

# BSAMC

Bocconi Students Asset Management Club

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# INVERTED YIELD CURVE:

Is this a sign of bad news?



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## **Executive Summary:**

This comprehensive report delves into the intricate relationship between an inverted yield curve and its potential to instigate an economic recession. Traditionally recognized as a robust predictor of economic downturns, an inverted yield curve arises when short-term returns surpass their long-term counterparts. The report employs an extensive analysis, incorporating historical data, current market conditions, and pertinent economic indicators to unravel the nuanced mechanisms through which an inverted yield curve influences economic recessions.

The initial focus of the report centers on providing a comprehensive explanation of the inverted yield curve. By dissecting key factors influencing yield curve movements, including interest rates, expected inflation rates, economic growth fluctuations, and credit ratings of securities, the report lays the groundwork for a thorough understanding of this complex phenomenon.

To contextualize the real-world impact, the report conducts a comparative analysis of two major global markets: the European Union (EU) and the United States. The evaluation of the current market situations in these regions reveals similar movements with distinct impacts. Notably, the report highlights the differentiated impact of the inverted yield curve on the EU, owing to its fragmented structure, resulting in a more vulnerable environment to financial shocks. Conversely, despite the presence of an inverted yield curve in both markets, key indicators of the U.S. economy continue to reflect stability.

In recognizing the evolving nature of economic models, the report underscores the challenges associated with predicting future market cycles. The historical trend linking an inverted yield curve to an economic recession remains relevant, yet the rapidly changing dynamics of economic models demand a unique perspective. The report emphasizes the unreliability of relying solely on one metric to understand the entirety of market dynamics. It highlights the importance for investors and authorities to exercise caution amid this significant shift in market reactions.

## 1. Introduction to Inverted Yield Curves:

To understand how the inverted yield curve works the yield curve in general must be defined and understood. The yield curve is a graphical representation of interest rates of bonds that have the same credit quality but different maturity. The slope of the yield curve can predict future interest rate changes and economic activity.<sup>1</sup> There are three different types of the yield curve: normal, inverted and flat. The graph below is an example of a (normal) yield curve.

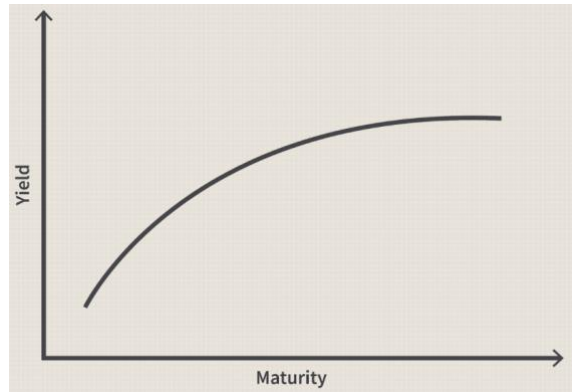


Figure 1 "Image by Julie Bang © Investopedia 2019"

As it can be seen on Figure 1, the x-axis represents the maturity date of the bond, while the Y-axis represents the bond yield. Generally speaking, the yield curve slopes upward indicating that the longer the maturity the higher the yield. This should not be surprising as tying one's investments down for a longer time period comes with higher opportunity cost which must be compensated for. Bonds with longer maturity dates also tend to be riskier as the ability of the issuer to pay back the loan is more uncertain further into the future due to limited predictability. Bonds issuers can compensate for these factors by offering higher interest rates on the bonds with longer maturity.

However, the yield curve today takes on a different shape. Today the yield curve is inverted, indicating that as the maturity increases the yield decreases, resulting in a downward sloping yield curve. Figure 2 is a visual representation of the inverted yield curve.

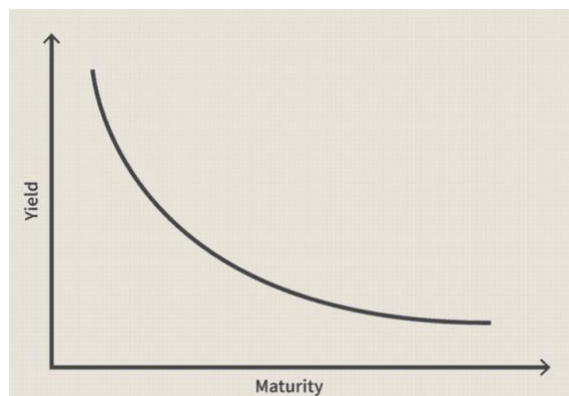


Figure 2 "Image by Julie Bang © Investopedia 2019"

<sup>1</sup> "Yield Curve: What is it and how to use it" Hayes Adam, n.d. Web. 27 Sept 2023. <https://www.investopedia.com/terms/y/yieldcurve.asp>

Having an inverted yield curve is a rare and significant occasion and since the economy is currently experiencing this noteworthy phenomenon, inverted yield curves must be examined more thoroughly.

