

In focus

What drives the equity-bond correlation?

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The negative correlation between equities and bonds plays a key role in the construction of diversified portfolios. Yet its underlying drivers are not fully understood, leaving much uncertainty about what to expect going forward. Our research aims to bridge this gap by examining the key factors that drive equity and bond returns and show how these have impacted the equity-bond correlation historically. Our research finds that the macroeconomic and policy environment are significant drivers. Given the current uncertainty over the future path of inflation and interest rates, investors should not assume that the forces over the past two decades will persist.



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For over two decades, multi-asset investors have benefited from the negative correlation between equities and bonds to lower portfolio risks and limit downside losses in times of market distress. In other words, when equities performed poorly, bonds tended to do well, and vice versa. However, the brief weakening of this relationship amid the recent surge in inflation has sparked concerns that we are on the cusp of a regime shift. Although such fluctuations are not uncommon in the short term, the macroeconomic and policy backdrop may be slowly shifting in favour of a positive-equity bond correlation.

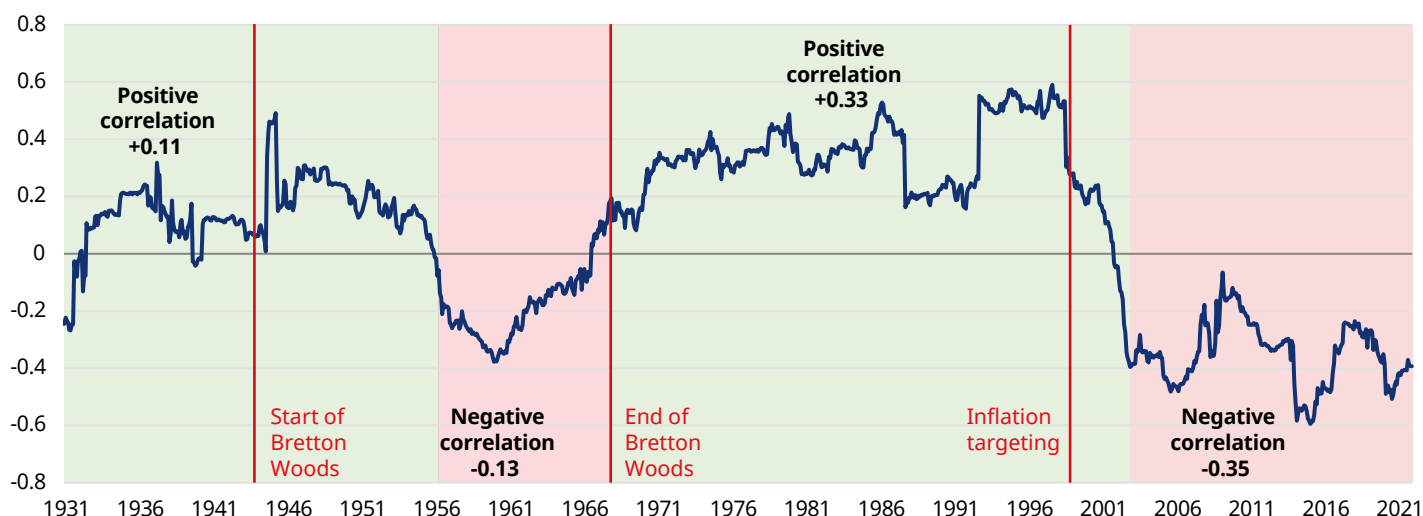
Indeed, a look back in history reveals that such a possibility is perfectly conceivable. For example, while the average five-year

correlation since 2000 has been -0.35, the longer-term average since 1926 is +0.06. Moreover, the correlation was positive in most five-year periods between 1931–1955 and 1970–1999 (Figure 1).

So what are the necessary conditions for correlations to weaken going forward? To answer this question, we examine the key factors that drive equity and bond returns and show how these have impacted the equity-bond correlation historically. We then formulate three scenarios that could shape the future direction of the equity-bond correlation. Our analysis is based on US financial markets, although the insights we provide are still relevant for global investors.

