A New Regime for Fixed Income? What Could This Mean for Alternative Investments?

By: Ahmed Aleid, Arya Gadage, Gabriel Odok Jr., Gabriella Pagnini, Ha Pham

Table of Contents

Section 1: Introduction, project goals, constraints

Mark Twain, an American humorist and writer, is credited with the aphorism: “History never repeats itself, but it often does rhyme.” While circumstances, details, and settings change, similar events can essentially recycle. This phrase could also be said of the Federal Reserve interest rate policy. There is a great deal of uncertainty in today’s economic landscape concerning rising interest rates and their impact on both the U.S. and global economies, but we can look to history to find solutions to today’s rising rate environment.

The goals of this project are to better understand the history of interest rate policy in the United States, quantify whether we are in a new regime for fixed income, and describe the implications for alternative investments, specifically hedge funds.

It is our contention that we are shifting into a new regime, categorized by increasing interest rates, but aspects of the regime have been seen before. This increasing rate environment will impact alternative investments, specifically hedge funds, in a number of ways. This paper will first describe the new rate environment and then outline its impact on hedge funds by examining financing costs, opportunities, hedge fund strategies, and risk. We will look to history, past performances, and case studies to drive our analysis and recommend that investors need to adjust their past thinking when navigating this new rate environment.

Some constraints with our analysis include the fact that past performance is not completely indicative of future performance and that the data used in this project is a reflection of the macroeconomic environment in which it was taken. It can be challenging to draw conclusions just from the data alone since other environmental factors could contribute to success or failure during a given period.

Section 2: General description of information important to analysis

2.1 Interest Rates and Inflation

Interest rates represent the cost of borrowing money, while inflation measures the increase in the price of goods and services over time. When interest rates and inflation rise, they can dramatically affect the economy, impacting everything from consumer purchasing power to business operations and fiscal policies.

In a low-interest-rate environment, it becomes cheaper for businesses to borrow money, resulting in high growth rates for the whole economy. When companies can borrow money at low costs, businesses tend to borrow more because it is cheaper, translating into more investments and high growth rates for the entire economy. On the other hand, high-interest rates lead to higher borrowing costs, making it more expensive for businesses to borrow, thus negatively impacting the economy's growth rate.

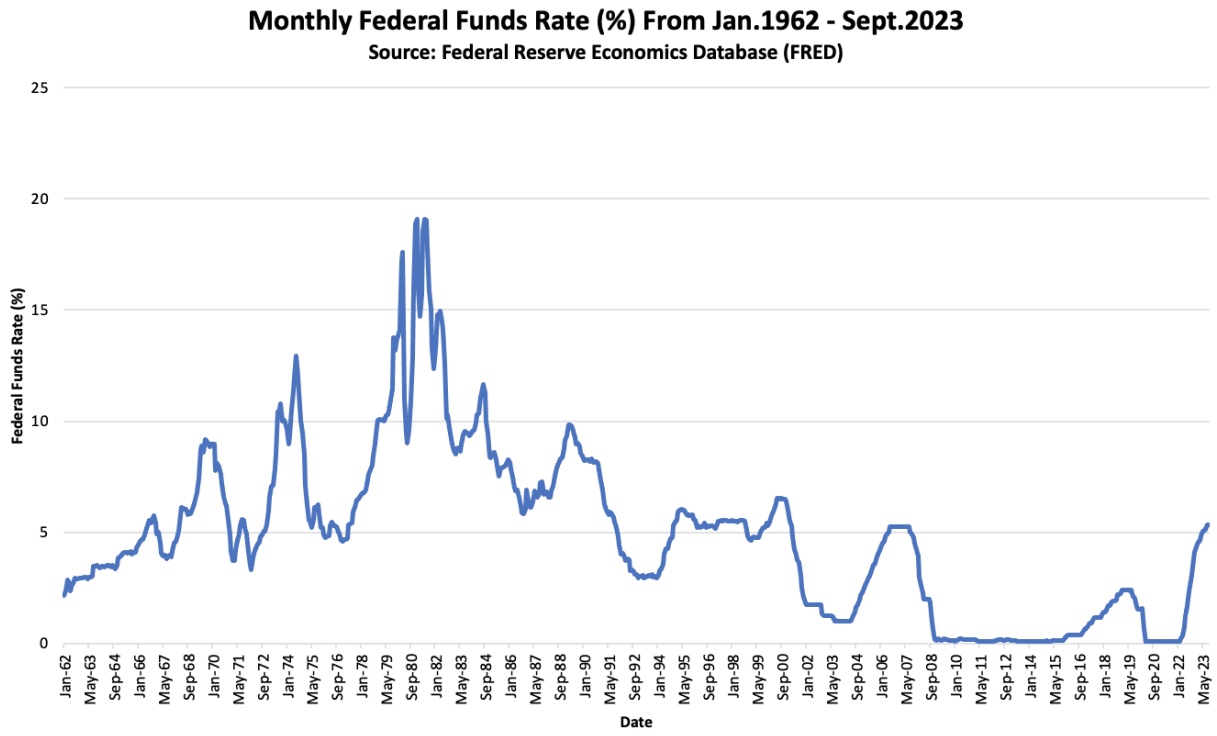
The inflation rate, the rate at which prices of goods and services grow, is another factor affecting the macroeconomy. For example, in the United States, inflation rates between 2015 and 2019 ranged from 1% to 3%. However, inflation rates have risen in the United States since the pandemic, reaching 9.06% in June of 2022.

The government believes high inflation rates are harmful to the economy. The Fed’s target inflation rate is around 2%. Since prices increase while incomes remain constant, many households struggle to manage their finances on the individual level when inflation rates rise above the 2% threshold. Additionally, businesses operating in non-critical industries, such as hospitality and tourism, may observe significant losses since people have less disposable income to allocate towards these non-critical activities. Historically, inflation rates are negatively

correlated with interest rates. As interest rates increase, economic growth slows down, negatively affecting consumer spending and inflation.

2.2 The Federal Funds Rate

The Federal Funds rate is the interest rate at which banks and credit unions lend reserves to other depository institutions overnight. It is a crucial tool the Federal Reserve uses to control the money supply, influence economic activity, and maintain price stability. The Federal Open Market Committee (FOMC) adjusts the Federal Funds interest rate in response to the macroeconomy. Adjusting rates helps the Fed achieve conditions that satisfy their dual mandate: Keep prices stable and maximize employment. The Fed raises interest rates when the economy starts overheating (i.e., there is too much inflation) and cuts rates when the economy looks weak (i.e. when there is high unemployment). Plenty of other data impacts the Fed's monetary policy decisions, including gross domestic product (GDP), consumer spending, and industrial production, as well as other significant events like a financial crisis, a global pandemic, or a massive terrorist attack. The Fed's benchmark rate matters because it determines how much people are charged to borrow and how much they earn in interest when they save (Tepper, 2023). Below is a graph of the Federal Funds target rate from 1962 to 2023.



Examining historical changes in the Federal Funds rate provides insight into the Fed's current interest rate decisions. The FOMC releases policy statements and holds press conferences that detail their rationale for any interest rate adjustment, providing useful information for analysts and investors to consider when making financial decisions. Since the 1990s, the Federal Funds rate has fluctuated for many reasons.

1. Fed Rate Hikes 1994-1995: A Soft Landing: The monetary policy tightening cycle of 1994-1995 is commonly remembered as a rare instance of the Fed carrying out a so-called "soft landing" for the economy. Between February 1994 and February 1995, Greenspan led the FOMC almost to double the Federal Funds rate in just seven increases. After a brief recession earlier in the decade, the U.S. economy was booming. GDP was +3.5% in 1992, +2.8% in 1993 and +4% in 1993. At the time, the baby boomer generation was at the height of their careers, immigration was strong, and new technology was transforming the economy. With strong productivity rates keeping

unemployment low, the Fed hiked into a strong economy. ‘The decision was taken to move toward a less accommodative stance in monetary policy in order to sustain and enhance economic expansion,’ according to the Fed’s statement accompanying the February 1994 rate increase. The rates increased from 3.25% in February 1994 to 6% in February 1995, a change of 300 basis points (Tepper, 2023).

