

Second Chance

1. Step 1. Collateral Related Risk

1.1. Student: Oratile - Personal unsecured loan at fixed rate Credit card Data Collection Challenges

	FINANCING RISK	COLLATERAL RISK
SENARIO 1	<ul style="list-style-type: none">• Credit card companies offer unsecured credit, which means that in the event of a default, there is no collateral to be recovered.• Default Risk is when borrowers won't make even the minimum payments or will fall far behind.• Interest Rate Risk. The profitability of credit card portfolios are impacted by changes in interest rates because higher interest rates could result in higher borrowing costs for the issuer.• Liquidity Risk: Credit card issuers must maintain enough liquidity to meet any potential funding requirements, such as credit card balances, operating costs, and any unforeseen withdrawals by cardholders.• Operational Risk: This includes the possibility of operational disruptions such as system failures, data breaches, fraud, mistakes, and other operational risks that could lead to monetary losses or reputation.	<ul style="list-style-type: none">• Because there is no collateral, this becomes an unsecure loan that is being tied to debts.• Credit Risk: Because credit card issuers give them to the holders looking at their record with credit, also how they pay. If a cardholder fails to make timely payments or exceeds their credit limit, it can result in credit risk for the issuer.• Default Risk: this is the possibility that a cardholder is unable to repay their credit card debt. Issuers may have collection procedures in place to recover unpaid debt.• Operational Risk: Operational risk includes risks associated with the day-to-day operations of credit card processing, including system failures, data breaches, and errors in billing or statements.• Regulatory Risk: Credit card issuers are subject to various regulations and consumer protection laws. Changes in these regulations or failure to comply with them can result in legal and regulatory risks.

1.2. Student Oratile - Personal unsecured loan at floating rate Car loan or home loan Data Collection Challenges

	FINANCING RISK	COLLATERAL RISK
SENARIO 2	<ul style="list-style-type: none"> Interest Rate Risk: Interest rate tend to vary from one loan to the next. This is so because of the different time assigned for the loans to be paid off. Monthly instalments can increase potentially causing financial strain. Defaulting of the borrower: the risk associated with the change in interest rates affecting and potentially impacting the borrowers ability to repay. Collateral Risk: For Home Loans: The home itself serves as collateral for the mortgage. If you default on your home loan, you risk losing your property through foreclosure. Depreciation Risk (Auto Loans): Because cars are things that are used on an everyday livig, their value tend to drop every now and then. If you finance a car and its value depreciates more quickly than you're paying down the loan, you might owe more than the car is worth, known as being "upside down" on the loan. 	<ul style="list-style-type: none"> Depreciation Risk: One of the primary risks associated with auto loans is the depreciation of the vehicle's value over time. If the borrower defaults on the loan, and the lender needs to repossess and sell the vehicle, it may not cover the outstanding loan balance if the vehicle's value has significantly depreciated. Maintenance and Insurance: Borrowers are typically required to maintain comprehensive insurance on the vehicle and perform necessary maintenance. If the borrower fails to do so, the value of the collateral may decrease, posing a risk to the lender. Market Value Fluctuations: The market value of used cars can fluctuate, which may impact the lender's ability to recover the loan amount if the vehicle must be repossessed and sold.

1.3. Student: Ebenezer Construction Business loan at fixed rate Data Collection Challenges

Scenario	Financing	Credit
Money at a fixed rate for a business for a construction loan	Default Risk: The business may face financial difficulties, affecting its ability to repay the loan, leading to default.	Property Valuation: The value of the property used as collateral must be accurately assessed and monitored to ensure it covers the loan amount and interest.
	Interest Rate Risk: Changes in interest rates can impact the cost of borrowing and the business's financial stability.	Economic Conditions: Economic factors like GDP growth, construction industry trends, and interest rates can influence the property's value and the borrower's ability to repay.
	Market Conditions: Fluctuations in the real estate market may affect property values and the borrower's ability to sell or refinance.	Legal and Permit-Related Risks: Legal issues, property ownership disputes, or permit delays can affect the collateral's value and project progress.

1.4. Student: Yhasreen for bond and equity

Table 1			Collateral Related Risk	
			Lender's Consideration	Borrower's Consideration
			Collateral Risk	Financing Risk
Security Lending Scenarios	4	AAPL Equity Investment	<ol style="list-style-type: none"> Regulatory and Legal Challenges: Like all big tech companies, Apple sometimes faces regulatory scrutiny and legal challenges in various jurisdictions, which can pose risks to its business model and, by extension, its stock price. Apple operates in various countries and is subject to diverse regulatory environments. Any legal disputes or regulatory restrictions can impact its stock value. Product Cycle Dependency: Apple's revenue heavily depends on its product cycles, especially for its flagship products like the iPhone. Any perceived missteps in product launches or updates can influence its stock price. Competitive Landscape: The tech industry is rapidly evolving, and Apple faces stiff competition in all its product segments. Changes in the competitive landscape can impact its market share and profitability. Company-Specific Risk: AAPL faces challenges, like slowing iPhone sales, competition from other tech companies, regulatory challenges, or other company-specific factors. Geopolitical Risks: Apple's global supply chain depends significantly on regions like China. Geopolitical tensions, trade wars, pandemics, natural disasters or supply chain disruptions can affect its business operations and stock value. [Business Insider] Investor Sentiment Shifts: Investor sentiment can be fickle. Factors like changes in management, strategic direction, or even broader market sentiment can impact AAPL's stock price. Technological Obsolescence: The tech industry evolves rapidly. AAPL products may become obsolete when rivals introduce superior technology. 	<ol style="list-style-type: none"> Dividend Risk: If AAPL were to reduce or eliminate its dividend payments, it could affect investor sentiment and the stock's value, especially for those investors seeking dividend income. While Apple pays dividends, its yield might be lower than other established companies. Other stocks offer higher dividend yields if investors seek income from their investments. Market Risk: AAPL's stock price can fluctuate based on overall market conditions, which might not necessarily reflect the company's fundamental health. Economic downturns, interest rate changes, or geopolitical events can impact stock prices. Currency Risk: Apple conducts business globally, exposing it to currency fluctuation risks. Changes in exchange rates can affect its earnings and, consequently, its stock price. Valuation Risk: Stocks can sometimes trade above their intrinsic value due to investor exuberance or other market factors. Investing in AAPL when its valuation is high can pose risks if the valuation contracts. Interest Rate Risk: Rising interest rates can lead to lower stock valuation. [USBANK]. Higher rates can make bonds and other fixed-income securities more attractive than equities. Interest Rate Sensitivity: While this is a broader market concern, rising interest rates can make bonds and other fixed-income investments more appealing, potentially leading to a rotation out of equities, including AAPL. Currency Risk: For international investors, fluctuations in currency exchange rates can impact the returns on their AAPL investment significantly if their home currency strengthens against the US dollar.