Figure 1: The persistently negative equity-bond correlation is a relatively recent phenomenon

5-year rolling equity-bond correlation



Past performance is not a guide to future performance and may not be repeated.

Source: CFA Institute, Datastream Refinitiv and Schroders. Notes: equity and bond returns are based on US large-cap equities and 10-year US Treasuries. Data to 31 December 2021.

Breaking down asset correlations

Bond and equity prices reflect the discounted value of their future cash flows, where the discount rate equals the sum of a risk-free short-term real interest rate (r_t), inflation (i_t) and a risk premium (BRP_t for bonds and ERP_t for equities) to capture risk preferences and compensate for the uncertainty of cash flows. While bonds pay fixed coupon payments, some equities offer the potential to pay and increase dividends over time and so will also incorporate a dividend growth rate (g_t). A simplified formula for pricing bonds and equities using these terms is shown below:

$$1) \text{ Bond price} = \sum_{t=1}^T \frac{\text{Coupon}_t}{(1 + r_t + i_t + BRP_t)^t} + \frac{\text{Face value}_t}{(1 + r_t + i_t + BRP_t)^t}$$

$$2) \text{ Stock price} = \sum_{t=1}^T \frac{\text{Dividends}_t (1 + g_t)}{(1 + r_t + i_t + ERP_t)^t}$$

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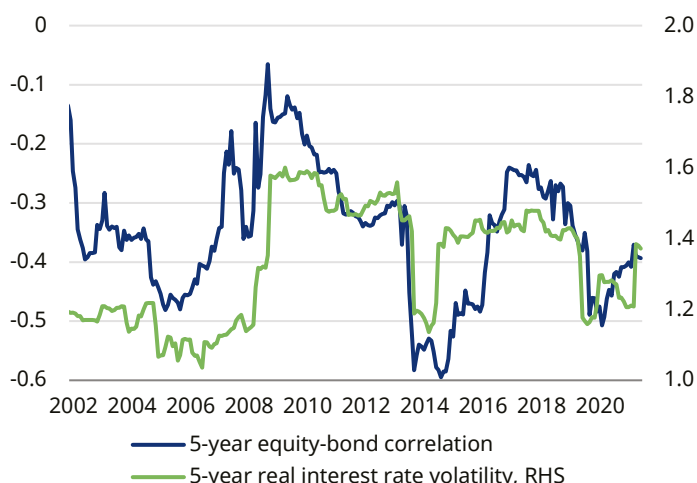
Source: Schroders. Notes: r_t , i_t and g_t refer to the short-term real interest rate, annual rate of inflation and dividend growth rate over period t respectively. If a stock pays no dividends, g_t refers to earnings growth. Equity risk premium incorporates bond risk premium.

As indicated in the formula, equities and bonds have both common and unique factors that cause their returns to move together or decouple. In addition, these factors can be positively or negatively correlated with each other. Disentangling all of these elements can be empirically challenging, so we focus on the four most important ones.

1. Risk-free real interest rate: An increase in real interest rates (r_t) affects both equities and bonds in the same direction by increasing the discount rate applied to future cash flows. Although this unequivocally hurts bond prices, the impact on equity prices is more ambiguous and will depend (among other factors discussed later) on the degree of risk appetite. For example, if rates rise alongside an increase in economic uncertainty, risk appetite should decrease as investors demand a higher risk premium (ERP_t) to compensate for the uncertainty of receiving future cash flows – a net negative for equity prices. But if rates rise alongside a decrease in economic uncertainty, risk appetite should increase as investors demand a lower risk premium – a net positive for equities.

In general, large interest rate fluctuations introduce additional uncertainty into the economy by making it more difficult for consumers and businesses to plan for the future, which in turn lowers investor risk appetite. So all else being equal, higher rate volatility should be negative for both bonds and equities, meaning positive equity-bond correlations. Figure 2 exemplifies this point: since the early 2000s, the equity-bond correlation has closely followed the level of real rates volatility.