An inverted yield curve is created because of poor long-term economic outlook resulting in investors demanding higher returns for short-term investment and accepting lower returns for the troubling future. For these reasons an inverted yield curve has been commonly viewed as an indicator of a pending economic recession.

To gain further understanding of the mechanics of the inverted yield curve we will look an example:

Consider a scenario where the 10-year yield are 3%, in contrast with the 4% yield of the 2-year treasury bonds. The slope of the yield curve can be calculated through dividing the yield spread (the difference between the 2 year and 10-year yield) by the difference in the years of maturity. This gives us  $-\frac{1}{8}$  which indicates a negative slope, an inverted yield curve.

## 2. Factors affecting the formation of a Yield Curve:

Now that we have a basic understanding of the inverted yield curve, we can move on to gaining deeper understanding of the specific implications of the inverted yield curve, how it is formed, and analyse what the yield curve currently looks like in the different markets.

As mentioned before, yield curves are a graphical representation that displays the yields or interest rates of bonds with the same credit quality but varying maturity dates. The slope of the yield curve enables investors to predict future interest rate changes and economic activity.

With these assumptions, it is intuitively acknowledged that many variables can affect the formation of the yield curves, such as risk-free rate, expected inflation, and economic growth. However, to describe the situations more precisely, these complex curves can be expressed under three graphical representations, which are Normal, Steep, Flat, and Inverted, even though we already compared the differences between normal and inverted versions.

In simple terms, illustrating yield curves begins by assigning labels to the x and y axes, representing maturity and interest rates, respectively. In retrospect, these dependent and independent variables are keen to fluctuations due to economic growth, credit ratings, inflation and interest rates<sup>2</sup>.

### 2.1 Interest Rates:

Interest rates and bond prices are inversely correlated, suggesting that bond prices tend to decrease as interest rates rise and vice versa. Consequently, fluctuations in interest rates lead to shifts in the yield curve, posing a risk, commonly referred to as yield curve risk, for bond investors.

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<sup>2</sup> "Yield Curve: Definition and Impact on Your Investments." Benson Alana, Durana Alieza n.d. Web 24 May 2023. <https://www.nerdwallet.com/article/investing/yield-curve>

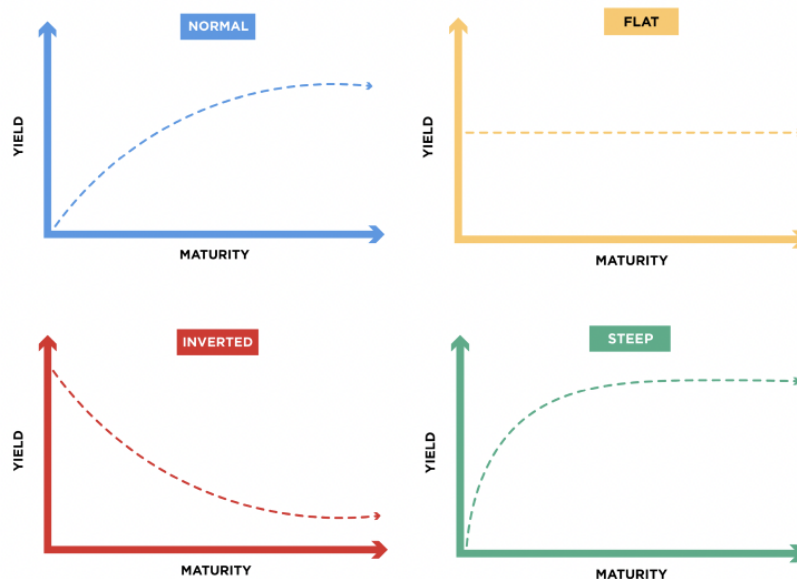


Figure 3<sup>3</sup>

Yield curve risk is linked to alterations in the shape of the yield curve, whether it flattens or steepens. These changes arise from shifts in yields among comparable bonds with varying maturities. When the yield curve undergoes such alterations, the bond's price, initially determined by the original yield curve, will experience a corresponding change.