1.5. Student: Yhasreen for bond and equity

Table 1			Collateral Related Risk	
			Lender's Consideration	Borrower's Consideration
			Collateral Risk	Financing Risk
security Lending Scenarios	5	2-year Treasury Bond Investment	<ol style="list-style-type: none"> 1. Interest Rate Risk: If market interest rates rise after purchasing a 2-year Treasury bond, the bond's price might decrease. However, if the trader holds the bond to maturity, the trader will receive the entire principal amount. 2. Limited Liquidity Premium: While 2-year Treasury bonds are highly liquid, they offer a lower yield than longer-dated Treasuries or other illiquid securities. 3. Economic Conditions: Broader economic conditions can impact the demand for and yield on 2-year Treasury bonds. In times of economic uncertainty, there is often a "flight to quality," where investors seek the safety of US government bonds, pushing prices up and yields down. 4. Foreign Exchange Risk for International Investors: For non-US citizen investors, changes in the currency exchange rate between their home currency and the US dollar can impact the effective return on the Treasury bond. 5. Sovereign Debt Concerns: <ol style="list-style-type: none"> 5.1. Investing in 2-year Treasury bonds/ Treasury notes is often seen as a low-risk investment since the full faith and credit of the US government backs them. 5.2. While the US is considered one of the most creditworthy countries in the world, political issues, such as debates over the debt ceiling, can introduce short-term volatility in Treasury prices. 6. Changing Monetary Policy: Actions and communications from central banks, particularly the Federal Reserve, can influence short-term interest rates and, by extension, the yields and prices of 2-year Treasury bonds. 	<ol style="list-style-type: none"> 1. Default Risk: Theoretically, the riskiest event would be a default by the US government on its debt. However, the risk of default is low, given the economic strength and stability of the US. Nonetheless, the possibility, however remote, does exist. 2. Interest Rate Risk: While not a "collateral" risk in the traditional sense, the primary risk associated with a 2-year Treasury bond is the potential for interest rates to rise after purchase. If the bond sales happen before maturity, the investor suffers investment capital loss when interest rates increase as the bond's price falls. 3. Inflation Risk: Inflation rates rise significantly over the 2-year span, which could erode the real value of the fixed returns provided by the bond. The two-year treasury bond yield may need to catch up with inflation, as real return after accounting for inflation turned negative, especially for nominal (non-inflation-adjusted) bonds. 4. Liquidity Risk: US Treasury bonds are generally highly liquid, but there might be some liquidity challenges in extreme market conditions. 5. Currency Risk: For foreign investors, the value of the US dollar can fluctuate over time, affecting the value of their bond investment when converted back to their home currency. 6. Fiscal Health of the US: Significant changes in the fiscal health or the economic outlook of the US can influence bond yields and perceptions of their safety.

1.6. Student: Ebenezer Illiquid Security Data Challenges

	FINANCING RISK	CREDIT RISK
An illiquid security – Real Estate Investment	<ul style="list-style-type: none"> • Valuation Risk: Determining the fair value of illiquid securities can be subjective and uncertain. 	<ul style="list-style-type: none"> • Historical Trading Data: Historical trading data for the chosen illiquid security is limited, making valuation and liquidity assessment challenging.
	<ul style="list-style-type: none"> • Liquidity Risk: Selling illiquid securities in the market may be difficult, leading to potential delays or unfavourable pricing. 	<ul style="list-style-type: none"> • Valuation Models: Complex valuation models may be required to estimate the illiquid security's value, introducing modelling risk.
	<ul style="list-style-type: none"> • Regulatory Compliance: Adhering to regulatory requirements for holding or trading illiquid securities is essential to avoid legal issues. 	<ul style="list-style-type: none"> • Regulatory Data: Regulatory requirements and restrictions may impact the ability to hold or sell the illiquid security.

2. Step 2. Statistical Related Challenges

2.1. Student: Oratile - Personal unsecured loan at fixed rate Credit card Data Collection Challenges

TASK 2	VOLATILITY	CORRELATION
SENARIO 1	<ul style="list-style-type: none"> Interest Rate Volatility: Credit card interest rates can be variable, meaning they may change over time based on underlying factors such as changes in the prime rate. Borrowers with variable-rate credit cards may face interest rate volatility, which can affect the cost of carrying a balance from month to month. Variable Interest Rates: If a cardholder carries a balance on their credit card, they may be subject to interest charges. These rates can vary depending on the specific terms of the credit card agreement, and they can lead to fluctuations in the cost of borrowing. 	<ul style="list-style-type: none"> Diverse Portfolio: Credit card issuers typically have a large and diverse portfolio of cardholders with varying credit scores, income levels, and spending habits. The diversity in the portfolio is intended to spread risk and mitigate potential losses. Correlation: Correlation risk arises when events or economic conditions cause the credit quality of many cardholders in the issuer's portfolio to deteriorate simultaneously. In other words, it's the risk that cardholders who are considered independent from one another may become correlated in terms of credit risk during adverse economic conditions. Risk Management: Credit card issuers employ risk management practices to monitor and mitigate correlation risk. This includes stress testing their portfolios under various economic scenarios to assess the potential impact of correlated credit events.

2.2. Student Oratile - Personal unsecured loan at floating rate Car loan or home loan Data Collection Challenges

TASK 2	VOLATILITY	CORRELATION
SENARIO 2	<ul style="list-style-type: none"> Interest Rate Volatility: change in interest rates can introduce volatility into the borrowing cost, this therefore impacting the borrowers financial obligations. Economic Conditions: Broader economic volatility, such as a recession or financial crisis, can influence interest rates and borrowers' financial stability. During periods of economic uncertainty, lenders may adjust their lending practices, making it more difficult to obtain loans or refinancing. 	<ul style="list-style-type: none"> Home Loans (Mortgages): Interest Rate and Housing Market Correlation: One common correlation risk in home loans is the relationship between interest rates and the housing market. In a scenario where both interest rates and housing prices decline simultaneously, homeowners may face difficulties if they need to sell their homes or refinance their mortgages, as the reduced home value can affect their ability to do so. Economic Correlation: Economic factors can impact auto loan performance. For instance, during a recession, auto loan delinquencies may increase as more people face financial difficulties. This correlation between economic conditions and loan performance can affect borrowers' ability to make car payments.