Figure 2: Higher rates volatility has recently been associated with weaker equity-bond correlations



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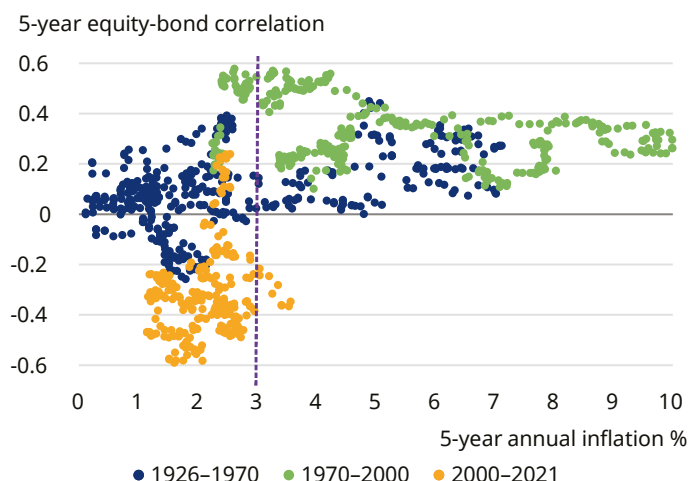
Source: CFA Institute, Datastream Refinitiv and Schroders. Data to 31 December 2021. Notes: equity and bond returns are based on US large-cap equities and 10-year US Treasuries. Interest rate volatility calculated as standard deviation of monthly change in short-term real yields (3-month US Treasury bills yield minus US CPI annual inflation rate).

This is, however, a relatively new phenomenon. In prior decades, rates volatility exerted only a weak influence on the variation in equity-bond correlations. One reason may be because market participants at the time assigned more importance to other economic variables such as inflation and whether it was under control. For example, the 1970s and 1980s coincided with a much more volatile inflation regime than today and is [widely believed](#) to have driven previous variations in the equity-bond correlation.

2. Inflation: Bonds are an obvious casualty from rising inflation. Their fixed stream of interest payments become less valuable as inflation accelerates (i_t), sending yields higher and bond prices lower to compensate. Meanwhile, the effect on equities is less straightforward. In theory, a rise in prices should correspond to a rise in nominal revenues and therefore boost share prices. On the other hand, it may be offset by a contraction in profit margins given the increase in companies' input costs. As long as input costs do not increase at the same rate as revenues, higher inflation should translate into greater nominal earnings (g_t).

But [as we have written before](#), the market will discount those future earnings at a higher rate when inflation rises, as they are worth less in today's money. It is therefore the net impact of higher expected nominal earnings versus higher discount rates that determines how equities behave in an environment of rising inflation. Our analysis suggests that the discount effect tends to dominate when inflation exceeds 3% a year on a five-year basis. This is illustrated in Figure 3: since 1926, the equity-bond correlation has been positive 98% of the time whenever inflation breached this threshold. Note that this does not mean low inflation equates with a negative-equity bond correlation. On the contrary, there have been many historical periods where the correlation remained positive despite weak inflation.

Figure 3: Persistently high inflation has been associated with positive equity-bond correlations



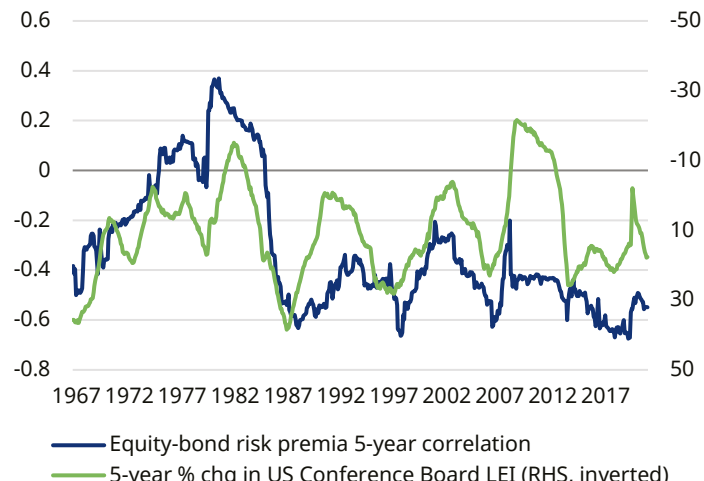
Past performance is not a guide to future performance and may not be repeated.
 Source: CFA Institute, Robert Schiller, Datastream Refinitiv and Schroders. Data to 31 August 2021. Notes: equity are US large-cap equities, bonds are 10-year US Treasuries, inflation is US CPI.