### 2.2 Inflation Rates:

Implementing the similar intuition stated in the interest rates, in a normal economic environment, where inflation is moderate, the yield curve tends to slope upwards, which implies a normal yield curve. Investors demand higher yields to take on the additional risk associated with longer maturities.

Subsequently, when inflation is expected to rise, the yield curve may steepen, which means that the difference between short-term and long-term interest rates increases. Investors anticipate that central banks will respond to rising inflation by increasing short-term interest rates to slow down the economy. As a result, long-term bond yields may rise more than short-term yields.

On the contrary, in case of an expectation of a decline in inflation rates, the yield curve shifts toward an inverted shape. Therefore, such escalation is perceived as a leading indicator of an economic downturn.

### 2.3 Fluctuations in Economic Growth:

In general, robust economic growth tends to cause a rise in inflation due to heightened demand. The acceleration in economic activity intensifies the competition for capital as investors are presented with a broader array of investment opportunities. This heightened competition prompts an uptick in yields, resulting in the formation of a steep or normal yield curve. However, the existence of an inverted yield curve is also plausible. Such cases

<sup>3</sup> "Yield Curve: Definition and Impact on Your Investments." Benson Alana, Durana Alieza n.d. Web 24 May 2023. <https://www.nerdwallet.com/article/investing/yield-curve>

occurred in the United States, where inverted yield curves have historically been linked with preceding an economic contraction.

#### **2.4 Credit Ratings:**

Credit ratings are crucial in shaping the yield curve by influencing investor perceptions of risk, yield spreads, and market expectations. Positive changes in credit ratings can lead to a flattening of the yield curve as investors accept lower yields for bonds with improved creditworthiness. However, the impact can vary based on the specific maturities and broader market conditions.

### **3. Current situation in US vs. the EU:**

An inverted yield curve has emerged as a major economic concern in recent months, with both the United States and the European Union experiencing this phenomenon. This development has sparked discussions and analyses among policymakers, economists, and investors, particularly regarding the potential economic implications. In fact, since World War II, every occurrence of a yield curve inversion has been followed by a recession within the next six to 18 months. The US yield curve inverted in March 2023, with the 2-year Treasury yield surpassing the 10-year Treasury yield. This was the first inversion since 2019 and has raised concerns about a potential economic slowdown or recession. The EU yield curve also inverted in March 2023, with the 2-year Eurozone yield surpassing the 10-year Eurozone yield. However, the inversion has been less pronounced in the EU compared to the US.

Several factors have contributed to the inverted yield curve in the US and EU, including rising interest rates, economic uncertainty and risk aversion. In fact, Central banks in both the US and EU have raised interest rates to combat inflation, leading to a decline in long-term interest rates, as investors anticipate further rate hikes. Concerning the economic uncertainty, both the US and EU economies are facing a number of headwinds, including the war in Ukraine, supply chain disruptions, and rising energy costs. This uncertainty has made investors cautious and more averse to holding long-term assets. Finally, investors have been increasingly risk-averse in recent months, seeking to reduce their exposure to potential market fluctuations. This has led to a demand for shorter-term investments with lower interest rates. The US Federal Reserve has been more cautious in its monetary policy response to the inverted yield curve than the European Central Bank (ECB). This is because the Fed is concerned about the potential impact of a recession on inflation, while the ECB, on the other hand, is more focused on ensuring that inflation does not get out of control.

#### **3.1 Yield Curve in U.S.:**

We will now discuss more in detail the situation in the US. The US economy has been on a rollercoaster ride in recent years, experiencing periods of both robust growth and challenging headwinds. The US economy emerged from the COVID-19 pandemic in a strong position, with robust consumer spending and a labor market that was rapidly recovering.

However, as 2022 progressed, several factors began to weigh on the economy, including rising inflation, supply chain disruptions, and the war in Ukraine. Inflation, which had been relatively subdued for several years, surged to multi-decade highs in 2022. These effects have persisted into 2023, making it more difficult for businesses to operate and for consumers to find the products they want.