2.3. Student: Ebenezer Construction Business loan at fixed rate Data Collection Challenges

TASK 2	VOLATILITY	CORRELATION
Money at a fixed rate for a business for a construction loan	<ul style="list-style-type: none">• Construction Cost Variability: Changes in construction material and labour costs can lead to budget overruns, impacting the project's financial stability.	<ul style="list-style-type: none">• Business Cycle Effects: Correlation with economic cycles can affect the business's ability to repay the loan during economic downturns.
	<ul style="list-style-type: none">• Market Volatility: Economic uncertainty and market fluctuations can affect property values and the construction industry.	<ul style="list-style-type: none">• Correlation with Economic Indicators: Property values may be correlated with economic indicators, impacting loan risk.

2.4. Student: Yhasreen for bond and equity

Table 2			Statistical Related Risk	
			Risk issues	Diversification issues
			Volatility	Correlation
Security lending scenarios	4	AAPL Equity Investment	<ol style="list-style-type: none"> Market Volatility: AAPL is subject to broader market volatility like all stocks. Movements in major indices, such as the S&P 500 or the NASDAQ, can influence Apple's stock price. Broader economic factors, including interest rates, inflation, and economic growth, can impact consumer spending and, in turn, Apple's sales and stock prices. Earnings Announcements: Apple's quarterly earnings announcements can significantly swing stock price if the reported figures diverge from analysts' expectations. Product Launches: The success, failure, or mere announcement of new products (like iPhones, iPads, or Macs) can lead to stock volatility. A product must be within market expectations to positively impact the stock. There is an ongoing innovation expectation for Apple to innovate. Supply Chain Issues: Apple relies on a complex global supply chain. Disruptions due to geopolitical tensions, natural disasters, or pandemics (like COVID-19) can impact production and sales, leading to stock price fluctuations. Regulatory and Legal Challenges: Apple faces various regulatory challenges in different jurisdictions as a global company. Antitrust concerns, patent disputes, or issues related to user privacy can influence stock performance. 	<ol style="list-style-type: none"> Global Market-wide Movements: Individual stocks, including AAPL, often move in tandem with the broader market. If the overall market declines, even due to factors unrelated to Apple's business operations, AAPL might face downward pressure. Economic data, such as employment figures or GDP growth rates, can impact the broader market's sentiment and correlate with movements in individual stocks, including AAPL. Sector-specific Movements: AAPL belongs to the technology sector. Events affecting the tech sector can influence AAPL's stock price, even if those events are not directly related to Apple's business. Diversification Challenge: Portfolio no diversification benefits as the investor's portfolio weighs more on tech stocks. Tech stocks are highly correlated with Apple, so adverse events in the tech sector could disproportionately impact the investor's portfolio. Geopolitical event Correlations: Apple's products are manufactured in China. Trade wars between the US and China can have spillover effects and influence Apple's operational costs and stock volatility. Apple is a global company; international events like the pandemic can influence its stock. Issues like U.S.-China trade relations. [Reuters] Interest Rate Correlation: Generally, when interest rates rise, equities, including AAPL, face downward pressure because higher interest rates can increase borrowing costs and fixed-income investments more attractive relative to stocks. [SPYNIGERIA] Commodity Price Correlations: AAPL relies on various commodities (copper, rare earth). Fluctuations in these commodity prices can correlate with Apple's stock performance. [CNBC]
			<ol style="list-style-type: none"> Competition: The tech industry is fiercely competitive. Developments from competitors, such as product launches or market share gains, can influence Apple's stock price. If a competitor like Samsung announces an innovative product, it might negatively impact AAPL's stock due to perceived threats to market share. Market Sentiment: Apple, a widely followed stock, is subject to shifts in market sentiment driven by global events, news, analyst upgrades or downgrades, and general public perception. [CMEGroup] 	

2.5. Student: Yhasreen for bond and equity

Table 2			Statistical Related Risk	
			Risk issues	Diversification issues
			Volatility	Correlation
Security lending scenarios	5	2-year Treasury Bond Investment	<ol style="list-style-type: none"> Interest Rate Risk: This is the primary risk associated with any bond investment. When interest rates rise, bond prices fall, and vice versa. A 2-year Treasury note will be less sensitive to interest rate changes than longer-duration bonds, but the risk remains. Reinvestment Risk: When the 2-year bond matures, the trader can reinvest the principal. If interest rates have dropped since the trader initially purchased the bond, the trader might reinvest at a lower yield. Inflation Risk: The bond's real return (nominal return minus inflation) could erode if inflation rises significantly. For example, the investor's real return is negative if the bond yields 2% but inflation is 3%. Liquidity Concerns: While the market for US Treasury securities is one of the most liquid in the world, in extreme market conditions or if there are significant changes to US creditworthiness, there could be liquidity concerns. Supply and Demand Dynamics: The US Treasury Department regularly issues bonds. Fluctuations in the supply (how many bonds are issued) and demand (how many investors want to buy them) can influence bond prices and yields. Government Policy and Central Bank Actions: Decisions made by the Federal Reserve, such as changes in the federal funds rate or the implementation of quantitative easing, can impact the yields on Treasury securities. Global Economic and Political Events: Major economic events, geopolitical tensions, or crises can lead to a "flight to safety" where investors flock to safe assets like US Treasury bonds. Global trade tension can impact yields and prices in the short term. US Fiscal and Economic Health: US Treasury bonds are backed by the full faith and credit of the US government; significant changes in the fiscal health of the US or its economic outlook can influence bond yields. Currency Risk: For international investors, fluctuations in the US dollar's value can impact the returns on US Treasury investments when converted back to their home currency. 	<ol style="list-style-type: none"> Inverse Correlation with Interest Rates: The most direct correlation risk with Treasury bonds is their inverse relationship with interest rates. A sharp rise in interest rates could lead to a decline in the bond's price and vice versa. Asset Diversification: During economic uncertainty or market volatility, there can be a "flight to safety" where investors move towards safe assets like US Treasuries. Recession can lead to a temporary decrease in yields. Conversely, investors might move away from Treasuries when market conditions improve, increasing yields. Correlation with Other Fixed-Income Assets: 2-year Treasury bonds positively correlate with short-duration fixed-income assets. An investor's portfolio is heavily weighted in similar assets or may provide the diversification benefits the investor seeks. The generally low yields of 2-year Treasury bonds negatively correlate with riskier, higher-yielding assets. Holding too much in Treasuries in bullish market conditions could mean missing out on potential gains elsewhere. Correlation with Equities during Crises: Typically, Treasuries and equities are negatively correlated; when stocks go down, Treasuries often go up. However, during extreme financial crises, there might be scenarios where all asset classes experience sell-offs. If the stock market or other investment vehicles offer higher returns, investing in a low-yield Treasury bond means opportunity Cost. Correlation with Currency: For international investors, changes in the US dollar's value can correlate with the value of their bond investments when converted back to their home currency. Economic Indicators: Various economic indicators, like employment data or inflation readings, can influence the broader bond market's sentiment, leading to correlated movements in bond yields. Global Bond Markets: Movements in foreign bond markets, especially in major economies, can have spillover effects on US Treasury yields due to the interconnectedness of global financial markets. Monetary Policy: Decisions by central banks, especially the Federal Reserve in the case of US Treasuries, can impact bond prices. If the Fed signals changes in its interest rate stance or implements other policies, it can drive correlated movements in bond markets.