3. Risk premia: Changes in risk preferences can also have an important effect on the relationship between equities and bonds. Equities are a relatively risky asset class, with a high correlation to the economic cycle and variable rate of return. The compensation investors demand for taking this risk is known as the equity risk premium. In contrast, government bonds are often perceived as a safer investment because they pay out a fixed income and so generally have lower return volatility. However, because of their greater sensitivity to changes in interest rates, bonds still carry more risk than cash and long-maturity bonds carry more risk than short-maturity bonds. This greater risk normally results in an upward-sloping yield curve and is the source of the bond risk premium.

Over the past four decades, changes in equity and bond risk premia have been negatively correlated with each other (Figure 4). This should not be surprising as bonds are often utilised by investors for diversification purposes and as a safe-haven asset. For example, when risk appetite is low, investors tend to sell equities and buy bonds for downside protection (i.e. equity risk premium increases relative to the bond premium). In contrast, when risk appetite is high, investors tend to buy equities and sell bonds (i.e. bond risk premium increases relative to the equity risk premium). All else being equal, this “risk-on, risk-off” behaviour, causes equity and bond returns to regularly diverge and is supportive of a negative ERP-BRP correlation.

However, if risk appetite is lacking because investors are worried about both slowing growth (g_t) and high inflation (i_t) (i.e. stagflation), they may dislike all assets that promise future cash flows and prefer cash instead, inducing a positive ERP-BRP relationship. This is exactly what manifested during the 1970s when the US economy was facing economic difficulties and high levels of inflation. But as growth rebounded and inflation came back under control, the risk premia correlation switched back to negative territory (although the overall equity-bond correlation remained positive due to other factors).

Figure 4: The correlation of risk premia has been affected by growth shocks

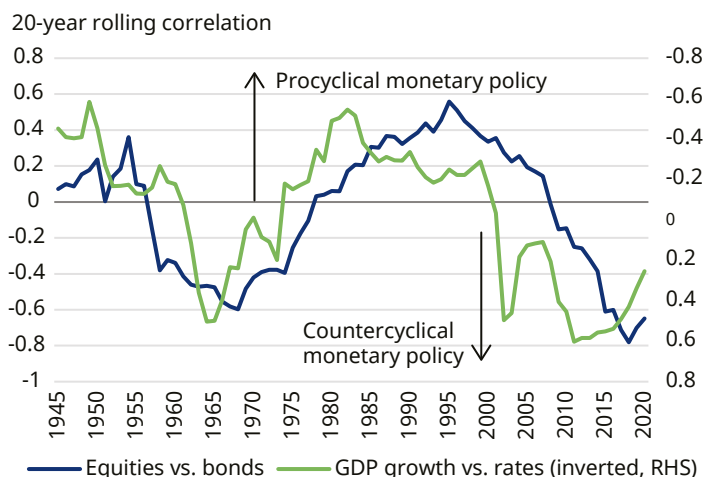


Past performance is not a guide to future performance and may not be repeated.
 Source: CFA Institute, Federal Reserve Bank of New York, Datastream Refinitiv and Schroders. Data to 31 August 2021. Notes: correlation based on monthly changes in risk premia, where ERP is 12-month trailing earnings yield minus 10-year US Treasury yield, BRP is the 10-year US Treasury yield minus an estimated 10-year average short-term rate. Growth is proxied using US Chicago Board Leading Economic Index.

3. Growth vs. rates: The interaction between corporate earnings and interest rates is one of the key long-term determinants of equity-bond correlations. As per Equations (1) and (2), earnings are positively related to equity prices, while rates are negatively related to *both* equity and bond prices. So all else being equal, if earnings growth moves in the same direction as rates and more than offsets the discount effect, then equities and bonds should have a negative correlation. If we assume earnings are influenced by economic growth over long time horizons, then positive growth-rates correlations should also correspond to negative equity-bond correlations and vice versa.

