

## QUANT RESEARCH

# Evaluating Gold's Role in Post-2020 Portfolio Strategy

This report investigates whether the traditional 60/40 equity-bond portfolio remains effective in today's market environment, or whether adding gold leads to a more resilient asset allocation. As Marc Faber wrote, *"Gold is a way of diversifying your risks and maintaining some stability when everything else is changing. It's not an investment in the traditional sense. It's a safe haven, a place to park your wealth when you're unsure of the future."*

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# Executive Summary

The classic 60/40 portfolio (allocating 60% to equities and 40% to bonds) has long been considered the benchmark for long-term balanced investing. For decades, this approach offered investors a simple and effective way to manage risk and return, benefiting from the typically negative correlation between stocks and bonds. However, the period from 2020 to 2025 has posed new challenges to this strategy.

The past 5 years were marked by a series of unprecedented macroeconomic and market events. The COVID-19 pandemic triggered a historic market crash and monetary policy response in 2020. This was followed by a surge in inflation and a sharp tightening of interest rates in 2022, which saw both equities and bonds deliver negative returns. More recently, markets have been shaped by a strong equity rally, partially driven by advances in AI. These events have not only raised questions about the resilience of the traditional 60/40 framework but also fuelled debates over how best to diversify risk in today's economies.

On one hand, analysts argue that the 60/40 portfolio is “making a comeback” in 2024 and 2025 as bond yields normalised and equity markets recovered strongly. On the other hand, others highlight that the spike in stock bond correlation during inflation shocks exposes a structural weakness and reduces the diversification benefits that the 60/40 mix typically provides. As a result, many suggest that investors may need a third stabilising asset such as gold to improve portfolio resilience. Gold is often described as a hedge against inflation and U.S. dollar weakness, a safe haven in periods of market stress and a diversifying asset due to its low or negative correlation with both equities and bonds. However, critics question whether gold's long-term performance justifies its role, particularly during periods of strong equity returns.

This debate raises a central question for investors in the post-COVID era:

**Is the classic 60/40 still good enough, or does adding gold make a better portfolio after 2020?**

In this study, we address this question using monthly data from January 2020 to November 2025. Our objective is to compare the performance of a classic stock-bond portfolio with gold augmented portfolios under different rebalancing approaches. Doing so, we aim to assess whether adding gold improves performance, reduces risk or only dilutes returns.

# Theoretical Framework

## Foundations of Diversification

Before evaluating how different portfolios performed during the 2020-2025 period, it is important to revise the theoretical foundations of diversification. At the heart of modern portfolio construction lies the principle that risk can be mitigated by combining assets that do not move together. The central idea of portfolio diversification is that combining assets with imperfectly correlated returns can reduce overall portfolio risk without reducing expected return. When assets do not move exactly together, losses in one part of the portfolio are compensated by gains (or smaller losses) in another part.

## Portfolio Variance Formula and Interpretation

Mathematically, the variance of a two-asset portfolio is:

$$\sigma_p = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \sigma_1 \sigma_2 \rho_{12}$$

Where:

- $w_i$  = weight of asset  $i$ .
- $\sigma_i$  = volatility of asset  $i$ .
- $\rho_{ij}$  = correlation between assets  $i$  and  $j$ .

The key term is the correlation  $\rho$  : when it is low or negative, the last term becomes small or negative because the two assets move in opposite directions, reducing total portfolio variance. This mechanism is what made the 60/40 equity-bond portfolio successful for decades: U.S. stocks and U.S. Treasury bonds were often negatively correlated, especially during recessions, allowing bonds to rise when equities fell. This formula shows that the overall risk (variance) of a two-asset portfolio depends not only on each asset's volatility but also on how similarly they move (their correlation).

## Limits of Diversification

Even though diversification reduces risk, it does not eliminate it. Adding more assets only helps if their correlations stay low or negative. In real markets, these relationships change over time. Correlations can rise sharply during crises, meaning that assets that usually move differently may all fall together when it matters most. Therefore, even an extremely diversified portfolio cannot remove systematic risk and cannot fully protect investors from large macro shocks such as inflation spikes, interest-rate surprises, or global recessions.

# Theoretical Framework

## Regime-dependent Behaviour of Correlations

However, correlations are not stable. They move in regimes, influenced by macroeconomic conditions. In disinflationary periods (1990s-2010s), stocks and bonds tended to be negatively correlated, which benefited 60/40 investors. On the other hand, during inflationary shocks, correlations often turned positive, meaning stocks and bonds fell together. This is exactly what happened in 2022, when surging inflation and aggressive monetary tightening caused both asset classes to end the year negatively, yielding one of the worst outcomes for multi-asset portfolios in more than a century.