In March 2023, the US yield curve inverted for the first time since 2019. This means that the yield on short-term Treasury bonds exceeded the yield on long-term Treasury bonds. This is a rare event and is typically seen as a warning sign of an impending economic recession, as it signals that investors are increasingly pessimistic about the economy's future growth prospects. This is because when investors believe that the economy is likely to weaken, they demand higher yields for longer-term investments. However, according to Mark Cabana, head of U.S. rates strategy at BofA, the yield curve will likely steepen in 2024 as the Federal Reserve will start cutting interest rates, as U.S. Treasury benchmark 10-year yields are expected to be at 4.25% by the end of next year. While it is too early to say definitively whether a recession will occur, investors and policymakers should be vigilant and take steps to mitigate the risks.

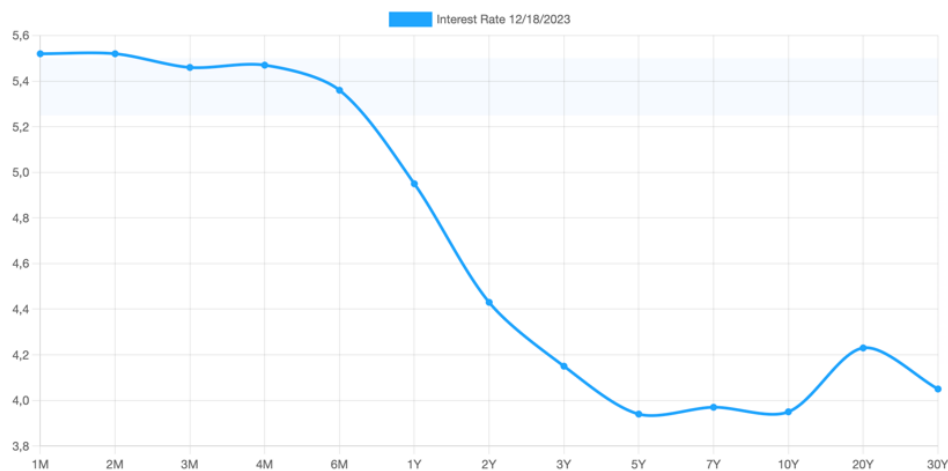


Figure 4-The Us yield curve, as of December 18.<sup>4</sup>

### 3.2 Yield Curve in EU:

Concerning the European Union, we want to underline that the inverted yield curve is a more significant concern for the EU economy than it is for the US economy, as its financial markets are more fragmented. This means that there is less liquidity and more risk of contagion between different countries, making the EU economy more vulnerable to financial shocks, such as a bond market sell-off.

The yield curve experienced a brief inversion in March 2023, with the 2-year Eurozone yield momentarily exceeding the 10-year Eurozone yield. However, the inversion was not as pronounced as the one observed in the US, and the yield curve has since steepened slightly. As of October 16, 2023, the 2-year Eurozone yield stands at 2.31%, while the 10-year Eurozone yield stands at 2.40%. Similar results happened also in the UK. The yield curve in the EU remains a subject of intense inspection as policymakers navigate the challenges of taming inflation without derailing the economic recovery. The ECB's actions, particularly its interest rate hikes and the phasing out of the Asset Purchase Program, are aimed at striking a delicate balance between controlling inflation and supporting growth. Even with positive

<sup>4</sup> "Inverted Yield Curve: What It Means and How to Navigate It." YCharts, n.d. Web. 18 December 2023. <https://get.ycharts.com/resources/blog/inverted-yield-curve-what-it-means-and-how-to-navigate-it/>



news recently, such as the business investment growing 0.6% in the third quarter of 2023 or the rising sales (+1.6%) since July 2023, the path ahead remains uncertain.

Since the EU economy is currently weaker and more exposed to the negative effects of economic shocks, the yield curve will continue to serve as a key indicator of the EU economy's health. However, it is important to note that the inverted yield curve is not a foolproof predictor of a recession, and there is no guarantee that either the US or the EU will experience a recession in the near future.