2. 1998 Fed Rate Cuts- Global Currency Crisis: Starting in September 1998, the Fed announced three interest rate increases, 25 basis points each, until November 1998. The Federal Funds rate increased from 4.75% to 5.25% in just three months. An Asian currency crisis started in Thailand in 1997 and then swept through the rest of Asia and Latin America. This helped spark a currency crisis in Russia in late 1998, and these problems drove a giant U.S. hedge fund called Long-Term Capital Management (LTCM) to the brink of bankruptcy (Tepper, 2023).
3. Dot-Com Boom, Dot-Com Bust, and 9/11: Between 1995 and its peak in March 2000, the Nasdaq rose 400% as a frenzy of speculation pushed up the value of internet stocks and tech companies. The Fed watched the bubble inflate and stepped in with rate increases starting in June of 1999. With the unemployment rate hovering around 4% and inflation inching toward the Fed’s 2% target, former Fed Chair Alan Greenspan hoped to stamp out any chance that inflation expectations could get entrenched—leading to the 50 basis point raise to cap this tightening cycle. The rate rose from 5% in June 1999 to 6.50% in May 2000. After the dot-com bubble of the late 1990s and 2000 came the dot-com bust of 2001. The frenzy of speculation led to a massive volume of weak dot-com investments, prompting an inevitable stock market crash. There was a modest contraction in GDP, higher unemployment levels, and an eight-month-long recession. The 9/11 terrorist

attacks only exacerbated the problems in the economy. The Fed lowered interest rates by a total of 5.25 percentage points, dropping from 6.00% in January 2001 to 1.75% in December 2001 (Tepper, 2023).

4. Housing Boom and 2008 Great Recession: The economy recovered quickly from the dot-com recession in the early 2000s. GDP expanded from +1.7% in 2001 to +3.9% in 2004—and by 2005, people were already talking about a bubble in U.S. housing markets. The Fed hiked interest rates 17 times in two years, raising the Federal Funds rate from 1.25% in June of 2004 to 5.25% in 2006. By early 2007, the housing bubble was bursting, and the unemployment rate started to rise. With the economy failing, the FOMC started reducing rates in September 2007, eventually reducing rates by 2.75 percentage points in less than a year. The rates dropped from 4.75% in September 2007 to 2.00% in April 2008. After the April 2008 rate cut, then Fed Chair Ben Bernanke hit pause to survey the impact of lower interest rates on the economy. The Great Recession officially began in December 2007 and lasted until June 2009. American families saw their home values collapse, and the stock market didn't reach its bottom until early 2009. The unemployment rate grew from 5% in December 2007 to 10% by October 2009. The Fed lowered rates to 0% in December of 2008 and began quantitative easing, where they bought trillions of dollars worth of bonds to stimulate the economy (Tepper, 2023).
5. Fed Rate Hikes 2015-2018- Returning to Normalcy: Interest rates remained near zero until 2015, when the Fed gradually increased interest rates until 2018 as the economy recovered. Rates increased from 0.25% in December 2015 to 2.50% in December 2018 (Tepper, 2023).

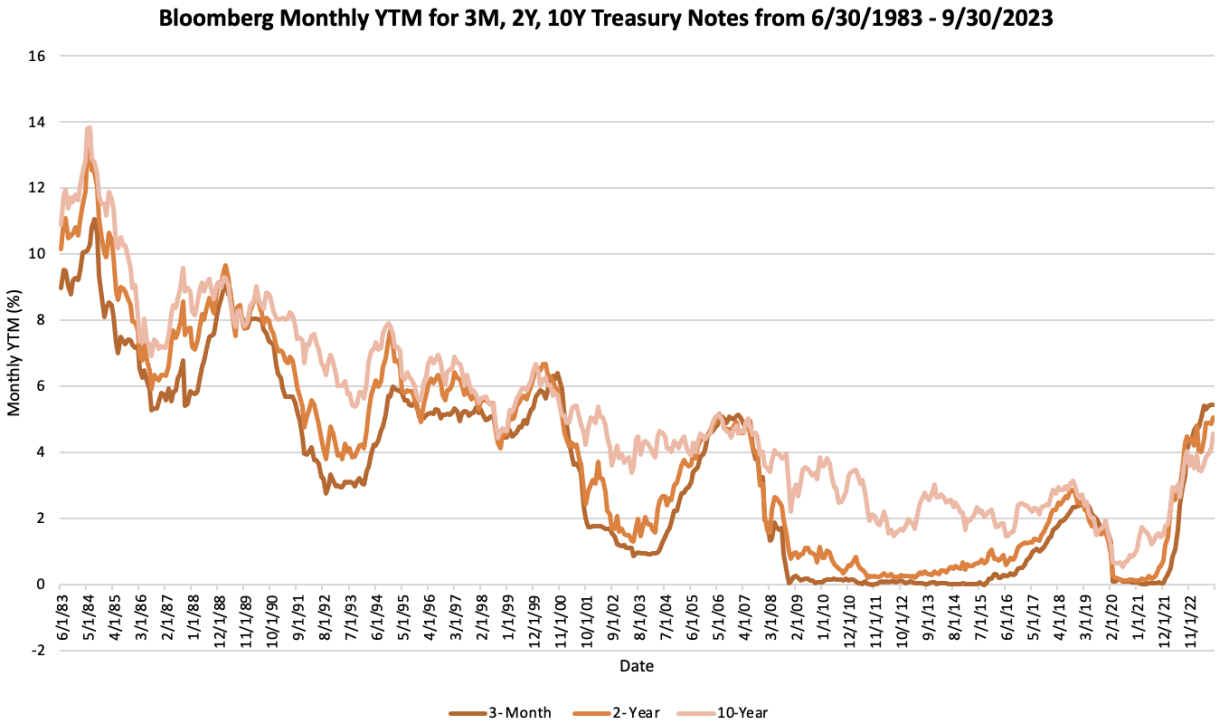
6. 2020 Fed Rate Cuts- Coping with COVID-19: When the COVID-19 pandemic spread across the globe, public health officials worldwide recommended that politicians impose lockdowns to stop the spread of the virus and ease hospital caseloads. Roughly 20.5 million jobs were lost in April 2020 alone, with the unemployment rate jumping to 14.7%. The FOMC delivered two huge rate cuts at unscheduled emergency meetings in March 2020, returning the federal funds target rate range of zero to 0.25%. While the economy was technically growing again by May 2020, after the shortest recession on record, the fallout from the economic measures to cope with the pandemic is still felt today (Tepper, 2023).

2.3 The Current Macroeconomic Environment & "New" Rising Rate Regime

Since the COVID-19 pandemic, trillions in fiscal stimulus, and Russia's invasion of Ukraine, demand dynamics have dramatically shifted. U.S. inflation hit 40-year highs, met with a strong labor market. As a result, the Federal Reserve has aggressively raised rates to prevent the economy from overheating (Neufold, 2023). During the first quarter of 2022, the Fed held interest rates around zero. They were also utilizing quantitative easing to stimulate the economy. Over the last 17 months, the Fed hiked rates 11 times, raising the Federal Funds rate by more than five percentage points. Rates rose from the 0.25%-0.50% range in March of 2022 to 5.25%-5.50% in July 2023 (Tepper, 2023). Many investors argue that the transition from quantitative easing to a pause and then to quantitative tightening sets forth a new fixed-income regime.

Despite their recent increases, the interest rates are still low by historical standards. Over the last four decades, the highest average annual 10-Year Treasury yield was 13.9% in 1981,

while the lowest was 0.9% in 2020 (Neufold, 2023). The 10-Year Treasury yield monthly average was 5.33 in November, 2023. The major shift we are experiencing is from a decreasing rate environment to an increasing rate environment. The chart below depicts the monthly yield to maturity for the 3-Month, 2-Year, and 10-Year U.S. Treasury notes from 1983 to 2023.



Examining the rates from a historical perspective allows us to understand the cyclical nature of rising and falling rates. While these rate hikes are the steepest rate hikes since the 1980s, and the increases come after a great deal of time with near-zero rates, the U.S. economy has experienced periods with rising interests of similar magnitude. The current macroeconomic environment represents a shift back into the rising rate environment, which is new to many investors, analysts, and managers.

As U.S. interest rates have increased, market participants have become increasingly pessimistic about the near-term economic outlook. Consequently, the yield on short-term U.S. bonds has risen since near-term risks appear greater than risks in the long term. The 10-year minus 2-year Treasury yield curve, which subtracts short-term bond yields from longer-term yields, illustrates this trend. In March, the Treasury yield inverted to -1.07 basis points, one of the lowest points in decades. When this yield curve inverts, meaning short-term yields are higher than long-term yields, it often signals market uncertainty. Historically, this has signaled a recession, but often with a several-month lag (Neufold, 2023).

2.4 Impact of Rising Interest Rates on Alternative Investments

High-interest rates can have several impacts on the alternative investment markets, affecting different strategies and asset classes in different ways.

1. Increased Borrowing Costs: High interest rates typically lead to higher borrowing costs. This can impact alternative investment strategies that rely on leverage, such as hedge funds and private equity. Increased borrowing costs may reduce returns and potentially limit the availability of credit.
2. Fixed Income and Bond Markets: High interest rates generally result in lower bond prices. As interest rates rise, the present value of future cash flows from fixed-rate securities decreases, leading to capital losses for existing bondholders. This can affect alternative fixed-income investments and strategies.
3. Real Estate: Real estate is often sensitive to interest rate movements. Higher interest rates can increase mortgage rates and the cost of financing for real estate projects. This may

lead to lower property values and impact the performance of real estate investment trusts (REITs) and other real estate-related alternative investments.

