non-linear price fluctuations in bonds. A 1% increase in interest rates, for example, may result in a price fall of more than 1% for a long-term bond.</p> <p>Credit Rating Downgrades: When an issuer's credit rating is reduced, bond prices fall in a non-linear manner. A modest decline in credit rating might result in a significant drop in bond market value.</p>
<p>Scenario 6: An illiquid security – you choose the security</p>	<p>Limited Market Demand: Illiquid securities frequently have a small number of purchasers in the market. Investors who borrow to invest in illiquid assets experience difficulties in selling these assets to repay the debt, particularly during a downturn.</p> <p>Price Volatility: Due to low trading volumes, illiquid assets can undergo fast price changes, resulting in enhanced leverage-related losses or gains for investors who have borrowed cash.</p>	<p>Sudden Market Demand Shifts: Nonlinearities may be the result of abrupt changes in the market demand for the illiquid security. These market demand shifts can cause non-linearities. A sudden increase or decrease in demand might cause prices to fluctuate disproportionately.</p> <p>Market Events Impact: The impact of market events is that illiquid assets may have responses to market events that are non-linear. For instance, a legal issue involving a tiny firm might lead to a disproportionately large decline in</p>

		the price of that company's illiquid shares.
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B. Step 2. Frictional Related Challenges

	Liquidity Challenges:	Regulation Challenges
Scenario 1: Money at a fixed rate for an unsecured purchase (e.g., credit card) for an individual	Credit Limit Restrictions: Restrictions on Credit Limit Credit card limits that are too low can make it difficult for consumers to have adequate liquid assets, which is especially problematic in the event of an unexpected need or while making expensive purchases. Merchant Acceptance: Acceptance by retailers The limited acceptance of some credit cards by retailers might limit an individual's liquidity, necessitating them to carry numerous credit cards.	Usury Laws: Regulations that are connected to maximum interest rates can have an impact on the profitability of credit card firms as well as lending practices, which can have an effect on the amount of credit that is available to consumers. Consumer Protection Regulation: Regulations that try to protect consumers from unfair practices, such as hidden fees or predatory lending, have an impact on how credit card firms do business and how they extend credit to individuals.
Scenario 2: Money at a floating rate for a secured purchase (e.g., home or automobile) for an individual	Market Volatility: Changes in the real estate or vehicle markets might have an impact on property liquidity. During economic downturns, selling property may take longer, forcing sellers to run out of cash. Limited purchasers: The liquidity of certain properties may be hampered by a small pool of possible purchasers, particularly for distinctive or high-end assets.	Real Estate restrictions: Property transaction restrictions, zoning laws, and land-use regulations can all have an influence on the liquidity of real estate assets. Strict rules may cause purchases to be delayed or property usage to be restricted. Consumer Protection Laws: Regulations protect customers during home or car purchases, affecting how these transactions take place. These rules can have an influence on the terms and circumstances of sales, thereby affecting asset liquidity.
Scenario 3:	Delays in construction projects: Delays in construction projects are common for a variety of reasons, tying up cash and	Building Codes and Regulations: Strict building codes and regulations can cause construction projects to be delayed,

<p>Money at a fixed rate for a business for a construction loan</p>	<p>hurting liquidity for both the borrower and the lender.</p> <p>Limited Project Financing Options: Due to a lack of financing options for construction projects, interest rates may rise, affecting the liquidity of construction companies.</p>	<p>hurting the business's timetable and liquidity.</p> <p>Environmental Regulations: Environmental impact assessments and compliance regulations can add costs and delay to building projects, impacting their liquidity.</p>
<p>Scenario 4: Publicly traded Equity (e.g., common stock)</p>	<p>Market liquidity: refers to the ease with which financial instruments, such as stocks, may be bought or sold in the market. In certain cases, stocks may exhibit lower levels of liquidity as a result of limited trading volumes. This lack of liquidity can pose challenges when attempting to execute transactions involving large quantities of stocks, since such actions may have a substantial influence on the prevailing stock price.</p> <p>Market Hours: The trading of stocks is confined to designated market hours, as engaging in after-hours trading may provide challenges in terms of restricted liquidity, hence impeding the execution of deals at desired price levels.</p>	<p>Insider trading laws are implemented to restrict individuals with access to non-public information from engaging in trading activities, hence upholding principles of equity and openness within the financial system.</p> <p>Market manipulation laws are implemented to enforce regulations that prevent the deliberate manipulation of stock prices, hence safeguarding the integrity of the market. These laws aim to outlaw acts that artificially inflate or deflate stock prices.</p>
<p>Scenario 5: Publicly traded bond (e.g., treasury bond, corporate bond)</p>	<p>Fragmented Market: The market for bonds might exhibit fragmentation due to the presence of bonds with different maturities, hence posing difficulties in locating bonds with certain characteristics at desirable price levels.</p> <p>Market Perception: The liquidity of bonds is influenced by the market's opinion of the issuer's creditworthiness. Bonds with lower ratings may exhibit less liquidity as a result of being associated with elevated levels of perceived risk.</p>	<p>Bond Rating Agencies: Regulatory measures are implemented to oversee bond rating firms, aiming to uphold the integrity and precision of credit ratings. This oversight facilitates the provision of reliable information to investors, enabling them to make well-informed decisions.</p> <p>Disclosure Requirements: Disclosure requirements are imposed on issuers in order to mandate the provision of pertinent information to investors, hence promoting transparency and equitable trading within the bond market.</p>