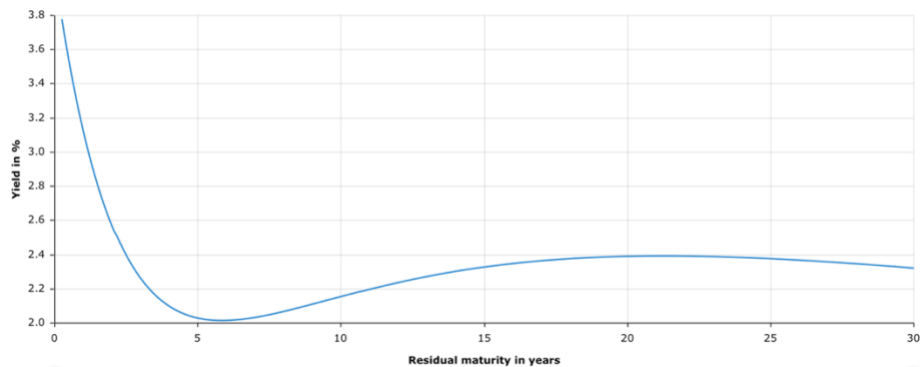


Figure 5-The Euro area yield curve, as of December 18.<sup>5</sup>

#### 4. Inverted Yield Curve as a Recession Indicator in the Past:

Economists use the yield curve to understand the macro-scenario related with the interest rates of a country. Thus, when the past analysis of the yield curve observed; it can be seen that except for a couple false positives, every recession we have seen as been preceded by an inverted yield curve.

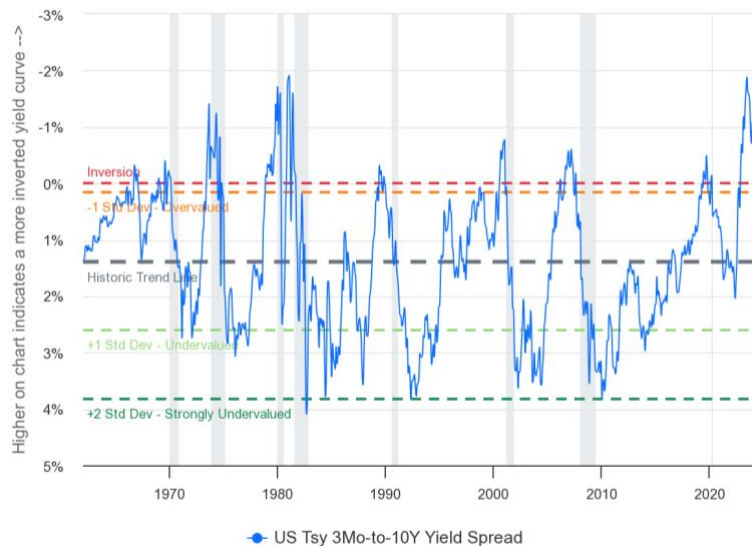


Figure 6-The representation of US yield curve inversions and recessions<sup>6</sup>

<sup>5</sup> "Yield Curves for the Euro Area." European Central Bank, n.d. Web. 18 December 2023. [https://www.ecb.europa.eu/stats/financial\\_markets\\_and\\_interest\\_rates/euro\\_area\\_yield\\_curves/html/index.en.html](https://www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves/html/index.en.html)

<sup>6</sup> "Yield Curve Models." Current Market Valuation, n.d. Web. 1 Jan. 2024. <https://www.currentmarketvaluation.com/models/yield-curve.php>

The chart above shows this model, tracking the spread between the 10-year to 3-month US Treasury-yield curve. Yield curve inversions are highlighted red, and the recessions are shown as the grey are occurring each time the direction of the curve inverts.

The graph shows that since the second world war, every yield curve inversion has historically been a very reliable indicator of an upcoming economic recession. The yield curve inversions have been followed by a recession in the following 6-18 months; and the recessions are naturally correlated with decreased stock market returns.

#### 4.1 S&P 500 Performance vs. Inverted Yield Curve:

So far, the report shows that the inverted yield curve can be a significant indicator of upcoming recessions. To understand how the overall market responds to an inverted yield curve, a key market performance index can be observed. For US, this index is the S&P 500. With the observation of S&P 500 we can understand if an inverted yield curve also precedes a market crash or not or do the normal yield curve indicates for a positive market.