4. Private Equity: Private equity investments may be affected by higher interest rates, particularly if they rely on debt financing for acquisitions. Increased borrowing costs can impact the profitability of leveraged buyouts and may lead to adjustments in deal structures.
5. Hedge Funds: Hedge funds often use various strategies, including leverage and derivatives. Higher interest rates can increase the cost of leverage and may impact the performance of interest rate-sensitive strategies within hedge funds.
6. Commodities: The impact of high interest rates on commodities can be mixed. On one hand, higher rates may strengthen the currency, potentially putting downward pressure on commodity prices. On the other hand, some commodities, such as gold, may serve as a hedge against inflation, and their prices may benefit from concerns about rising interest rates.
7. Equity Markets: Alternative investments that are linked to equity markets may experience volatility and adjustments during periods of rising interest rates. Investors may reassess their portfolio allocations, and valuation metrics for equities could be influenced by changes in discount rates.
8. Currency Markets: It's important to note that the relationship between high-interest rates and alternative investments is complex, and the impact can vary based on factors such as the specific strategy, market conditions, and the reasons behind the interest rate changes (e.g., inflation concerns or monetary policy shifts). Investors should carefully analyze the

potential implications for each specific alternative investment within the context of broader economic and market conditions (Investopedia).

2.5 Distinct Features of Hedge Funds

A hedge fund is a limited partnership of investors whose money is managed by a fund manager. Hedge funds are characterized by their use of leveraging and trading non-traditional commodities to generate maximum alpha.

- The fund is exclusively accessible to individuals with accredited investor status and is not available for public offering or sale. Prospective investors must satisfy specific net worth criteria, requiring more than $1 million in net worth.
- This fund invests extensively across various sectors, including real estate, equities, derivatives, currencies, and commodities. It often employs borrowed capital to magnify returns through leverage.
- Hedge funds entail management and performance fees. Typically, they charge an annual management fee of 1% of the total assets invested and a performance fee of 20% on any profits earned.
- Investors must commit their funds to the investment for a predetermined period, usually one year. Withdrawals can only occur at specified intervals, such as quarterly or semi-annually.
- The fund implements various investment strategies that must be disclosed to investors. (Investopedia)

2.6 Hedge Fund Strategies

Fund managers adopt different strategies based on the current market conditions. Each strategy adds unique portfolio risks. The main hedge fund strategies are described below.

1. Global macro strategies: Fund managers base their decisions on significant global macroeconomic trends, including changes in interest rates, currency fluctuations, demographic shifts, and economic cycles.
2. Directional hedge fund strategies: Fund managers invest directionally (long /short), expecting a trend to persist or reverse over a certain period. Managers analyze market dynamics, trends, and inconsistencies.
3. Event-driven strategies: True to the name, these strategies are based on events like acquisitions, mergers, recapitalizations, liquidations, and bankruptcies. These transactional events are the foundation for investments in distressed securities, risk arbitrage, and special situations.
4. Relative value arbitrage strategies: Relative value arbitrage hedge fund strategies capitalize on relative price disparities among different securities, anticipating their convergence or divergence over time. These include fixed-income arbitrage, equity market neutral positions, convertible arbitrage, and volatility arbitrage.
5. Long/Short strategies: Fund managers play “pair trades,” where if there are two competing companies/ companies with high correlation, the manager assumes a long position for the better-performing company and shorts the other.
6. Capital structure strategies: Some managers exploit the mispricing of securities on the upside and downside. (Corporate Finance Institute)

Section 3: Data Used

In order to understand the impact of changing interest rates on the different hedge fund strategies, we utilized the following main sources of data shown below:

1. 3-Month Treasury Bill Secondary Market Rate, Discount Basis (TB3MS). This data is pulled from the Federal Reserve Bank of St. Louis website.
2. Ten individual CISDM Hedge Fund Strategy Indices reflecting the median performance of funds within self-reported hedge fund strategy classifications reporting to the Morningstar CISDM Hedge Fund Database.
3. Monthly yield to maturity (YTM) rates on the 3-month, 2-year, and 10-year Treasury Notes from Bloomberg (GB03 Gov, GT02, GT10)
4. The monthly Federal Funds rate from 1962-2023. This data was pulled from the Federal Reserve Economic Database (FRED).

Section 4: Thorough Analysis

4.1 Financing Costs

The Fed's new monetary policy tremendously affects the economy as it attempts to engineer a contractionary climate following the over-supply of money post-pandemic. Hedge Funds and their strategies are not immune to this hawkish stance. The unprecedented hike in interest rates has led to higher and higher yields on treasury bills and other fixed-income products, resulting in higher financing costs and ushering in a new regime that could impact hedge fund strategies in unexpected ways. To examine the impact of this new regime, its opportunities, and threats, it is vital to think of it from two perspectives: the perspective of the

hedge fund/ hedge fund manager and the perspective of the hedge fund investor. Analyzing from these perspectives is not exhaustive, but understanding the impact of rate hikes on hedge funds is developing, and this dual analysis gets us in the right direction.

4.1.1 Financing Cost Impact on Hedge Fund Investors.

Hedge Funds (HFs) are a risk-on asset class. Most investors are drawn to HFs in a bid to get uncorrelated returns and are equally conscious of the accompanying risk. In an environment with high nominal rates, the incentive to take on more risk reduces significantly when the risk-free interest rate is high. A return of 9% or below by HFs is currently only a return of 4% on risk because the return on cash (almost risk-free fixed-income products) is 5%. This dynamic can potentially change investors' appetite for high-risk alternative asset classes, and hedge funds will be impacted. We have begun seeing this shift in risk appetite as DoubleLine Capital Founder Jeffrey Gundlach, a bond investor and trader, was quoted on Yahoo Finance saying, "Buy a T-Bills and Chill," an expression that captures the potential risk-off climate that could ensue due to higher nominal rates. This is not all bad news for hedge funds, as they could potentially end high returns on their cash as they wait to capitalize on opportunities. This is discussed in the sections below.

4.1.2 Financing Cost Impact on Hedge Funds/ Hedge Fund Managers.

We will examine hedge funds through the lens of collateral yields, impact on asset value, options, and liquidity to understand the impact of the financing cost on them holistically.

Higher collateral yield:

When hedge funds engage in short selling, hedge funds typically pay fees to the owner of the shares (often facilitated by a broker) to use those shares in a short sale. These borrowing fees are influenced by supply and demand dynamics and are an additional cost for the hedge fund.

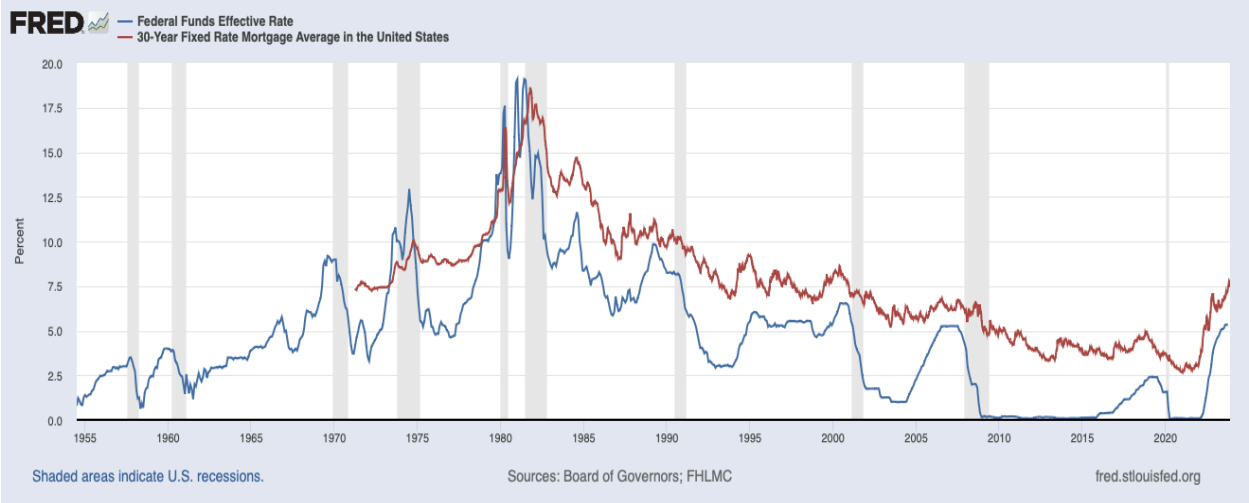
On the other hand, hedge funds also post assets as collateral with brokers when borrowing stocks. This collateral protects against the risk of default if the short trade goes against the hedge fund. While the stock is borrowed, the hedge fund is owed interest payments on its provided collateral. In a low-interest-rate environment, these interest payments might have been relatively small and not have covered other costs associated with short selling, such as dividend payments. However, with higher interest rates, the interest payments on the collateral become more substantial. This means that the collateral posted by the hedge fund serves as insurance and becomes a source of income, potentially offsetting some of the costs associated with short selling. The increased income from collateral can make it cheaper for hedge funds to borrow stocks for short-selling purposes, enhance the profitability of short trades, and encourage more short-selling activity in a higher-interest-rate environment.