2.6. Student: Ebenezer Illiquid Security Data Challenges

TASK 2	VOLATILITY	CORRELATION
An illiquid security – Real Estate Investment	<ul style="list-style-type: none"> • Location and Property Type Variability: The volatility of real estate can vary by location and property type. For example, commercial real estate may have different volatility patterns compared to residential real estate. 	<ul style="list-style-type: none"> • Asset Type Correlation: Different types of real estate assets, such as residential, commercial, or industrial properties, may exhibit varying degrees of correlation with economic and market conditions. For example, commercial real estate may be more sensitive to economic downturns than residential properties.
	<ul style="list-style-type: none"> • Valuation Model Uncertainty: Valuation models for illiquid securities may be less reliable, introducing uncertainty into volatility estimates. 	<ul style="list-style-type: none"> • Correlation with Other Illiquid Assets: The illiquid security may exhibit correlation with other illiquid assets in the portfolio.

3. Step 3. Identifying Data Characteristics Part A

3.1. Student: Oratile - Personal unsecured loan at fixed rate Credit card Data Collection Challenges

CREDIT CARD LOANS	1		1	Data type	Credit data Financial data
			2	Data preprocessing	Raw credit transaction data Interest rates Loan repay data
			3	Data frequency	Monthly
			4	Data class	Individual credit data
			5	Data source	Credit card companies Audited financials like banks Financial institutions
			6	Data variety	Actual transaction data

3.2. Student Oratile - Personal unsecured loan at floating rate Car loan or home loan Data Collection Challenges

Home or automobile loan	2		1	Data type	Asset Financial Real estate
			2	Data preprocessing	Raw mortgage loan Property valuation
			3	Data frequency	monthly
			4	Data class	Individual mortgage loan Property market data
			5	Data source	Regulatory Authorities Dealers Audited Financials Real estate listings Government financials
			6	Data variety	loan interest rate credit

3.3. Student: Ebenezer Construction Business loan at fixed rate Data Collection Challenges

Construction Loans	3		1	Data type	Construction and Business Loan Data
			2	Data processing	construction costs loan interest rates
			3	Data frequency	Monthly Quarterly yearly
			4	Data class	Real estate Business
			5	Data source	Lenders Construction companies Audited financials
			6	Data variety	Actual data Modeled data credit

3.4. Student: Yhasreen for bond and equity

Table 3.			Data Collection	
Security Lending Scenarios	4	AAPL Equity Investment	1	Data type <ol style="list-style-type: none"> 1. AAPL Stock price. 2. AAPL's balance sheet, income statement, and cash flow statement. 3. Macroeconomic indicators influence AAPL stock, like GDP growth, consumer sentiment, and technological trends. 4. AAPL Analyst ratings and reports.
			2	Data preprocessing <ol style="list-style-type: none"> 1. AAPL unprocessed raw price from the exchange. 2. AAPL options price's implied volatility.
			3	Data frequency <ol style="list-style-type: none"> 1. Millisecond or microsecond data for high-frequency trading. 2. Intraday APPL stock price 3. Daily closing APPL stock price 4. Quarterly financial disclosures. 5. Yearly performance data or annual financial statement data.
			4	Data class <p>Equity</p>
			5	Data source <ol style="list-style-type: none"> 1. AAPL is listed on the NASDAQ exchange 2. Stock Broker that provides AAPL custodian service for international stock traders.
			6	Data variety <ol style="list-style-type: none"> 1. AAPL Traded Data 2. AAPL closing stock prices. 3. AAPL stock split or dividend 4. Relative data to compare AAPL's performance like the S&P 500.
Security Lending Scenarios	5	2-year Treasury Bond Investment	1	Data type <ol style="list-style-type: none"> 1. 2-year Treasury Bond Price 2. The US government's financial statements provide context for the creditworthiness supporting the bond. 3. Economic data: Interest rates set by the Federal Reserve, inflation rates, GDP growth and employment numbers. 4. Credit ratings of the US government by Moody's, S&P, and Fitch agencies.
			2	Data preprocessing <ol style="list-style-type: none"> 1. 2-year bond yield and 2-year bond price 2. Bond option implied volatility
			3	Data frequency <ol style="list-style-type: none"> 1. Intraday closing yield. 2. Daily closing yield.
			4	Data class <p>Fixed income</p>
			5	Data source <ol style="list-style-type: none"> 1. Treasury exchange 2. Over-the-counter trades between parties for more significant transactions. 3. Bond Broker provides custodian bond trading services.
			6	Data variety <ol style="list-style-type: none"> 1. Bid and ask prices for the bond in secondary markets. 2. predictions of future interest rates 3. Forecast bond yields. 4. Bond's yield compared to the 10-year Treasury yield or inflation rates.

3.5. Student: Ebenezer Illiquid Security Data Challenges

4. Construction Loans	3		1	Data type	Construction and Business Loan Data
			2	Data processing	construction costs loan interest rates
			3	Data frequency	Monthly Quarterly yearly
			4	Data class	Real estate Business
			5	Data source	Lenders Construction companies Audited financials
			6	Data variety	Actual data Modeled data credit