Because of this breakdown in diversification, many analysts argue that the “golden age” of 60/40 (late 1990s-2022) is over: if bonds cannot hedge equity risk, the foundation of the classic balanced portfolio becomes weak. Hence, today gold is often proposed as a complement to equities and bonds because it behaves differently from both.

## Why Gold helps: Correlation and Risk Properties

From a portfolio theory perspective, gold tends to have low or negative correlation with equities and bonds, because it is driven by different economic forces, not tied to earnings or credit conditions. It is seen as a hedge against inflation, currency weaknesses and geopolitical risk. In fact, it carries no credit risk (it cannot default) and reduces volatility, helping smooth drawdowns (ex: 2020 pandemic shock and 2022 inflation shock).

These qualities help explain why major institutions are recommending a more explicit role for gold in standard portfolios. To cite some, Morgan Stanley has suggested shifting from 60/40 to a 60/20/20 allocation, with gold weighted equally to bonds. In Europe, wealth managers have also publicly stated that gold acts as an “excellent diversifier” that helps remove tail risk during geopolitical shocks. Additionally, Central Banks have been buying the commodity at record levels due to concerns about inflation, U.S. dollar dominance and instability.

## Empirical Context and Observations

The practical reality is that institutional investors are already reallocating: 2025 has seen record inflows into gold ETFs, though the average portfolio weight to gold remains low (around 2% in global surveys).

# Theoretical Framework

## Expected Behaviour of Gold-Enhanced Portfolios

Theoretically and empirically, we can form expectations about how a stock-bond-gold portfolio might behave relative to a classic 60/40. Despite lower overall volatility due to weaker correlations, allocating to gold means allocating less to assets with higher long-run expected returns. Moreover, during strong equity bull markets (ex: 2023-2025 AI-driven rally), gold often lags equities. This introduces a trade-off: while gold can reduce portfolio risk, it may also reduce expected returns, particularly in bull markets.

It is also relevant to mention that gold may only matter during extreme events; outside of crises, its diversification benefits may be neutral. Over a short horizon (like 2020-2025), differences in cumulative performance may be driven more by timing than by structural advantages. In other words, theory alone cannot predict a clear winner.

Again, the performance of gold-enhanced portfolios is regime-dependent: they can outperform, underperform or match 60/40 depending on the macro environment (inflation, interest rates, risk sentiment and U.S. dollar cycles). This shows the importance of examining realised portfolio outcomes over the 2020-2025 period.

# Methodology

In this section, our objective is to compare simple multi-asset portfolios combining equities, bonds and gold over the period January 2020-2025, under different allocation and rebalancing rules.

## Data and sample period

Asset	Symbol	Description
Equities	^GSPC	Broad stock market index (SP500)
Bonds	AGG	Investment-grade bond index
Gold	GLD	Gold (gold-backed ETF without physical delivery)

Frequency: daily prices are aggregated to the month-end, from which log monthly returns are computed:

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

This computes the percentage change in price from one month to the next, expressed in logarithmic form to simplify compounding.

## Portfolio definitions

Having established the data sources, we now define the portfolios to be tested.

Portfolio	Weights	Description
A	60% Equities, 40% Bonds, 0% Gold	"Classic Balanced"
B	60% Equities, 20% Bonds, 20% Gold	"Three Pillar"
C	50% Equities, 30% Bonds, 20% Gold	"More Conservative"

In each case, the vector of target weights ( $W = (w_{EQ}, w_{BD}, w_{GLD})$ ) is normalised to sum to 1.

# Methodology

## Rebalancing rules

For each portfolio, we study 2 rebalancing scenarios:

### Case 1: Buy-and-hold (BH)

- Initial weights are set in January 2020 and the portfolio is left to drift.
- Asset weights evolve individually as some assets outperform others.
- The portfolio wealth at time (t) is:  $W_t = W_{t-1}(1 + R_t^{(p)})$  where  $R_t^{(p)}$  is the realised portfolio return given the drifted weights. This equation shows how the portfolio value evolves each month based on the realised return.

### Case 2: Annual rebalancing (RB)

- The portfolio starts with the same target weights in January 2020.
- At the end of each year, weights are reset exactly to the target allocation ( $W$ )
- Between 2 rebalancing dates, the portfolio behaves like buy-and-hold; on the rebalancing date, positions are notionally traded to restore the original mix.

This design allows us to isolate the effect of asset mix (A vs B vs C) from the impact of rebalancing frequency (BH vs RB). With this, we aim to understand whether the rebalancing method affects performance across different portfolio types.