Over the past 15 years, when interest rates were low, the interest payments on collateral might have been insufficient to cover all the costs associated with short selling, including borrowing fees. In the current environment of higher interest rates, the dynamics have shifted, and the interest earned on collateral may now be more significant, making short selling more cost-effective for hedge funds.

Decline in asset value:

As interest rates rise, certain assets, notably bonds, tend to lose value. Moreover, when both interest rates and inflation increase, the original yield of bonds may fall below the inflation rate. This results in a scenario where the returns on the investment do not keep pace with the rising cost of living, leading to a loss in real profit on our investment. In essence, the dual impact of rising interest rates and inflation creates a challenging environment for bond investments, eroding both their market value and the real purchasing power of their returns.

Not only does it affect bonds, but the increase in interest rates also affects the value of other assets. The higher interest rates also make mortgage rates higher. As a result, people might delay their plans to buy a home, which decreases the demand for houses. Consequently, sellers will have to decrease the price of mortgages to attract more buyers, leading to a decline in overall property value.



Illiquidity and Borrowing:

Higher interest rates present a challenge for illiquid investments, assets that are not easily sold or converted to cash promptly. The adverse impact of the increased cost of borrowing to finance illiquid projects makes such investments less appealing. Therefore, investors with illiquidity issues must carefully navigate borrowing strategies. Investors need to tailor financing deals that account for the heightened costs associated with borrowing in a higher interest rate environment. This approach requires careful calculation in investment strategy and considering the potential constraints of illiquid assets for investors.

Furthermore, the influence of higher interest rates extends to the effect of risk-adjusted returns. Investors, now facing heightened financing costs and increased uncertainties associated with elevated interest rates, may readjust their expectations.

Interest rates can affect the value of options:

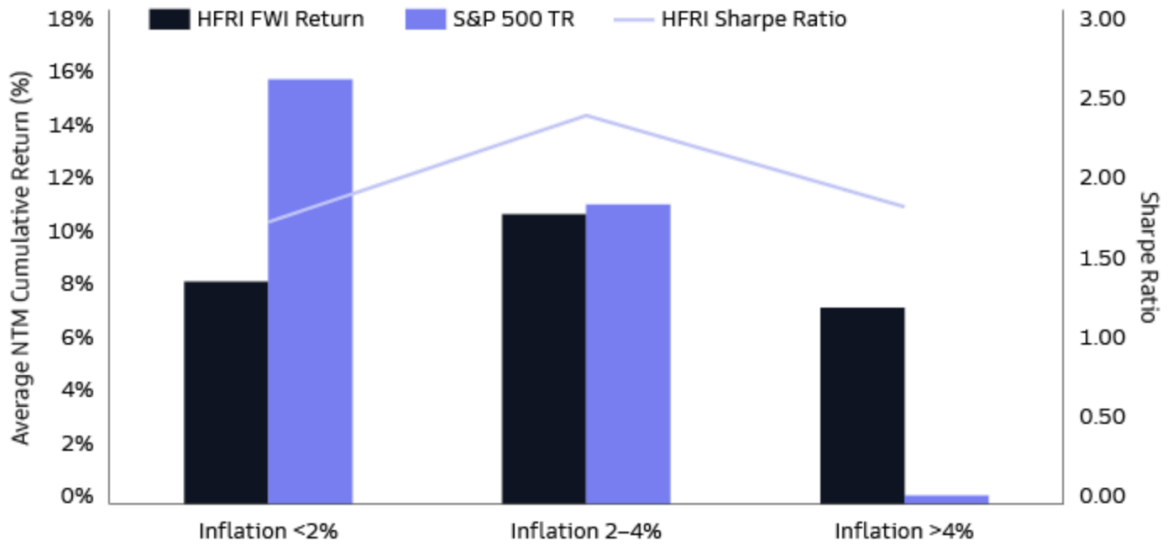
When investors buy an at-the-money put option, they purchase the right (but not the obligation) to sell the underlying stock at the strike price. This is similar to having a short stock position because both allow them to profit from decreased stock prices. With a short stock position, they don't own the stock; they've borrowed and sold it. To maintain this position, they need to cover the cost of borrowing, and prevailing interest rates influence that cost. If interest rates are high, the cost of borrowing stock to maintain a short position is higher, affecting the put option's value because it's less expensive to hold the option in a high-interest-rate environment.

In summary, interest rates affect the value of options by influencing the opportunity cost associated with alternative strategies. The higher the interest rates, the more expensive it becomes to tie up capital or borrow stock, which impacts the cost of holding options. As a result,

changes in interest rates can lead to changes in option prices. This relationship between interest rates and the value of options holds particular significance for hedge funds that frequently engage in complex options strategies. Therefore, hedge fund managers must consider the effect of interest rates when adjusting their options portfolio.

4.2 Opportunities

Historically, the hedge fund industry has consistently performed well when inflation and interest rates are high. In times of high inflation, hedge fund returns tend to exceed US equity market returns. In contrast, during low inflation periods, hedge funds tend to generate returns about 52% lower than what equity investors receive. When inflation is close to the Federal Reserve's target of 2%, hedge fund returns are similar to equities but significantly less volatile.



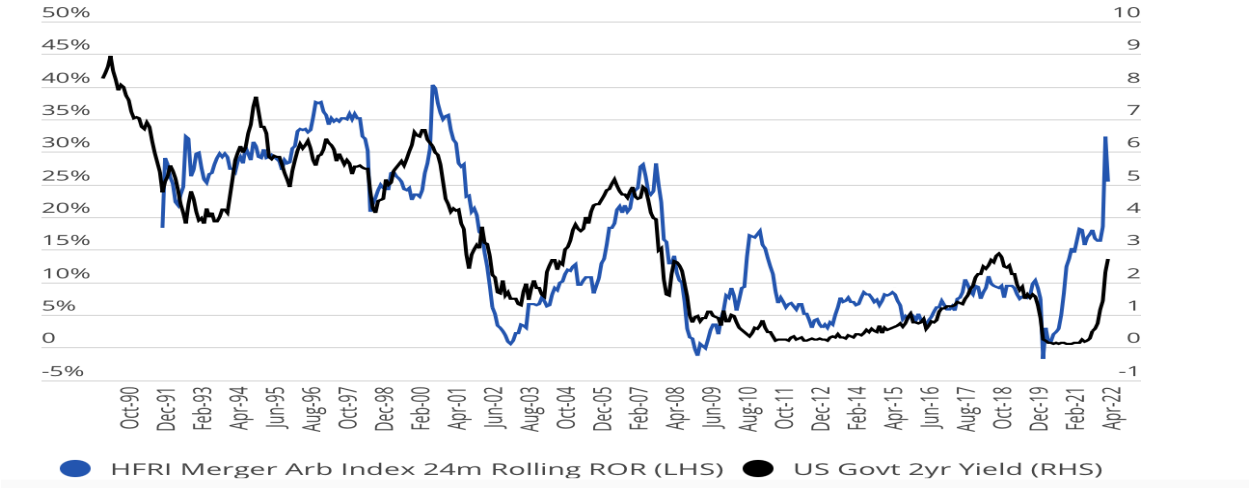
Source: Bureau of Labor Statistics, Bloomberg, HFRI. Analysis from 1990-2022.

There are strategies that hedge funds have used to generate greater returns when the interest rate and inflation rates are high:

Spread-Based Arbitrage Strategies:

As interest rates increase, the spreads involved in arbitrage opportunities tend to widen. This is particularly relevant for hedge funds engaging in spread-based arbitrage strategies, which profit from price differentials between related assets. The widening spreads create more favorable conditions for these strategies, potentially increasing expected returns.

One specific strategy mentioned is merger arbitrage. In this approach, hedge funds take advantage of price differentials between the current market price of a target company's stock and the price offered in a merger or acquisition deal. The widening spreads in a rising interest-rate environment could enhance the profitability of such merger arbitrage opportunities.