Scenario 6: An illiquid security – you choose the security	<p>Limited Buyers: Illiquid securities frequently encounter a restricted group of possible purchasers, hence posing challenges in locating a suitable market for the sale of these assets.</p> <p>Specialized Nature: The limited liquidity of certain illiquid assets can be attributed to their specialized character, which restricts the pool of potential purchasers.</p>	<p>Market access regulations can impose restrictions on the trading of illiquid assets, limiting the ability of non-qualified or non-accredited investors to participate in the market.</p> <p>Price Manipulation Laws: Regulatory measures are implemented to prohibit price manipulation and deceptive tactics, therefore safeguarding equity and integrity in the trading of illiquid securities.</p>
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C. Step 3: Identifying Additional Data

1) Money at a Fixed Rate for an Unsecured Purchase (e.g., Credit Card) for an Individual

Data Type: Economic, Accounting

Data Processing: Raw prices; Levels; Implied Volatilities

Data Frequency: Daily, Monthly

Data Class: Credit

Data Source: Banks, Credit Card Companies, Economic Research Firms

Data Variety: Actual Data, Adjusted Data

Additional Data Series:

Consumer Spending Data: Economic data indicating consumer spending patterns, influencing credit card usage.

Interest Rate Data: Daily or monthly data on interest rates affecting credit card borrowing costs.

Default Rates: Accounting data on historical default rates to assess credit risk.

2) Money at a Floating Rate for a Secured Purchase (e.g., Home or Automobile) for an Individual

Data Type: Asset, Economic

Data Processing: Raw prices; Levels; Returns

Data Frequency: Monthly, Quarterly

Data Class: Real Estate

Data Source: Real Estate Agencies, Government Housing Data, Mortgage Lenders

Data Variety: Actual Data, Observed Data

Additional Data Series:

Home Price Index: Economic data reflecting housing market trends and property values.

Mortgage Interest Rates: Monthly data on interest rates affecting mortgage costs.

Foreclosure Rates: Real estate data indicating the frequency of property foreclosures, reflecting market stability.

3) Money at a Fixed Rate for a Business for a Construction Loan

Data Type: Economic, Accounting

Data Processing: Raw prices; Levels; Implied Volatilities

Data Frequency: Monthly, Quarterly

Data Class: Credit, Real Estate

Data Source: Banks, Construction Industry Reports, Economic Research Firms

Data Variety: Actual Data, Observed Data, Adjusted Data

Additional Data Series:

Construction Industry Performance Data: Quarterly reports detailing construction sector performance, including growth rates, new projects, and industry outlook.

Credit Risk Scores: Business credit scores indicating the creditworthiness of construction companies applying for loans.

Zoning and Permit Data: Local government data on zoning regulations and construction permits, indicating the ease of starting new construction projects.

4) Publicly Traded Equity (e.g., Common Stock)

Data Type: Asset, Economic

Data Processing: Raw prices; Returns; Implied Volatilities

Data Frequency: Daily, Intraday

Data Class: Equity

Data Source: Stock Exchanges, Financial News Platforms, Trading Platforms

Data Variety: Trade Data, Actual Data, Relative Data

Additional Data Series:

Analyst Recommendations: Daily data on stock analysts' buy/sell/hold recommendations for the chosen publicly traded equity.

Short Interest Data: Daily or weekly data indicating the short interest in the stock, reflecting market sentiment and potential price movements.