A positive growth-rates correlation indicates that monetary policy is countercyclical (i.e. rates are raised when economic growth is strong) while a negative growth-rates correlation indicates monetary policy is procyclical (i.e. rates are raised when economic growth is weak). As Figure 5 shows, changes in monetary policy regimes are closely linked to variation in equity-bond correlations. However, this relationship can only be observed over long horizons (e.g. 20 years) because regime changes happen very gradually. For example, the countercyclical monetary policy regime from 1950 to 1970 coincided with negative equity-bond correlations. In contrast, the procyclical monetary policy regime from 1970 to 2000 coincided with positive equity-bond correlations.

Figure 5: Procyclical monetary policy has been associated with positive equity-bond correlations



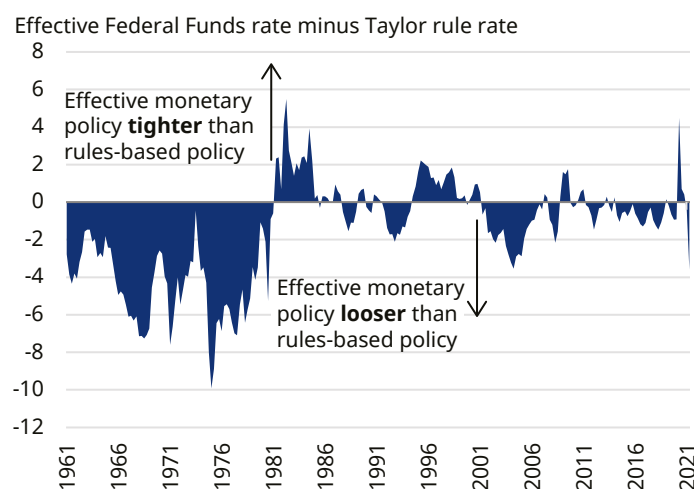
Past performance is not a guide to future performance and may not be repeated.
 Source: CFA Institute, Measuring Worth and Schroders. Data to 31 December 2020.
 Notes: growth is real GDP and rates are 3-month Treasury yields.

But why do monetary policy regimes change in the first place? While many factors come into play, we believe a critical one is whether the Federal Reserve adopts a “rules-based” or “discretionary” policy framework. Whenever monetary policy is predominantly rules-based, changes in policy rates are set in advance according to an economic formula such as the “Taylor Rule” (e.g. raise/lower rates when growth or inflation is above/below a target). This ensures that the economy is neither overheating nor running below its potential capacity. As a result, growth and rates tend to move in the same direction, which supports a negative equity-bond correlation.

In comparison, discretionary policy uses more subjective judgement to respond to economic conditions and is more flexible around any prescribed rules. For example, if rates are deliberately kept low when economic growth is strong, policymakers may need to aggressively raise rates further down the line to reduce inflation and defend the domestic currency, which can induce an economic downturn. This leads to a negative growth-rates correlation and hence supports a positive equity-bond correlation.

By benchmarking the actual US federal funds rate against the hypothetical rate prescribed by the Taylor Rule, we can identify historical periods when monetary policy was more rules-based or discretionary. As Figure 6 shows, from the mid 1960s, policy became increasingly discretionary as the federal funds rate ran well below the rules-based rate. This period was conducive to a negative growth-rates correlation and hence positive equity-bond correlation. In hindsight, we know that loose monetary policy also stoked high levels of inflation, which contributed further to this regime. By the 1980s, monetary policy continued to operate in a discretionary manner by setting higher rates than the rules-based rate. It was only until the late 1990s that monetary policy adhered more closely to the Taylor Rule (i.e. via a lower deviation versus the rules-based rate), which arguably helped to pave the transition from a positive to negative equity-bond correlation regime.

Figure 6: Policy rates have in the past diverged significantly from the Taylor Rule



Source: Atlanta Fed and Schroders. Data to 31 August 2021. Notes: Rules-based rate is inferred from the Taylor-rule.