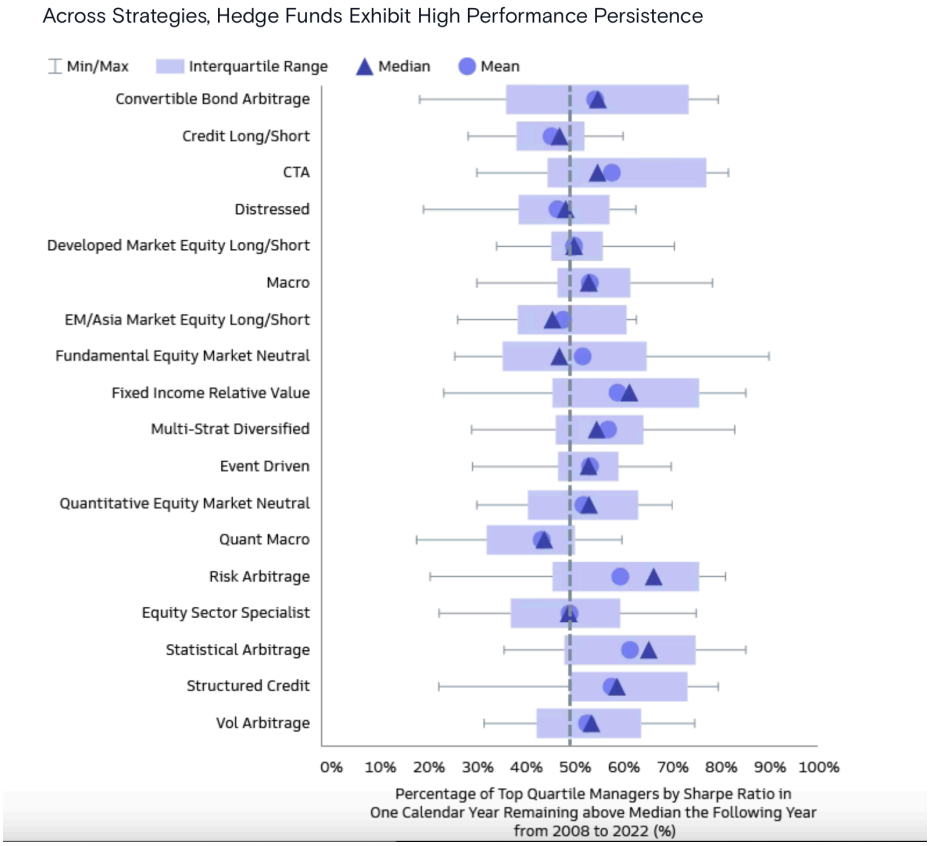
Source: Bloomberg, Hedge Fund Research, abrdn, June 2022.

Macroeconomic Environment and Hedge Fund Strategies:

Hedge funds may benefit from factors like inflation and interest rates, potentially delivering stronger returns with higher inflation and interest rate regimes. The performance

pattern in higher inflation and interest rate environments is attributed to structural and environmental factors. These factors could include the impact on various asset classes, the behavior of market participants, and the effectiveness of different hedge fund strategies in navigating such conditions.

Hedge funds' resilience is attributed to their highly diversified and dynamic cross-asset exposures. Short positions and a focus on arbitrage and relative value allow hedge funds to adapt to changing market conditions and potentially thrive even in periods of weak economic growth.



Source: Goldman Sachs Asset Management XIG Hedge Fund Database. As of 2022.

In essence, the data highlights that hedge funds can incorporate interest rate spreads into their trading strategies, optimizing their performance across diverse market conditions. By strategically navigating the nuances of interest rate differentials, hedge funds employing CTA,

statistical arbitrage, or risk arbitrage can enhance their ability to generate alpha and deliver favorable returns to their investors.

Future contracts:

Hedge funds can use interest rate futures contracts to speculate on the future direction of interest rates. If a hedge fund anticipates that interest rates will rise, it can take a long position in interest rate futures. If their prediction is correct, and interest rates indeed increase, the value of these futures contracts rises, leading to a profit for the hedge fund.

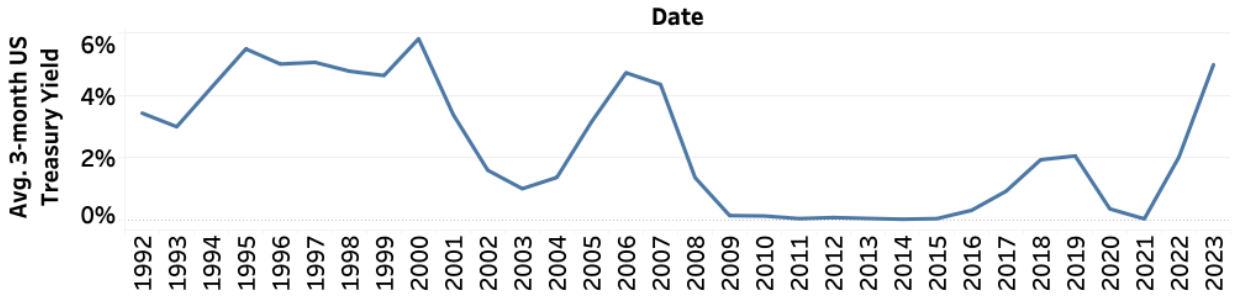
In addition, hedge funds can employ more sophisticated strategies involving interest rate spreads. For instance, they might simultaneously enter into futures contracts with different maturities or on different interest rate instruments. It can result in profitable outcomes if they correctly predict the shape of the yield curve or changes in the yield spread between different maturities.

4.3 Hedge Fund Strategies

Interest rates have a direct impact on different hedge fund strategies because financing costs become more expensive, negatively impacting borrowers and positively impacting lenders. At the same time, the fluctuating cost of money has collateral effects that impact the whole economy, affecting the profitability of the different hedge funds.

When interest rates are high, lenders charge borrowers higher interest. As a result, when interest rates are high, investors require higher investment returns for giving up their money. When investors demand higher returns on their investments, money managers become under pressure to over-perform to satisfy the investors.

In this section, the performance of different hedge fund strategies is analyzed in order to understand how changing interest rates affect the performance of these hedge fund strategies. In the figure below, the yield of 3-month treasury bills is plotted against time.



In order to understand how the changing interest rates affect hedge fund strategies, different time periods are selected based on how interest rates change during that time period. The table below highlights ten time periods that will be used to analyze impact on hedge funds.

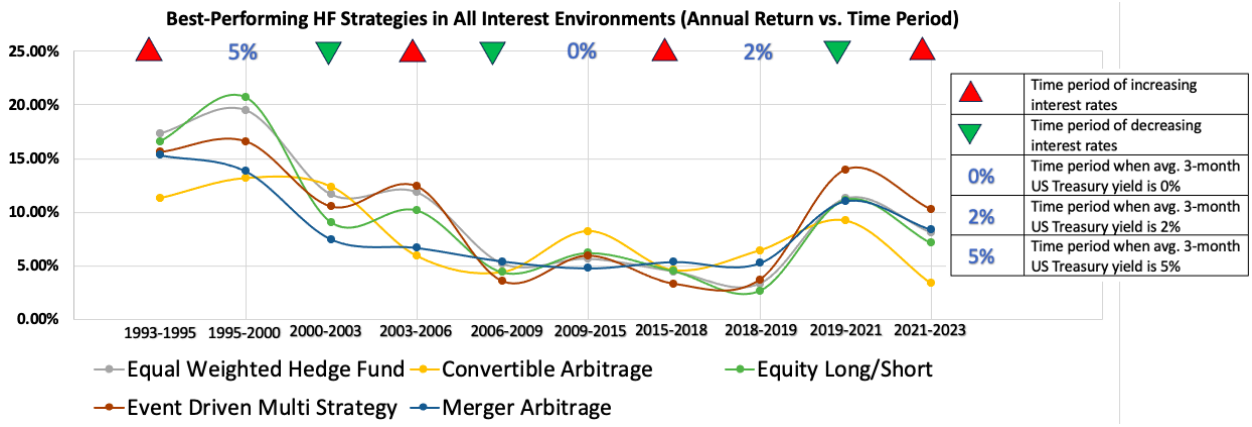
Time Period	Change in 3-Month US Treasury Yield	Symbol Used for later charts
1993-1995	Increasing	▲
1995-2000	Constant at ~5%	5%
2000-2003	Decreasing	▼
2003-2006	Increasing	▲

2006-2009	Decreasing	
2009-2015	Constant at ~0%	
2015-2018	Increasing	
2018-2019	Constant at ~2%	
2019-2021	Decreasing	
2021-2023	Increasing	

By analyzing the performance of the different hedge fund strategies during these time periods, we found that there are some strategies that outperform other strategies, regardless of where the interest rate is. In addition, there are some strategies that outperformed other strategies under specific interest environments.

4.3.1 HF Strategies that outperformed other strategies regardless of interest rates

Below is a chart that shows hedge fund strategies that outperform other strategies at all times, regardless of interest rates.