Volume Weighted Average Price (VWAP): Intraday data calculating VWAP, providing insights into stock price trends throughout the trading day.

5) Publicly Traded Bond (e.g., Treasury Bond, Corporate Bond)

Data Type: Asset, Economic

Data Processing: Raw prices; Yields; Implied Volatilities

Data Frequency: Daily, Weekly

Data Class: Fixed Income

GROUP WORK PROJECT # 01
GROUP NUMBER: #4162

MScFE 600: FINANCIAL DATA

Data Source: Bond Exchanges, Financial News Platforms, Central Banks

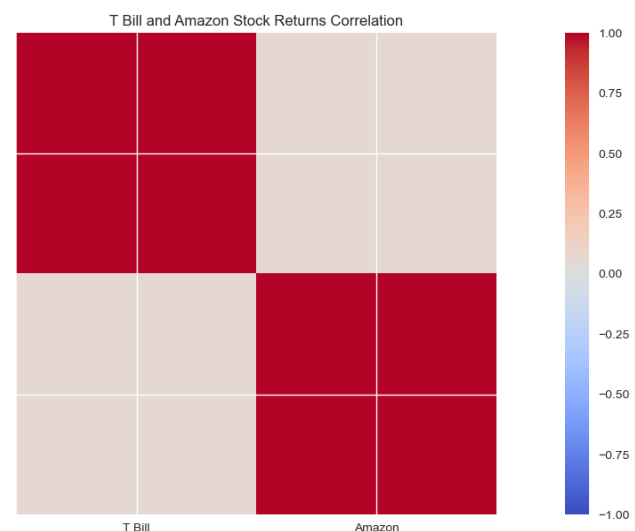
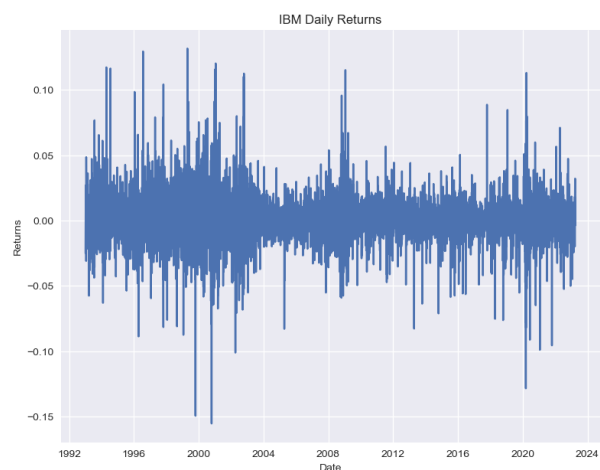
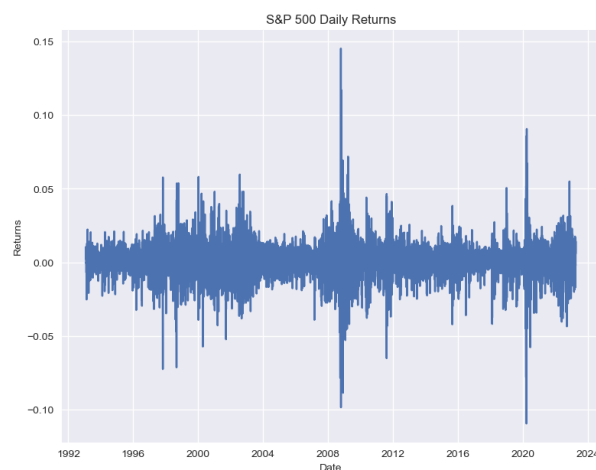
Data Variety: Quote Data, Actual Data, Relative Data

Additional Data Series:

Credit Spreads: Daily or weekly data showing the yield difference between the chosen bond and a benchmark (e.g., Treasury yield), indicating credit risk.

Bond Auction Results: Data on government or corporate bond auctions, reflecting demand, bid-to-cover ratios, and accepted yields.

Yield Curve Data: Historical data on yield curves to assess the bond's position in the interest rate environment.



6) An Illiquid Security (Specific Security Type Chosen)

Data Type: Asset, Economic

Data Processing: Raw prices; Trade Data; Levels

Data Frequency: Monthly, Quarterly

Data Class: Illiquid Security

Data Source: Private Market Transactions, Specialized Brokerage Firms, Industry Reports

Data Variety: Actual Data, Observed Data, Estimated Data

Additional Data Series:

Illiquidity Premium: Quarterly data on the illiquidity premium for the specific security, indicating the additional return required for holding illiquid assets.