5. Step 3. Identifying in Data Collection Challenges Part B

5.1. Student: Yhasreen

5.1.1. AAPL Equity Investment Data Collection Challenges

- 5.1.1.1. Equity investment in Apple requires comprehensive data collection to make informed decisions.
- 5.1.1.2. Accessing real-time and comprehensive historical data for equities, especially from reputable sources, often comes at a significant cost. Some data sources offer data going back just a few short years, while others provide extended periods of historical datasets. Ensuring no gaps in the data is crucial for accurate back-testing and analysis. **Access to ancillary data** beyond just price and volume data, analysts might be interested in other datasets related to AAPL, such as analyst recommendations, earnings data, or institutional ownership data. Not all sources that provide price data offer these additional datasets. Premium financial data sources **from Bloomberg or Reuters** charge **hefty fees for comprehensive financial datasets** ranging from financial news for stock vessel counts at port to weather reports for commodity markets.
- 5.1.1.3. **Tick size** is the minimum price change between different bid and offer prices of an asset traded on an exchange platform. **[Economic Times]**. A smaller tick size can lead to more price levels within a given price range. Small size tick also allows more orders to be placed at different price points, potentially increasing the number of buy and sell orders matched. **[NASDAQ]**. A smaller tick size allows for more potential price points within a range, which inherently increases the granularity of trading data. Smaller **data granularity**, like intraday or tick-by-tick data, might be harder to come by or at a higher cost. High-frequency and intraday data are crucial for short-term traders. Conversely, long-term investors might look at quarterly and annual data. The data challenge is capturing accurately and promptly across different **data frequencies**, addressing both the immediate and future outlook.
- 5.1.1.4. While some sources provide real-time data, others may offer data with a 20-minute delay. **Data latency** disadvantages traders if timely decisions are required, especially for high-frequency trading. **[LIME]**
- 5.1.1.5. **Timeliness**: The stock market moves swiftly, and older data might differ from the company's current or future stance. The challenge of Obtaining real-time data or the most recent updates, especially during product launches or financial disclosures, is crucial. A delay can lead to missed opportunities or misconstrued analysis. While Apple, a publicly traded company, has regulatory obligations to disclose accurate financial information periodically, investors must ensure they are working with the most recent and accurate data. Even minor delays in data access can lead to missed investment opportunities.
- 5.1.1.6. Not all data providers ensure the same level of **data accuracy**. Data might sometimes contain errors or be subject to revisions, which can impact investment or research decisions— **like data accuracy on closing price and adjusted closing price**.
- 5.1.1.7. **The ever-evolving economic** landscape can render macroeconomic data irrelevant quickly. Since 2020, the economy has been volatile; floating interest data changes rapidly against fixed interest data, affecting a borrower's repayment capacity. Lenders must constantly monitor and update this data to make informed investment decisions. **[stlouisfed]**

5.1.2. 2-year Treasury Bond Investment Data Collection Challenges

- 5.1.2.1. The US 2-year Treasury bond is among the most liquid and widely monitored government securities. However, despite its significance and transparency, there are challenges associated with obtaining and utilizing data related to the 2-year Treasury.
- 5.1.2.2. Beyond mere data collection, understanding what drives 2-year Treasury yields expertise and additional data sources. Bond prices, mainly Treasuries, are influenced by macroeconomic indicators like GDP growth, employment figures, and inflation rates. The task lies in collecting this data and deciphering which indicators will most influence bond yields over the bond's short maturity period. Accurately sourcing diverse data types like economic indicators and ratings, ensuring they are up-to-date and reliable.
- 5.1.2.3. In addressing data collection challenges, many professionals rely on a combination of government sources like the US Department of the Treasury, major financial news outlets, and specialized financial data providers to obtain a comprehensive and accurate picture of the 2-year Treasury market.
- 5.1.2.4. While there are accessible sources of Treasury bond data, the most detailed and comprehensive datasets often come from premium financial data vendors. These providers offer high-quality data but at a significant cost. **[S&P Global Market Intelligence]**
- 5.1.2.5. While Treasury bond prices are updated frequently, ensuring real-time access, particularly for high-frequency trading, might require specialized services. Additionally, ensuring that data is accurate and not subject to errors or omissions is crucial. **[Fred]**
- 5.1.2.6. Depending on the source, **the data granularity varies**. Some might provide end-of-day data, while others might offer intraday data. For specific analytical needs, tick-by-tick data can be harder to source and more expensive.
- 5.1.2.7. Data sourcing and standardizing this **comparative data can be complex as data can be fragmented**.
- 5.1.2.8. Gathering data from different data vendors might present bond data in various formats or use different conventions. Ensuring **data standardization** is incredibly challenging when **integrating fragmented data** from multiple sources.

1. **Step 456. Data source, data analysis and data challenges met.**

1.1. **Student: Oratile Personal unsecured loan at a fixed rate (like Credit Card) Data insights**

1.1.1. SENARIO 1:

- 1.1.2. Gathering acknowledge related information, for example, crude Mastercard exchange information and advance reimbursement information would be vital to evaluate the reliability and reimbursement limit of individual borrowers. In any case, this is private information and isn't open. Total monetary information is subsequently gathered which incorporates Visa wrongdoing rates, Mastercard loan costs, Credit usage rate and charge card exchanges.
- 1.1.3. Charge card Misconduct Rates: These are helpful for credit risk appraisal. The wrongdoing rate on Visa credits gives moneylenders a proportion of the level of Mastercard advances that are past due. By following this rate, moneylenders can survey the reliability of borrowers and the general gamble related with their charge card portfolios. Higher wrongdoing rates might show a higher probability of default and credit risk. Additionally, they are likewise helpful in portfolio the executives. For instance, banks can utilize wrongdoing rates to screen the presentation of their charge card credit portfolios. By examining changes in misconduct rates over the long run, banks can distinguish patterns and examples in borrower installment conduct and make proper moves. This might incorporate changing credit limits, carrying out designated assortments systems, or altering guaranteeing models to oversee credit risk successfully. Besides, wrongdoing rates assist moneylenders with recognizing borrowers who are in danger of falling behind on their Mastercard installments. By following wrongdoing rates, banks can proactively mediate, speak with delinquent borrowers, and carry out assortments procedures to limit misfortunes and further develop recuperation rates.
- 1.1.4. Loan fees on Mastercards: These are valuable for benchmarking. The information on business bank financing costs on charge card plans permits loan specialists to benchmark their own loan fees against industry midpoints. By contrasting their financing costs and those of different banks, moneylenders can assess their seriousness on the lookout and change if essential. This data assists moneylenders with guaranteeing that their loan fees are alluring to borrowers while as yet mirroring their gamble evaluation and productivity objectives. Credit utilization rate (90th percentile): It is an important factor in assessing an individual's creditworthiness and financial health.