Although other hedge fund strategies are not shown on this chart above, these five strategies on the chart outperformed other strategies consistently. One common factor between these best-performing strategies is that they require excess cash to be set aside as collateral for the borrowed equities. In a high-interest environment, excess cash is an advantage because it means that the money manager can allocate the excess cash to zero-risk financial instruments, such as government bonds.

During low-interest environments, these five strategies above are proven to outperform other strategies as well. Even though these five strategies do not earn significant risk-free interest on the excess cash, they still outperform the other strategies in the hedge fund space.

In the following section, four out of the five best-performing strategies are analyzed in detail. The purpose of the analysis is to understand why these strategies outperformed other HF strategies under all interest environments. Note that the equal-weighted HF strategy is excluded from the analysis because this strategy does not represent a specific managing strategy.

Merger Arbitrage

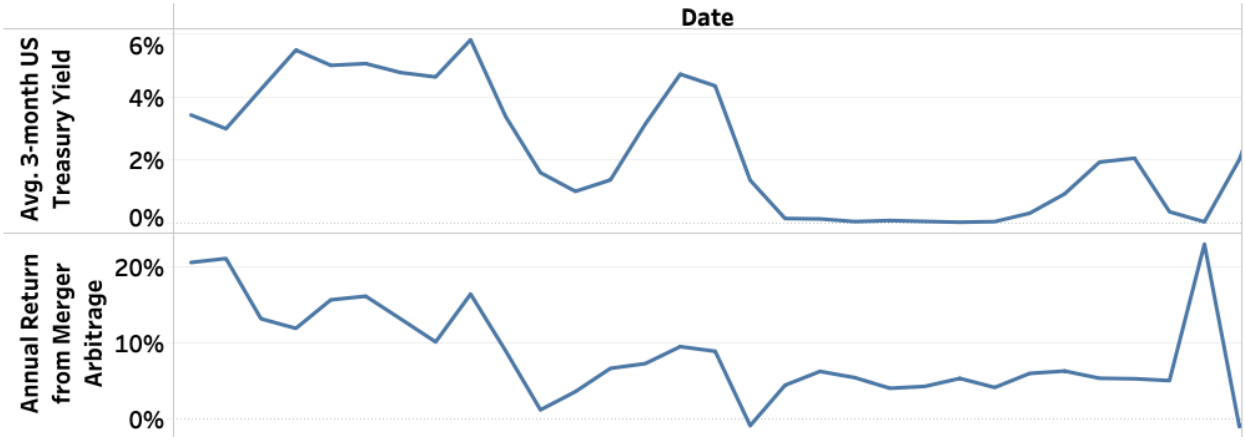
One hedge fund strategy that is positively impacted by higher interest rates is merger arbitrage. Hedge fund managers that follow the merger arbitrage strategy benefit from the changes in stock price for both the acquirer company and the target company.

When the acquirer company announces that it will acquire a target company, the stock price of the acquirer company tends to go down, while the target company's stock price tends to increase. This happens because the acquirer company tends to buy a target company for a price that is higher than the actual, realistic stock price. Since target companies get acquired for higher than their actual stock price, the target company's stock price tends to go up to reflect this event.

Similarly, the stock price of the acquirer company tends to go down because the acquirer company will have to buy a target company for a higher stock price value, translating to potential financing and higher debt. Hedge fund managers who are active in the merger arbitrage strategy benefit from this process by longing the target company and shorting the acquiring company, making profits that arise from this transaction.

In a high-interest rate environment, investors require higher returns on their investments, which means that the overall stock market may be under pressure to perform well so that investors continue to hold their stock shares. In an acquisition scenario that takes place during a high-interest environment, the target company’s stock price is still likely to increase to a value between the original stock price and the announced acquisition price. On the other hand, the stock price of the acquirer company is likely to go down by a larger magnitude compared to a low-interest environment. This happens because investors demand higher returns on investments during high-interest periods, resulting in a more significant negative impact when acquirer companies announce acquisition plans.

Because the stock price of the acquirer company decreases more than usual in a high-interest environment, merger arbitrage investors tend to make more profits. In other words, high-interest rates result in a wider spread between the pre- and post-announcement values, helping merger arbitrage investors realize more substantial profits. Below is a chart that plots the average 3-month US treasury yields and annual return of the HF merger arbitrage index.

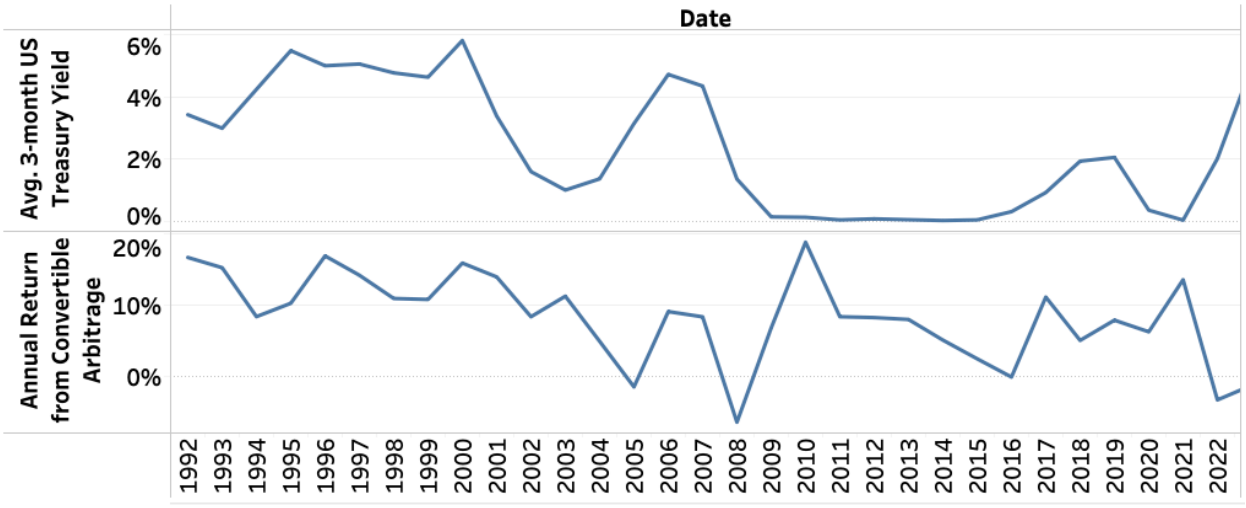


To some extent, the performance of the merger arbitrage strategy mirrors the changes in US treasury yield rates during the different time periods. Although the two rates are not 100% correlated, this is not a surprise because the merger arbitrage index is affected by many other factors besides the interest rates.

Convertible Arbitrage

The convertible arbitrage strategy is another hedge fund strategy that benefits from higher interest rates. In this strategy, the hedge fund manager buys convertible bonds while shorting the underlying stock. If the stock goes down, the HF manager gains from shorting the stock. If the stock goes up, the HF manager gains from the increasing bond price.

In a low-interest environment, HF managers practice this profitable strategy as they always do. On the other hand, in a high-interest environment, HF managers who use this strategy gain more interest yield from the bond because the interest rate in the whole economy is higher. Below is a chart that plots the average 3-month US treasury yields and annual return of the HF convertible arbitrage index.



Similar to the returns from the merger arbitrage index, the returns from the convertible arbitrage index mirror the changes in US treasury yield rates to some extent. However, it is clear from the chart that the correlation between convertible arbitrage returns and interest rates are less obvious, indicating that the convertible arbitrage strategy is impacted by many factors other than just interest rates. Such factors include the credit risk of the underlying company.

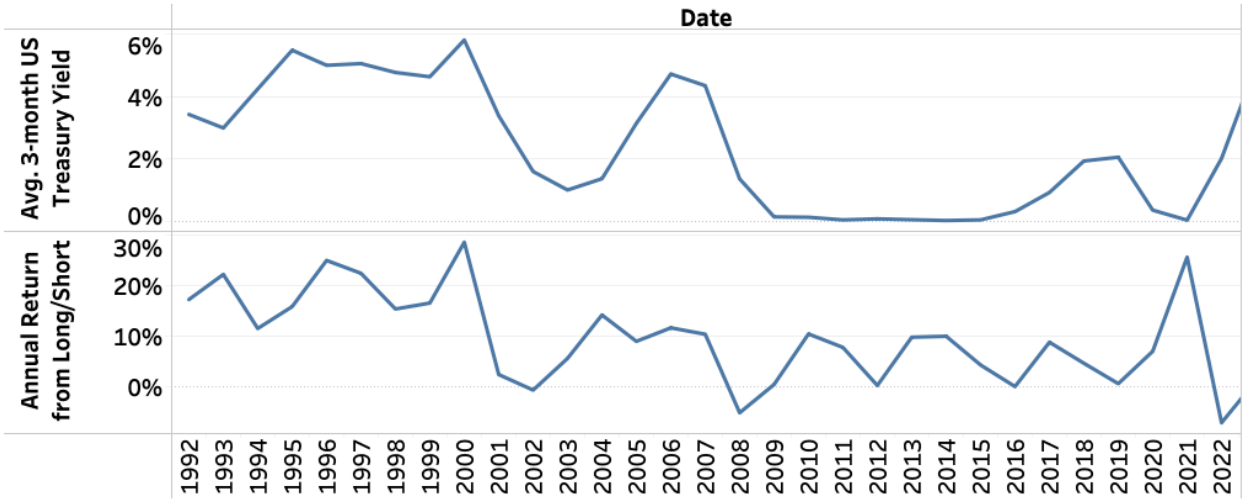
Equity Long/Short

This hedge fund strategy is also positively impacted by higher interest rates. In this strategy, hedge fund managers long on stocks that are expected to go up and short on stocks that are expected to go down.