Industry Reports: Data from specialized industry reports providing insights into market trends, demand/supply dynamics, and trading volumes for the illiquid security.

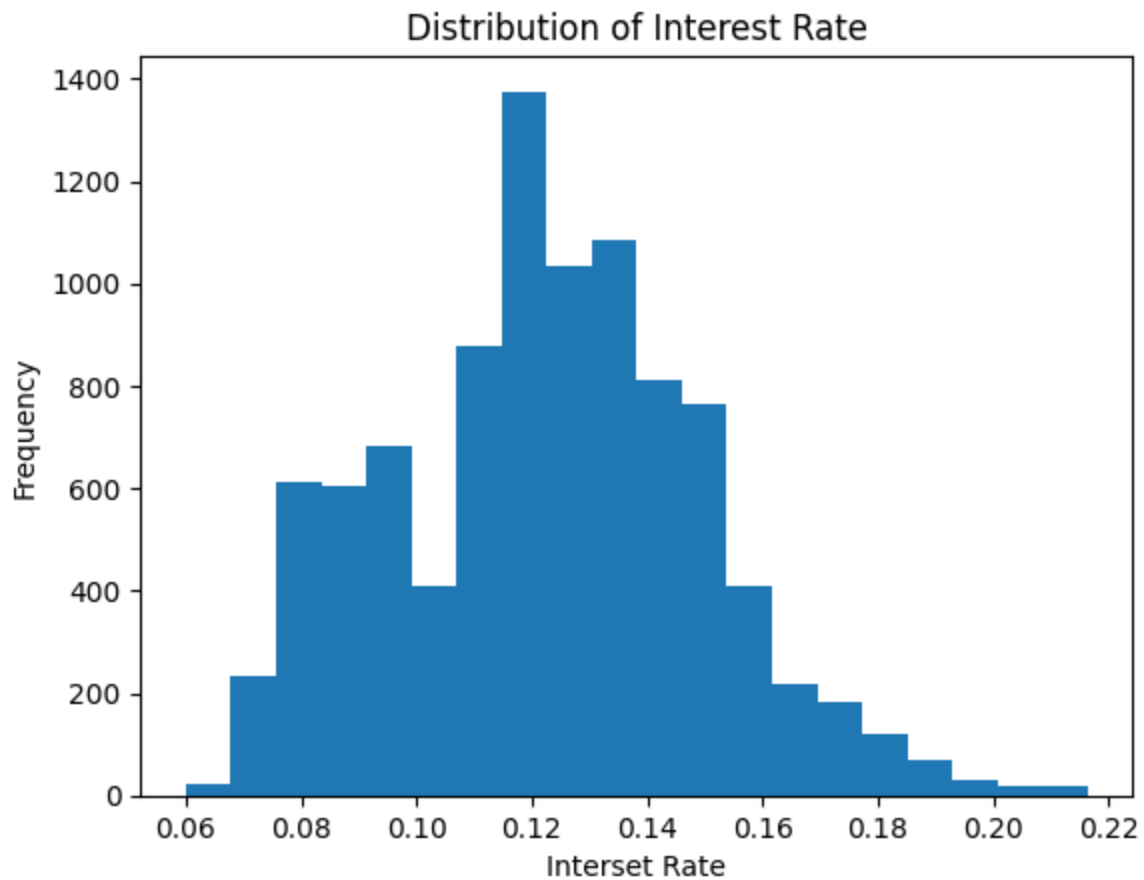
Private Placement Data: Information on private placement transactions and volumes, providing insights into institutional investor interest and market depth.

Step 4 & Step 5:

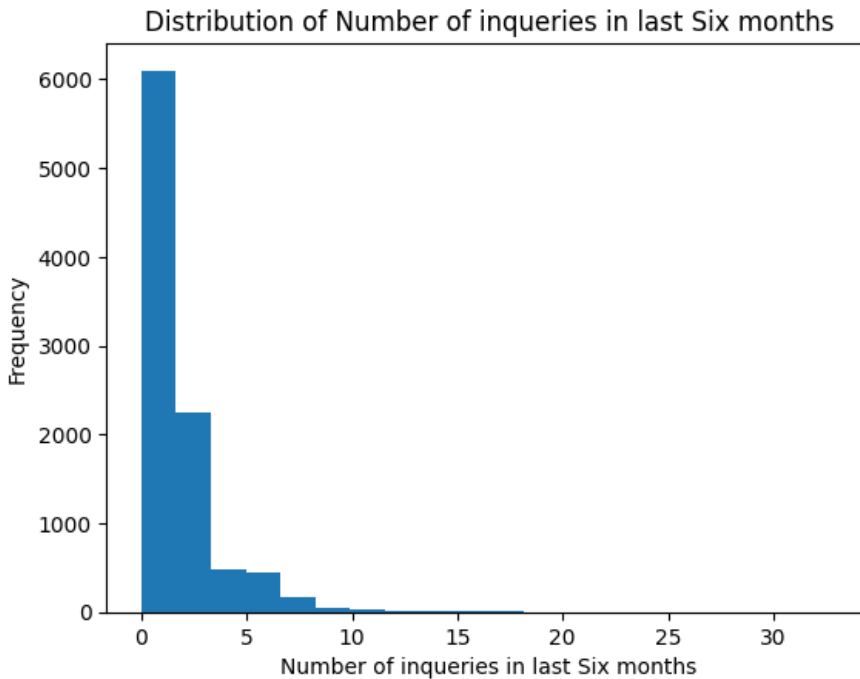
Scenario 2: Money at a floating rate for an individual's secure purchase (e.g., home or automobile). Instrument: Home or Automobile Loan

Data Source: "Loan Data." Kaggle, 2021, www.kaggle.com/datasets/itssuru/loan-data^[3]

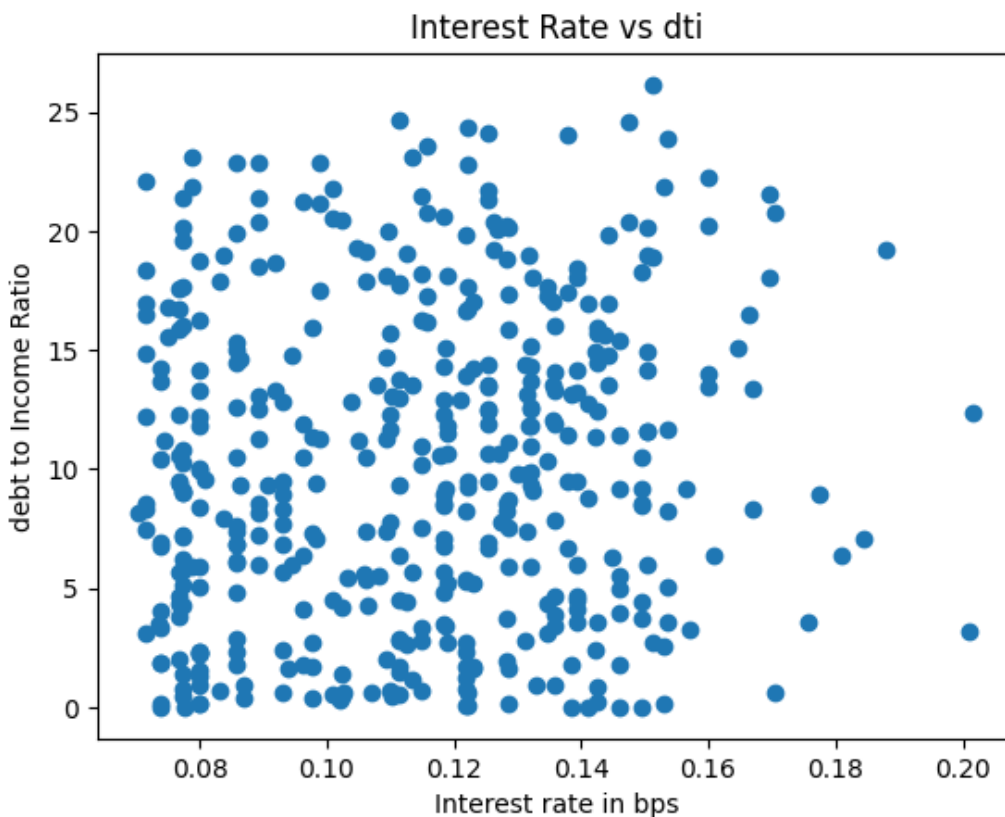
EDA : Using loan data, performed various EDA which explains distribution of fields and relationship between debt to income ratio and interest rate. Few insights, we could draw from data are :



Distribution of interest rate explains lower percentage of interest rates are higher than the median as the graph is negatively skewed.