1.1. **Student: Oratile Personal unsecured loan at a floating rate (like a Car or Home Loan). Data insights**

1.1.1. SENARIO 2:

- 1.1.2. In Scenario 2, raw mortgage loan data, macroeconomic factors, housing market indicators, and real estate data is collected.
- 1.1.3. Contract Advance Information: Contract record series can be useful in market examination. The diagram assists banks with understanding the overall loan fees proposed to borrowers in various financial soundness classes. It permits them to assess the intensity of their own loan fees contrasted with the market. Also, by observing the patterns in contract financing costs for various borrower sections, moneylenders can evaluate the potential dangers related with explicit loaning classes. For instance, assuming financing costs for borrowers with lower FICO assessments and higher credit to-esteem proportions are fundamentally not quite the same as different fragments, it can show higher gamble levels for that class. Moreover, the diagram can direct banks in creating estimating techniques for contract items. By dissecting the developments in contract record series, banks can change their financing cost contributions to line up with market patterns and actually position themselves in the serious scene.
- 1.1.4. Macroeconomic Variables: The macroeconomic variables that the information was gathered on were joblessness rate, total national output (Gross domestic product), expansion rate, loan cost, workforce cooperation, buyer opinion, monetary file (S&P 500). These macroeconomic elements assist with Situation 2 by giving important data to evaluating the financial climate where loaning choices are made. Checking these variables assists moneylenders with measuring the in general monetary circumstances, survey the security and likely dangers in the economy, and pursue informed choices in regards to financial soundness, risk the board, and market patterns. For instance, a high joblessness rate or slow Gross domestic product development might show a higher gamble of credit defaults, while low expansion and stable loan costs might make positive getting conditions. Shopper feeling and monetary market execution can likewise influence purchaser conduct and credit interest. By integrating these macroeconomic elements into their investigation, loan specialists can all the more likely assess the financial soundness of borrowers and deal with their loaning portfolios successfully.

- 1.1.5. Real estate Market Pointers: The real estate market pointers considered were assessed market worth of claimed home, existing home deals, house cost list. These real estate market pointers are urgent for Situation 2 as they assist banks with surveying the real estate market's general wellbeing, strength, and likely dangers. By checking these pointers, loan specialists can pursue informed choices in regards to contract loaning, property valuation, risk appraisal, and market patterns. For instance, changes in the assessed market worth of claimed homes can affect borrowers' value positions and their capacity to get to credit. Existing home deals information can mirror the degree of real estate market movement, while house cost files give data on value patterns and possible changes. Banks can use these pointers to assess the financial soundness of borrowers, decide fitting advance to-esteem proportions, and evaluate the general economic situations for contract loaning.
- 1.1.6. Land Information: Home estimations information for various areas in the US was gathered. Picturing this information over the long haul can assist with following the exhibition and soundness of the real estate market in a particular region. This can help with decision making regarding which regions are more safe for loaning.

1.2. Student: Ebenezer - Construction Business loan at fixed rate Data insights

- 1.2.1. Distribution Analysis (Construction Loans): The distribution plot of Construction Loans data, resembling a normal distribution, provides information about the dispersion of loan values.
- 1.2.2. Utilizing distribution analysis techniques, we gain a comprehensive view of the spread of Construction Loans across various values. This distribution often mirrors a normal curve, indicating a balanced dispersion of loan values. Importantly, this equilibrium suggests an absence of significant skewness or concentration of loans with exceptionally high or low values. Lenders find immense value in this data aspect as it guides them in risk management strategies, emphasizing the importance of maintaining a diversified loan portfolio. This diversification is a fundamental approach to mitigating potential risks associated with extreme loan value concentrations.
- 1.2.3. Relationship Assessment through Scatterplots (Construction Loans vs. External Factors): The scatterplot demonstrates the connections between Commercial Real Estate Construction Loans and external factors such as economic indicators.
- 1.2.4. Employing scatterplot visualizations, we delve into the intricate relationships between Commercial Real Estate Construction Loans and external variables, notably economic indicators. By scrutinizing these scatterplots, lenders gain valuable insights into the degree of correlation between changes in external factors and fluctuations in loan volumes. This profound understanding assumes paramount significance in the lending domain as it facilitates an in-depth evaluation of how shifts in external economic conditions influence both loan demand and repayment dynamics. The ability to discern these cause-and-effect relationships equips lending institutions with the tools necessary for informed decision-making and proactive risk management.
- 1.2.5. In summary, data pertaining to Commercial Real Estate Construction Loans plays a pivotal role in the lending industry, serving as a compass for lenders navigating the complex terrain of loan management. Through various data visualization techniques, such as time series analysis, distribution plots, and scatterplots, lenders can harness the power of data-driven insights to make informed decisions, manage risk effectively, and adapt their strategies in a dynamic lending landscape

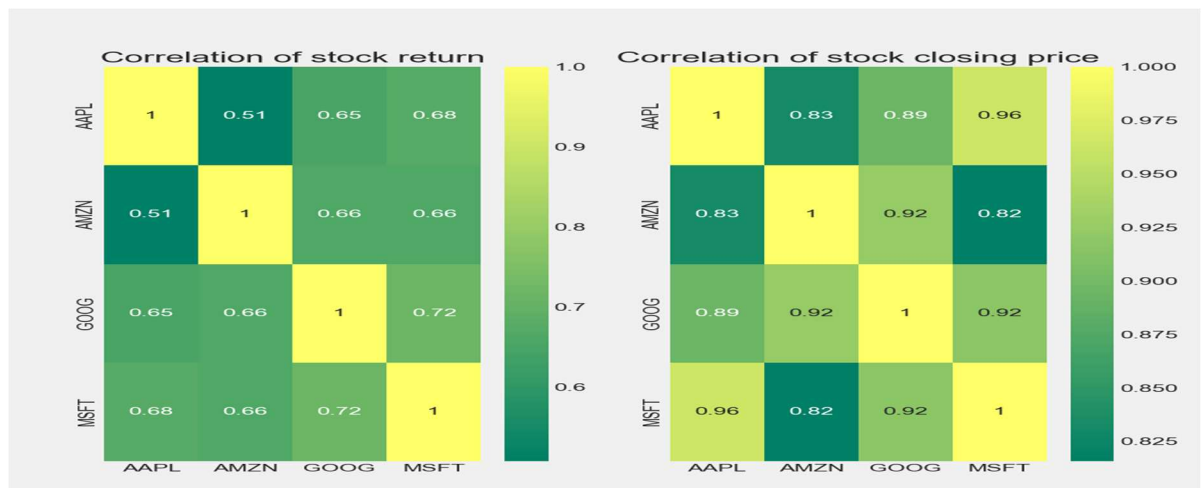
1.3. Student: Yhasreen - AAPL Equity Investment Data insights

- 1.1.7. Apple's quarterly earnings reports offer insights into its revenue, profit margins, and net income. These reports also include management's forecasts, which can influence investor sentiment and stock price movements.

	fiscalDateEnding	reportedEPS
0	2023-06-30	4.66
1	2022-09-30	6.11
2	2021-09-30	5.62
3	2020-09-30	3.27
4	2019-09-30	2.98
5	2018-09-30	2.97
6	2017-09-30	2.3
7	2016-09-30	2.0675
8	2015-09-30	2.3
9	2014-09-30	1.6075

1.1.8.