## Portfolio return computation

Given the monthly asset returns ( $R_t^{EQ}, R_t^{BD}, R_t^{GLD}$ ), portfolio returns are computed as:

$$R_t^{(p)} = w_t^T R_t$$

Where:

- $R_t$  is the column vector of asset returns at month  $t$ .
- $w_t$  is the vector portfolio weights at month  $t$ , equal to:
  - the initial weights under BH at  $t = 0$ , then drifted mechanically, or
  - the target weights at each year-end under RB and drifted in between.

This means the portfolio return is calculated by multiplying each asset's return by its weight and summing the results.

From the monthly return series, we construct the wealth path of each portfolio:

$$W_t = W_0 \prod_{s=1}^t (1 + R_s^{(p)}), \quad W_0 = 1$$

# Methodology

This expression gives the full growth path of the portfolio by compounding all monthly returns starting from an initial value of 1.

## Performance and risk metrics

For each portfolio-rebalancing combination and for each period considered, we compute:

- Annualised average return.
- Annualised volatility.
- Sharpe ratio (= the extra return an investment generates for each unit of risk taken) with 10 Year US Treasury Bonds 2020-2025 average as risk-free rate.
- Maximum drawdown (= the worst peak-to-trough loss over the period).
- Best/worst month (= the maximum/minimum single-month returns in the sample).

These metrics allow us to evaluate both return potential and downside protection. In parallel, we compute the correlation matrix of monthly returns between the 3 underlying assets. This helps interpret the diversification properties of gold and bonds in different market regimes.

## Sub-period analysis

To highlight how performance changes across regimes, the full sample (2020-2025) is split into 2 sub-periods:

### 2020-2022: high-stress regime

- COVID-19 crash and rapid rebound (2020).
- Strong equity market (2021).
- In 2022, simultaneous drawdowns in stocks and bonds due to inflation and rate shocks.

### 2023-2025: recovery and AI-driven equity boom

- Equity markets led by large-cap and AI-related stocks.
- Partial normalisation of inflation and interest rates.
- Changing role of bonds and gold as diversifiers.

We reapply the previous performance metrics and correlation matrices across both sub-periods to observe regime-specific effects. This allows us to compare how the role of gold and the impact of rebalancing differ in stress versus recovery environments.

# Results

## Full-period performance

We begin by examining how the three portfolio configurations (A, B and C) perform when implemented under 2 different strategies: buy-and-hold (BH) and annual rebalancing (RB).

Over the whole sample, all portfolios demonstrate good performances. However, the more diversified mixes (labelled 60/20/20 and 50/30/20) clearly earn higher returns than the traditional 60/40 portfolio. In fact, annual returns were around 11-12% vs ~9% for the 60/40. Volatility is similar across the sample (roughly 11-12%). However, the Sharpe ratios of the rebalanced portfolios are close to 0.7, compared with about 0.4 for 60/40.

For each allocation, the re-balanced version slightly lowers volatility and drawdowns compared with the simple buy-and-hold version. However, the difference in the Sharpe ratio is minimal. In other words, over the full period, the primary benefit comes from choosing a more growth-oriented allocation, while the re-balanced strategy mainly “smooths the ride”.

Figure 1: Annual returns, volatility and Sharpe for BH vs RB portfolios, full period

portfolio	period	ann_return	ann_vol	sharpe	max_drawdown	best_month	worst_month
60_40_BH	Full period	9.09%	12.25%	0.42	-22.52%	7.23%	-7.90%
60_40_RB	Full period	8.54%	11.69%	0.39	-21.66%	7.23%	-7.90%
60_20_20_BH	Full period	12.35%	12.16%	0.69	-21.58%	8.46%	-7.87%
60_20_20_RB	Full period	12.16%	11.76%	0.69	-20.71%	8.46%	-7.87%
50_30_20_BH	Full period	11.16%	11.06%	0.65	-20.47%	7.39%	-7.02%
50_30_20_RB	Full period	10.75%	10.61%	0.64	-19.54%	7.39%	-6.59%

To assess how results varied across economic regimes, we now examine the stress and recovery periods separately.

## Performance during the stress period (2020-2022)

The picture changes when we look only at the stress years 2020-2022. Returns drop to about 2-5% per year, while volatility rises to 13-15% and maximum drawdowns reach 20% to 23% for every portfolio. In this difficult environment, the re-balance strategies do better than buy-and-hold across the board: they deliver slightly higher returns, lower volatility, higher Sharpe ratios and smaller drawdowns for each allocation.

This means that, during market stress, the re-balanced approach acts as a shock absorber: it does not eliminate losses, but it makes them shallower and less volatile than a pure buy-and-hold approach.