In loan data, number of enquiries impact cibil score as higher numbers of enquiries decrease our cibil score/credit score. So, from above data we could see frequency of less than 5 enquiries is highest.



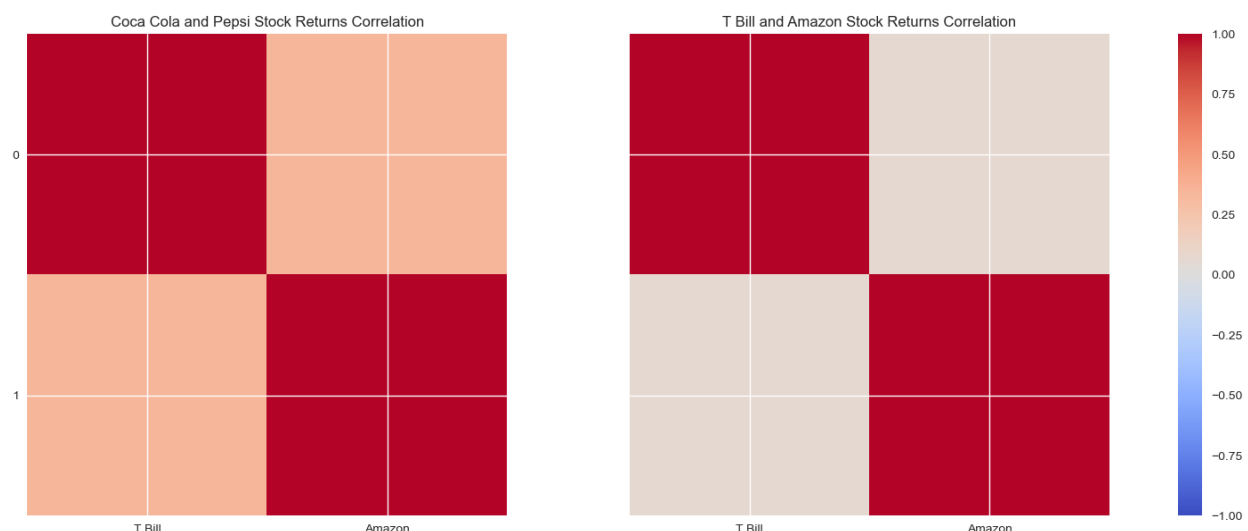
The debt-to-income ratio and interest rates are integral to the lending process, their non-linear relationship is explained by above scatterplot. debt-to-income ratio emphasizes on assessing a borrower's capacity to take on additional debt and interest rates determine the cost of borrowing.

Due to the lender's reduced risk, a lower debt-to-income ratio is often accompanied by higher interest rates. Highlighting the complex nature of lending determinants, additional factors that may affect interest rates include creditworthiness and the amount of days remaining on the credit line.

There are several other factors which help lenders in assessing borrowers and also help borrowers in comparing various interest rates using historical data.

Scenario 5: Publicly Traded Bond (e.g. treasury bond, corporate bond)—that is, securities lending of a bond.

Using treasury bond data and stock we try to get a linear relationship between different asset class and treasury bond. As we can see below returns correlation between the same asset class have strong correlation while stock and T Bill have weak correlation. This could be advantageous for diversification because it implies that the performance of one asset class doesn't significantly affect the other.



Step 6:

From analyzing the graph in scenario 2 and general inference we concluded that the consumers who have high Debt to Income ratios may be more sensitive to fluctuations in interest rates since they are carrying more debt than they can afford. Consumers may pay more to service their debt if interest rates rise significantly as a result of elevated market volatility (as measured by the VIX), which may limit their ability to invest or manage financial risks. The broader economic context can provide insight into how changing market dynamics might affect consumers' financial security because it considers the relationship between interest rates and the DTI ratio.

From scenario 5, we concluded that different asset classes can be used for diversification as they might have weak correlation between them.

References:

1. Leverage: a basic concept in trading <https://www.bbva.com/en/leverage-basic-concept-in-trading/>
2. Shorting restrictions, liquidity, and returns
https://www.sec.gov/about/economic/shopilot091506/jones_slides.pdf
3. "Loan Data." Kaggle, 2021, www.kaggle.com/datasets/itssuru/loan-data.
4. Stock lending data B3 : <https://arquivos.b3.com.br/Web/Consolidated>