- 1.1.9. Analyzing AAPL's **historical stock price movements** helps investors understand its volatility, market sentiment, and reaction to broader economic events. **Coupled with data about AAPL competitors' performance, product releases, and market shares** in the technological sector, such as Microsoft, Meta or Google, can provide context about Apple's relative position and potential challenges or opportunities.

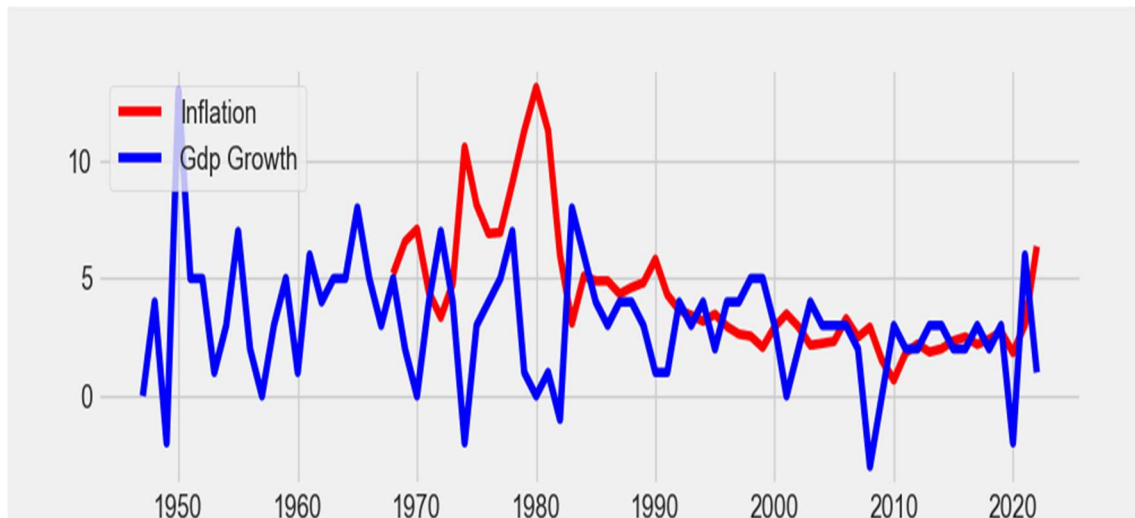


1.1.10.

- 1.1.11. **Macroeconomic Data:** Broader economic indicators, including global GDP trends, unemployment rates, and consumer confidence, can impact Apple, especially as it has a vast international market presence. A buoyant economy often means higher consumer spending on electronics and luxury goods.

- 1.1.12. While inflation erodes purchasing power, potentially reducing consumer spending on discretionary items, including Apple products. As production costs rise due to inflation, Apple may face squeezed profit margins. If central banks respond to inflation by hiking interest rates, borrowing costs for companies like Apple can increase, potentially impacting stock prices. **[TheStreet]** Higher inflation can deter investment, leading to stock price volatility.

- 1.1.13. Economic indicators can fluctuate, affecting an individual's ability to repay. Staying updated with real-time economic conditions and integrating them into loan decisions is a continuous challenge.



1.1.14.

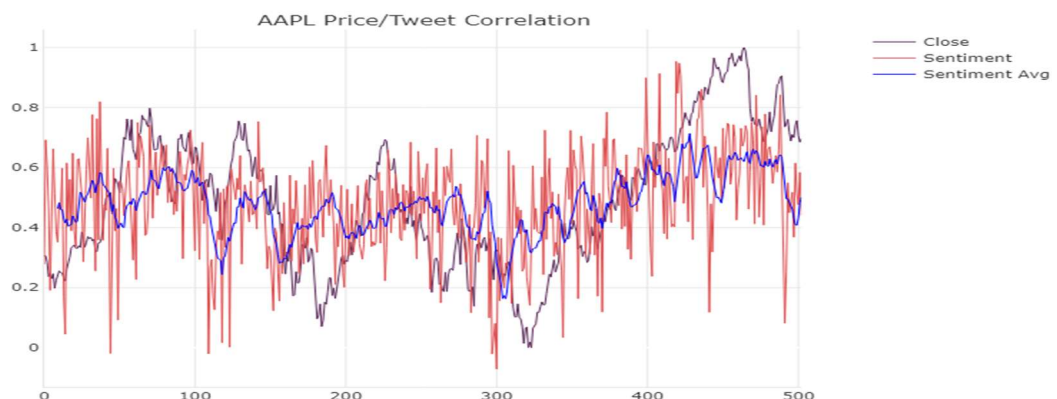
1.1.15. **Economic Indicators:**

- 1.1.16. These economic indicators influence Apple's equity performance:

- 1.1.16.1. Gross Domestic Product, GDP growth rates.
- 1.1.16.2. Employment data, including unemployment rates
- 1.1.16.3. non-farm payroll numbers.
- 1.1.16.4. Manufacturing and services Purchasing Managers' Index, PMI

It can offer investors critical insights into potential macroeconomic tailwinds or headwinds facing the company.

- 1.1.17. Economic indicators provide a broad view of the health and direction of an economy, and their influence extends to individual stocks, including giants like AAPL (Apple Inc.).
- 1.1.18. GDP growth rates indicate the economic health of the countries where Apple operates and sells its products. A strong GDP growth rate might suggest increased consumer spending power, potentially boosting sales of Apple products. On the flip side, a declining GDP can indicate an economic downturn, which might reduce consumer discretionary spending.
- 1.1.19. Employment data, especially unemployment rates and non-farm payroll numbers, can provide insights into consumer confidence. High employment means more consumers might have the disposable income to buy luxury items like Apple products. Conversely, rising unemployment can indicate economic distress, potentially affecting Apple's sales.



1.1.20.

1.1.21. Market Sentiment:

1.1.22. In today's digital age, news and tweets are crucial in shaping investor sentiment. Live video streams from social influencers on Twitter, now X, on positive Apple product reviews or hedge fund trader tweets, can trigger immediate stock price movements and boost investor confidence. [abcNews] Conversely, a negative news article about Apple's supply chain issues can result in a stock dip. Savvy investors monitor these digital channels closely, leveraging the real-time information to make timely trading decisions. Thus, staying attuned to news, TikTok, and tweets can offer a competitive edge, helping investors capitalize on market sentiments and potentially invest in AAPL more profitably.

1.2. Student Yhasreen - Bond Investment Data insights:



1.2.1.