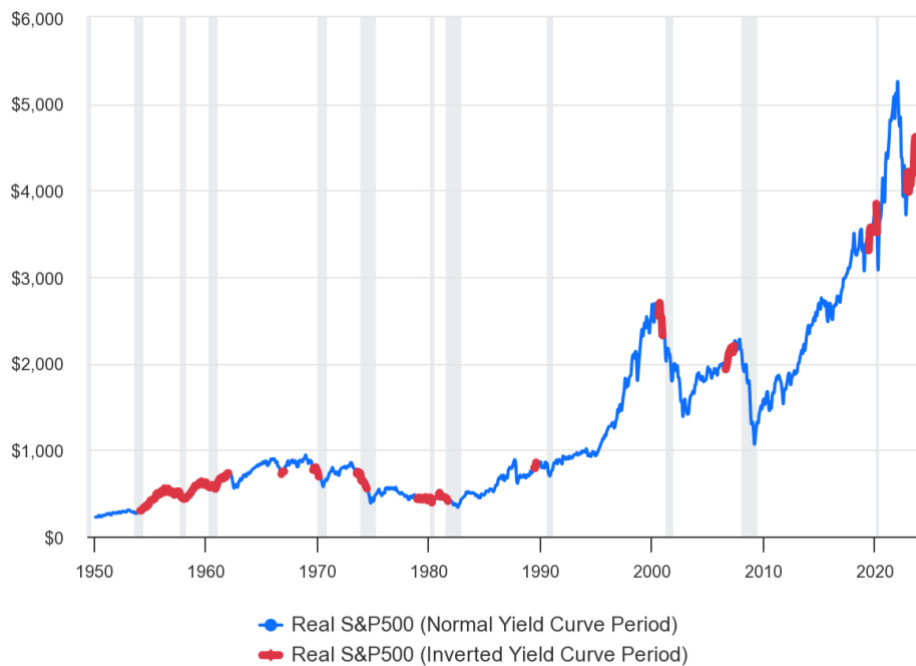


Figure 7-S&P500 with yield curve inversions highlighted<sup>7</sup>

The chart above illustrates how the yield 3 months to 10-year yield spread is mapped over S&P 500 returns. The data series is just the price of S&P 500 with the colour of the line highlighted red during periods of yield curve inversion. Clearly, a strong correlation where periods of inversion tend to precede stock market devaluations can be seen.

<sup>7</sup> "Yield Curve Models." Current Market Valuation, n.d. Web. 1 Jan. 2024. <https://www.currentmarketvaluation.com/models/yield-curve.php>

## **5. Criticisms on the Yield Curve Inversions:**

The first and most significant criticism about the market evaluations related to yield curve is that no single metric is available to illustrate the health of an entire market, and there may be some reasons behind a yield curve inversion which is not correlated to the whole market health.

### **5.1 Unorthodox Monetary Policy:**

Especially after the Great Financial Crisis in 2008, the central banks worldwide started to implement unprecedented monetary policies which resulted in influencing the traditional dynamic of a yield curve. Programmes implemented in US or EU like “quantitative easing” or “asset purchasing programme” which resulted in mass acquisition of long-term securities. This may have driven down the long-term interest rates and can potentially cause yield curve inversions or materially change the yield curve from its historic trend. Therefore, in today’s context the yield curve may not be traditional representation of market health.

### **5.2 Rising International Influence:**

This is also linked to one of the drivers of GFC in 2008 which is “interconnectedness”. In an increasingly interconnected economy, the U.S. Treasury Yields are more open to get affected from the international economic conditions and global investors. Therefore, a global interest in U.S. Treasuries, especially those with longer maturities, has the potential to push down long-term yields, possibly resulting in a yield curve inversion. This may happen without any recessionary influences on the U.S. economy. For example, in times of worldwide economic instability, global investors might view U.S. government bonds as a secure investment, hence driving up demand and causing yields to decrease. While this factor alone may not be sufficient to invert the yield curve, it still represents a significant factor that requires attention.

## 6. Conclusion:

The yield curve represents the yield that an investor demand from various debt securities. Traditionally it is expected to have an upward slope which means the return of long-term maturity securities is more than short term. This happens because of the uncertainty of the future; the risk rises which also increases the return. However, in the past, it is observed that yield curve is not always upward sloping. It can be upward, downward, or even flat time to time.

When a yield curve is downward sloping, it may seem like its inverted. Therefore it's usually named as the inverted yield curve. An inverted yield curve represents a deterioration in investor sentiment regarding the economy and riskier investment opportunities. Hence, history shows that an inverted yield curve in most cases is followed by an economic recession.

However, there may be some rising critics on what the yield curve represents in today's interconnected, unorthodox markets. Therefore, critics argue that yield curve may not represent an economic cycle in a country because of the rising global investors and the unusual policies of the central banks.

Overall, whether it's a representation of the whole market health or not; the inverted yield curve occurs because of significant shifts in market behaviour, and it is always important to be cautious with big changes in the dynamics of the market environment.

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