When long/short managers are short on a particular stock, they borrow stock options while waiting for the stocks to go down. Because stock options are borrowed, long/short managers must keep cash collateral that guarantees repayment of the borrowed stocks.

When interest rates are high, this cash collateral can be invested in profitable, risk-free investments, such as government-issued bonds. In this high-interest environment, hedge fund managers can invest as they usually do while making high profits on the excess cash that they have to keep as collateral for their investment.

Therefore, equity long/short managers can record higher-than-average profits during a high-interest environment. Below is a chart that plots the average 3-month US treasury yields and annual return of the HF equity long/short index.



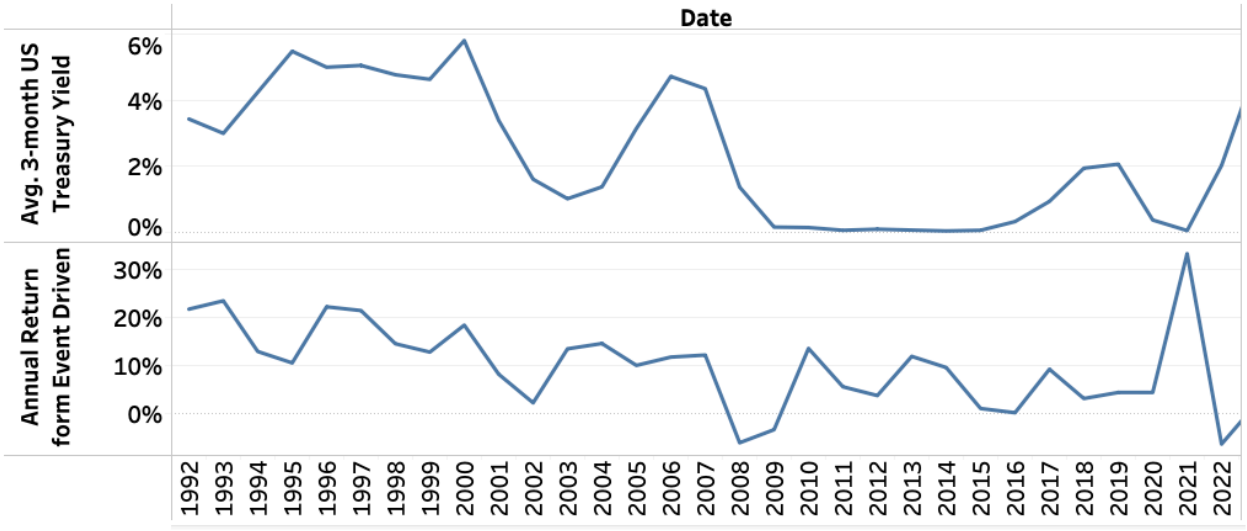
Similar to the returns of merger arbitrage and convertible arbitrage indices, the return from equity long/short index performs well regardless of the interest rates. In addition, similar to the arbitrage indices, this index has higher returns when interest rates are high.

Event Driven

The last HF strategy that performs well under all interest environments is the event-driven strategy. In this strategy, money managers speculate how specific stocks will perform in the future based on events that take place at a particular corporation.

For example, it usually takes some time for the stock price to reflect on recent news from earning calls and spin-off announcements. Therefore, money managers who are active in this strategy benefit from the market inefficiencies that result from such events.

Similar to arbitrage and long/short strategies, this strategy outperforms other strategies regardless of the interest rates. In a high-interest environment, money managers exercising this strategy can earn risk-free interest on their excess cash collateral. Below is a chart that plots average 3-month US treasury yields and annual return of the HF Event Driven index.

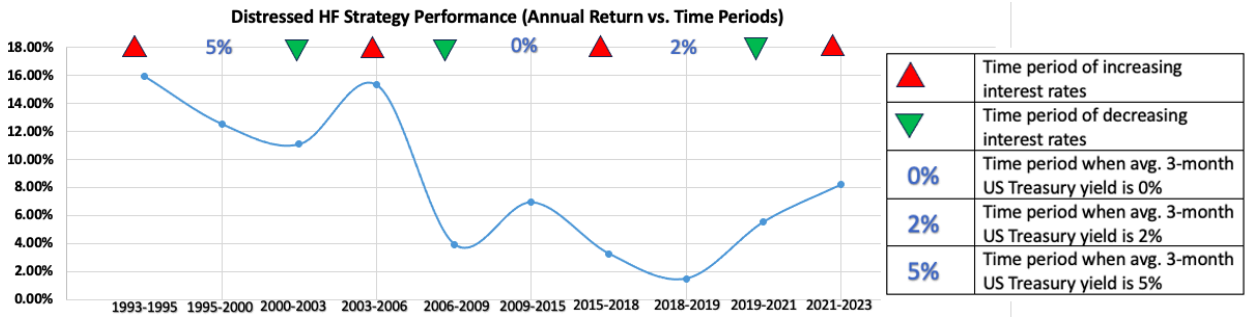


Similar to the arbitrage and long/short strategies, this strategy mirrors the changes in interest rates to some extent. Because there are other factors that play a role in how this strategy and other strategies perform, these rates are not expected to be perfectly correlated.

4.3.2 The Distressed HF Strategy outperformed other strategies in rising interest environments

When interest rates rise, corporations are exposed to higher borrowing costs on their existing loans as well as future loans. Depending on their financial statements at the time, some corporations fail to meet their obligations.

HF managers who are active in this strategy utilize their due diligence to identify corporations most likely to fail during the rising interest rates, securing significant gains when speculations are accurate. Below is a chart that plots annual return from distressed HF strategy vs different periods.

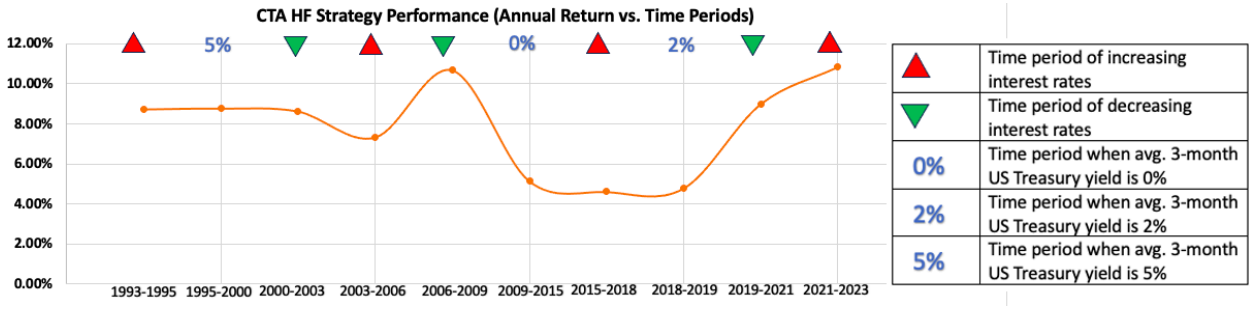


From the chart above, it is clear that the returns from the distressed strategy increase during time periods when interest rates are increasing, making it join the other best-performing strategies only during rising interest environments.

4.3.3 The CTA HF Strategy outperformed other strategies in changing interest environments

When interest rates change, opportunities arise in the futures markets. Because interest rates impact the whole economy, changes in interest rates result in market inefficiencies in the bond and commodity markets.

CTA HF managers exploit these market efficiencies by trading future contracts. HF managers who are active in this strategy are able to maximize their profits when the economy undergoes significant changes. Below is a chart showing the annual returns from CTA HF strategy vs. different time periods.



From the chart above, it can be seen that the CTA HF managers perform very well when the interest rates are changing, profiting from the different opportunities that arise in these changing interest environments.