1.2.2. Inverted Yield Curve:

1.2.3. Historically, an inverted yield curve has been a reliable predictor of a recession. [Kaulkin]. An inverted Yield Curve is when the 2-year bond yield becomes higher than the 10-year yield. It indicates that investors expect weaker growth in the future and, therefore, are willing to accept lower yields for longer-term bonds due to a pessimistic outlook on the economy. [Bloomberg]

2 Years Bond & Fed Fund Rates



1.2.4.

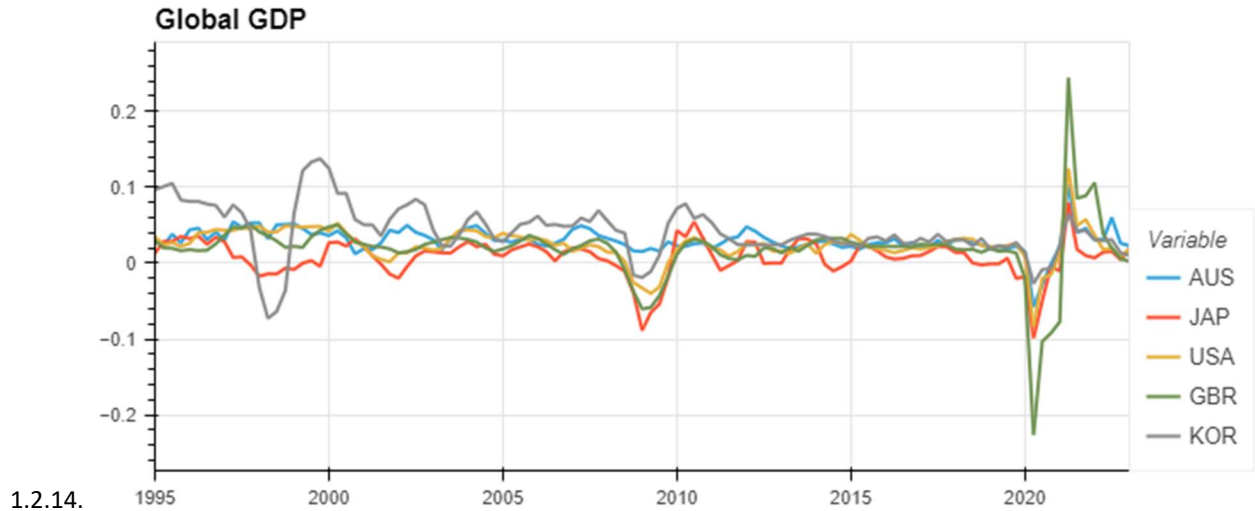
1.2.5. **Interest Rate Data:**

- 1.2.6. The Central bank base rate, or Federal funds rate, is the interest rate banks lend to each other overnight. The US Federal Reserve sets this rate as a benchmark for various short-term interest rates, including those on 2-year bonds. When the Federal Reserve adjusts the Fed funds rate, it ripples through the broader financial system. The most direct correlation risk with Treasury bonds is their inverse relationship with interest rates. A sharp rise in interest rates could lead to a decline in the bond's price and higher yields on 2-year bonds as investors demand greater returns in a rising rate environment. Vice versa
- 1.2.7. Monitoring the Fed funds rate is crucial for bond investors, as its movements provide insights into future interest rate trends, economic outlook, and monetary policy, directly influencing the pricing and yield of 2-year bonds.



1.2.8.

- 1.2.9. **Inflation data and economic indicators** are crucial elements in the analysis of bond investments, especially for instruments like the 2-year bond. Central banks often adjust interest rates in response to inflation data.
- 1.2.10. Consumer Price Index, CPI and Producer Price Index, PPI are measures of inflation. If the Consumer Price Index suggests that inflation is rising faster than expected, central banks might increase interest rates to temper this inflation. Higher interest rates can lead to lower bond prices, especially for those with shorter durations like the 2-year bond. Thus, tracking CPI and PPI can give bond investors a head start in predicting potential interest rate movements.
- 1.2.11. **The bond yields are, in part, compensation for expected inflation.** If inflation, either CPI or PPI, is expected to rise, bond yields might increase to compensate investors for the eroding purchasing power of their fixed interest payments. A bond investor who anticipates these moves can position their portfolio accordingly.
- 1.2.12. **The Gross Domestic Product (GDP) growth rate gives a snapshot of a country's economic health and two-year Bond demand.** In a growing economy, corporate profits typically rise, leading to stock market gains and potentially less demand for safer assets like bonds. Conversely, in a slowing economy, bonds, especially government bonds like the 2-year note, might be in higher demand due to their relative safety.
- 1.2.13. **Employment data, especially non-farm payroll numbers, provide insights into the economy's strength.** Substantial employment numbers signal a robust economy, leading to higher interest rates and lower bond prices. Conversely, weak employment data might indicate economic challenges, potentially leading to lower interest rates but higher bond prices.



1.2.15. Global Macroeconomic Data:

1.2.16. Economic data from major economies influences global interest rates and growth expectations.

1.2.17. Geopolitical events or financial crises that might drive a flight to safety, increasing demand for bonds, especially from stable governments. Global macroeconomic data plays a pivotal role in shaping the financial landscape. With their vast economic activities, major economies often serve as a barometer for global financial health. When these economies display robust growth or face downturns, they can send their ripples worldwide. This data informs investors about potential interest rate movements, inflation expectations, and overall growth trajectories.

1.2.18. Additionally, in times of uncertainty, whether due to geopolitical tensions or looming financial crises, investors often seek refuge in safer assets. Bonds, particularly those issued by stable governments, become the preferred choice as they offer a semblance of security. This "flight to safety" can increase the demand for such bonds, impacting their yields and prices.



1.2.20. **Market Sentiment Data:**

1.2.21. Twitter, or X, and social media in general, have transformed how market participants obtain and disseminate information, which has significant implications for financial markets. Twitter tweets instantly update major economic, geopolitical, or financial events. [\[ncbi\]](#) Using natural language processing and NLP tools, analysts can quantify the sentiment of tweets related to specific bond market topics. A surge in negative sentiment may indicate increasing market concerns about credit risk or general market sentiment, which could impact bond prices. Comments from influential figures, such as central bank officials, finance ministers, renowned economists, or Elon Musk, can have a disproportionate impact on market sentiment. [\[Reuters\]](#) Monitoring tweets can provide insights into potential market-moving opinions.

1.3. Student: Ebenezer - Illiquid security Investment data insights

1.3.1. Role of Real Estate Market Data:

- 1.3.1.1. Real Estate Price Trends (Time Series Plot): The time series plot illustrating Real Estate price movements over a year provides a chronological view of market dynamics. This historical perspective aids investors in comprehending market trends, empowering them to make well-informed decisions regarding the value and timing of real estate transactions

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