Summary

Figure 7 summarises the key factors that we have demonstrated influence equity-bond correlations. When interest rates and inflation are high and volatile, risk premia are moving in the same direction and monetary policy is procyclical, equity-bond correlations are more likely to be positive.

In contrast, when interest rates and inflation are low and stable, risk premia are moving in the opposite direction and monetary policy is countercyclical, equity-bond correlations are more likely to be negative. Complicating matters further, the relative importance of these factors is not constant, but varies over time.

Figure 7: Factors that are historically associated with positive or negative equity-bond correlation regimes

Positive equity-bond correlation	Negative equity-bond correlation
High and volatile real yields	Low and stable real yields
High and volatile inflation	Low and stable inflation
Positive ERP-BRP correlation	Negative ERP-BRP correlation
Slowing growth + high inflation	"Risk-on, risk off" sentiment
Negative growth-rates correlation	Positive growth-rates correlation
Procyclical monetary policy	Countercyclical monetary policy
Discretionary policy framework	Rules-based policy framework

Source: Schroders. For illustrative purposes only.

So what does this framework tell us about the prospect of a regime change? Well, some of the factors that have supported a negative equity-bond correlation may be waning. In particular, inflation has risen to multi-decade highs and its outlook is arguably also highly uncertain, meaning more economic uncertainty and rate volatility could lie ahead. Conviction over a continuation of the negative equity-bond correlation of the past 20 years should at least be questioned. However, rather than forecasting a particular outcome, we believe that investors should “stress-test” their portfolios across a range of possible outcomes. We envisage three potential scenarios that could play out in the future:

Scenario 1: equity-bond correlation turns persistently positive as high inflation becomes entrenched

Covid-19 vaccines lose their effectiveness in response to new mutations of the virus, resulting in further economic restrictions and additional fiscal stimulus. Supply-chain bottlenecks continue to exert upward pressure on global operating costs. These additional costs are passed onto consumers as workers demand higher wages to counter the greater cost of living. “Transitory” inflation becomes persistent, running above 3% for the next five years, leading investors to further discount the future cash flows of both equities and bonds.

The Fed raises interest rates, but not as forcefully as expected so as to offset earlier periods where inflation ran persistently below target. Political pressure to inflate away elevated levels of government debt contributes to this policy stance. Rates therefore remain loose by past standards and monetary policy turns procyclical. However, as economic growth slows down against a backdrop of high inflation, investors prefer to hold cash over financial assets, leading to a sudden rise in equity and bond risk premia. All of these conditions push equity-bond correlations into positive territory.

Scenario 2: equity-bond correlation remains negative as countercyclical monetary policy sticks

Covid-19 mutations become less virulent over time and goods shortages are resolved quicker than expected. Production capacity returns to normal, alleviating pressure on business operating costs and global supply chains. Although this boosts economic growth, the labour market also tightens, putting upward pressure on wages and inflation. The Fed responds by raising interest rates gradually. Along this roadmap, negative equity-bond correlations remain relatively intact.

Scenario 3: negative equity-bond correlation weakens as real rate volatility and inflation uncertainty looms

Covid-19 mutations become less virulent over time, but supply-chain pressures ease only very gradually. Bottlenecks and worker shortages therefore continue to exert upward pressure on inflation, raising questions over the future path of monetary policy. The fear of persistent inflation forces the Fed to remove market liquidity at a faster pace. This pushes up real rate volatility and weakens equity-bond correlations. Inflation levels moderate but settle at 3% over the next five years. In this scenario, equity-bond correlations weaken.

Figure 8: Potential scenarios that could play out...

Factor	Scenario 1	Scenario 2	Scenario 3
Economic growth	Weaken	Strengthen	Weaken
Real yield volatility	Low	Low	Increase
Inflation volatility	High	Increase	Increase
ERP-BRP correlation	Positive	Negative	Negative
Monetary policy	Procyclical	Countercyclical	Countercyclical
Equity-bond correlation	Positive	Negative	Weak

Forecasts should not be relied upon and are not guaranteed.
 Source: Schroders. For illustrative purposes only. Notes: green is conducive to a negative correlation, red is conducive to a positive correlation, amber is conducive to a weak correlation.

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