4.4 Risk Management

Hedge funds specialize in generating alpha regardless of the main trend of their markets. For these reasons, hedge funds adopt a variety of strategies to mitigate and minimize risk. Hedge funds calculate risks using different instruments. The standard deviation measures the volatility of asset quotations within a portfolio by assessing the extent to which each value deviates from the average. These divergences are then averaged to determine the relevant figure, with greater deviations indicating higher dispersion or volatility of values. Conversely, hedge funds analyze Value at Risk (VaR), a statistical measure estimating the maximum potential loss that an investment portfolio may incur within a specified timeframe.

4.4.1 Impact on stocks and bonds:

This high-interest environment exposes hedge fund managers to various risks and opportunities that must be managed. For example, hedge fund managers may short on stocks that are expected to lose value due to the high-interest rates, generating high returns for hedge fund managers. At the same time, hedge fund managers may keep their cash in the bonds market, generating high returns for cash that is not invested elsewhere.

4.4.2 Impact on commodities:

Nowadays, it is challenging to estimate the future of commodities. Multiple macroeconomic factors affect how much businesses pay for commodities, including interest rates and inflation. As interest rates increase, it becomes harder for businesses to keep high inventory levels of commodities, pushing demand down and, therefore, commodities become cheaper. On

the other hand, when interest rates go down, it becomes cheaper for businesses to hold commodities as inventory, pushing demand up and making commodities more expensive. However, although interest rates are currently significantly high, commodity prices have also increased due to many other factors. Such factors include post-covid supply chain disruptions and the war in Ukraine. As part of their strategy, hedge fund managers have to understand the sensitivity of different commodities to different factors in order to implement successful investing strategies.

4.4.3 Hedge Fund Risk Management Strategies

Hedge funds use a variety of strategies to manage risk, employing tools such as diversification, hedging techniques, and derivatives.

- **Diversification:** Hedge funds often diversify their portfolios across different asset classes and geographic locations to reduce the impact of poor performance in any single investment. This is a very helpful strategy to counter risk, although it might not get the best yields.
- **Hedging:** Hedge funds may use various hedging techniques, such as short selling, to offset potential losses in one part of their portfolio with gains in another. Short selling involves borrowing and selling assets with the expectation of repurchasing them at a lower price.
- **Derivatives:** Financial derivatives, such as options and futures, are commonly used by hedge funds for risk management. These instruments provide a way to hedge against adverse price movements or to speculate on market directions.

- **Arbitrage:** Some hedge funds engage in risk arbitrage strategies, taking advantage of price discrepancies between related securities, such as mergers and acquisitions.
- **Quantitative Strategies:** Hedge funds may employ quantitative models and algorithms to identify and manage risks systematically. These strategies involve statistical analysis and mathematical models to make investment decisions.

4.4.4 SVB Case Study

A prime example of the consequences of poor risk management is SVB. Silicon Valley Bank was the 16th largest US Bank before its collapse in 2023. They focussed on financing venture capital-backed tech startups. During the pandemic, startups deposited large amounts of cash from investors since tech was in huge demand. SVB deposited the money in a number of US Treasury bonds and mortgage securities. However, with the Fed's hiking interest rates, bonds dropped in 2022, causing SVB's portfolio to drop. (They would have recovered its capital if they held the bonds till maturity).

SVB also did business with high-risk startups (that most banks wouldn't normally recommend) and lent money for a short time. Treasury Bonds (>10 years) are usually long-term investments for a better yield. They did not invest in any short-term investments that provide cash in case of quick liquidation. So, when companies withdrew their money, they incurred huge losses.

With inflation rising and the tech sector going down with mass layoffs, many customers withdrew cash because venture capital was stagnant. To give money back to the customers, SVB started selling their assets(primarily bonds) at a significant loss. Shortly after, on March 8, they announced a $1.75 billion capital raising, making people concerned about the bank being short

on cash. Customers started rapidly withdrawing their money, causing SVB's stock to drop by 60% in a day. FDIC announced First Citizens Bank's purchase of SVB and assumed most of its majority deposits and debt. FDIC estimated the cost of SVB's failure to be $20 billion.

Section 5: Data limitations

This report's hedge fund strategy performance data is pulled from self-reported hedge funds. Because the data is self-reported by money managers, there may be significant bias in the data. Therefore, the analysis in this paper may be built on data pulled from successful hedge fund managers who chose to report their performance to Morningstar, leaving us with no information regarding the other hedge fund managers who did not self-report their performance.

Another source of data limitation is that changes in interest rates are usually associated with other significant events in the economy. For example, when the coronavirus pandemic started in March 2020, the Fed decided to lower interest rates to ease borrowing. The change in performance of hedge fund strategies at around that time can be related to the pandemic, decreasing interest rates, or both. Therefore, we cannot draw perfect conclusions from how the performance of HF strategies correlates with interest rates because these strategies are affected by many other factors.

Section 6: Final recommendations and conclusion

In conclusion, we have examined the intricate relationship between macroeconomic factors, specifically interest rates and inflation, and their profound impact on hedge fund

strategies and risk management. Our current economic landscape is marked by uncertainty, and understanding the interplay of these elements is vital for making informed financial decisions.

The Federal Reserve's management of the Federal Funds Rate, a pivotal economic lever, has witnessed significant fluctuations since March 2022 as it grapples with heightened inflation rates. While tackling inflation, this measure introduces complexities such as slower economic growth and higher unemployment rates.

Hedge funds, with their distinctive features and diverse strategies, are not impervious to the impact of these macroeconomic shifts. We've discussed the unique characteristics of hedge funds, the strategies they employ, and their vulnerability to changing interest rates, highlighting financing cost implications for both hedge fund managers and investors, shedding light on the potential shift in risk appetite and the necessity for adaptive strategies in response to higher nominal rates.

Analyzing the performance of different hedge fund strategies in the context of interest rate changes is critical for understanding how these funds navigate evolving economic conditions. As interest rates rise, the pressure on fund managers to outperform increases, necessitating a nuanced approach to risk management. We, therefore, provide the following recommendations.

1. Hedge funds shield themselves against interest rate risk to ensure the generation of alpha despite prevailing economic trends.

2. A shift to excess-cash strategies such as equity long/short and merger arbitrage that would allow for earning interest on the collateral cash.

3. A reduction in strategies that require borrowing large amounts of capital and resulting financing costs.

Section 7: References

1. *YouTube*, YouTube, 15 Mar. 2023, https://www.youtube.com/watch?v=EpMLAQbSYAw. Accessed 3 Dec. 2023.
2. Dougherty, Christian, and Jordi Pujol. "Navigating The Rising Tide: How Interest Rates Shape Company Valuations And Investment Strategies." *Objective Investment Banking and Valuation*, https://objectivecp.com/navigating-the-rising-tide-how-interest-rates-shape-company-valuations-and-investment-strategies/#:~:text=Discount%20Rates%20and%20the%20Tides%20of%20Future%20Earnings&text=With%20rising%20interest%20rates%2C%20discount,earnings%2C%20consequently%20lowering%20its%20valuation.
3. Dougherty, Christian, and Jordi Pujol. "Navigating The Rising Tide: How Interest Rates Shape Company Valuations And Investment Strategies." *Objective Investment Banking and Valuation*, https://objectivecp.com/navigating-the-rising-tide-how-interest-rates-shape-company-valuations-and-investment-strategies/#:~:text=Discount%20Rates%20and%20the%20Tides%20of%20Future%20Earnings&text=With%20rising%20interest%20rates%2C%20discount,earnings%2C%20consequently%20lowering%20its%20valuation.
4. Hecht, Andrew. "Higher Interest Rates and Commodity Prices." *The Balance*, The Balance, 31 Jan. 2022, www.thebalancemoney.com/commodity-prices-when-interest-rates-rise-4084273.
5. Lo, Andrew W. "Risk management for hedge funds: Introduction and overview." *SSRN Electronic Journal*, 2001, https://doi.org/10.2139/ssrn.283308.
6. Neufeld, Dorothy. "Visualizing 40 Years of U.S. Interest Rates." Visual Capitalist, 26 May 2023, www.visualcapitalist.com/sp/visualizing-40-years-of-u-s-interest-rates/.
7. Tepper, Taylor. "Federal Funds Rate History 1990 to 2023." Forbes, Forbes Magazine, 17 Oct. 2023, www.forbes.com/advisor/investing/fed-funds-rate-history/.
8. "2023 Current State of the Union: US Economy." USAFacts, 20 Mar. 2023, usafacts.org/state-of-the-union/economy/.
9. "What Is a Hedge Fund? Examples, Types, and Strategies." Investopedia, Investopedia, 11 Aug. 2022, www.investopedia.com/terms/h/hedgefund.asp.
10. "Hedge Fund Strategies." Corporate Finance Institute, 20 Oct. 2023, corporatefinanceinstitute.com/resources/career-map/sell-side/capital-markets/hedge-fund-strategies/.