# Results

**Figure 2: Comparison of stress-period return, volatility and max drawdown for BH vs RB portfolios**

portfolio	period	ann_return	ann_vol	sharpe	max_drawdown
60_40_BH	Stress 2020–22	2.63%	14.46%	-0.09	-22.52%
60_40_RB	Stress 2020–22	2.75%	13.92%	-0.09	-21.66%
60_20_20_BH	Stress 2020–22	4.24%	14.63%	0.02	-21.58%
60_20_20_RB	Stress 2020–22	4.59%	14.17%	0.04	-20.71%
50_30_20_BH	Stress 2020–22	3.08%	13.05%	-0.07	-20.47%
50_30_20_RB	Stress 2020–22	3.40%	12.56%	-0.05	-19.54%

## Performance during the recovery period (2023-today)

From 2023 onwards, markets recovered strongly. Annual returns jump to 14-21%, volatility falls to about 8-10% and Sharpe ratios move well above 1.0, often above 1.8 for the diversified portfolios. In this phase, performance metrics are showing contrasted results as opposed to the previous period:

- Buy-and-hold now delivers slightly higher returns and Sharpe ratios,
- While re-balanced versions keep volatility and drawdowns a bit lower.

Therefore, in a strong bull market, rebalancing reduces portfolio oscillations by periodically locking in gains and reducing exposure to overperforming assets.

**Figure 3: comparison of recovery-period return, volatility and max drawdown for BH vs RB portfolios**

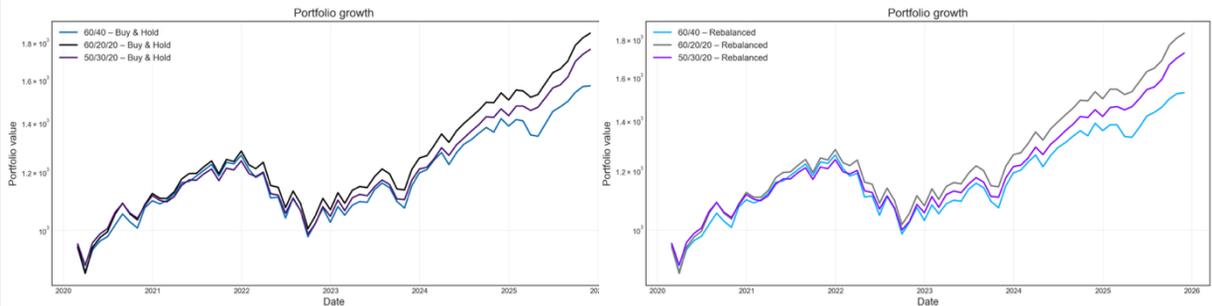
portfolio	period	ann_return	ann_vol	sharpe	max_drawdown
60_40_BH	Recovery 2023+	15.77%	9.58%	1.23	-7.51%
60_40_RB	Recovery 2023+	14.48%	8.97%	1.17	-7.31%
60_20_20_BH	Recovery 2023+	20.85%	8.92%	1.89	-6.35%
60_20_20_RB	Recovery 2023+	20.03%	8.62%	1.86	-6.28%
50_30_20_BH	Recovery 2023+	19.61%	8.39%	1.86	-5.95%
50_30_20_RB	Recovery 2023+	18.40%	8.05%	1.79	-5.88%

# Results

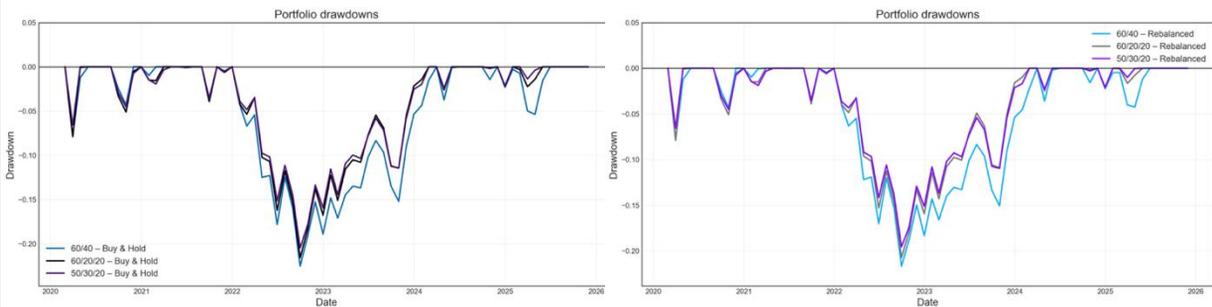
## Overall effect on the investment journey

To visually summarise the overall effect of the strategy, it is also useful to show the evolution of wealth and risk through time. The following illustrations highlight that most of the long-term value comes from remaining invested through both stress and recovery phases, while the re-balanced approach adds value by smoothing the path of returns and reducing the severity of temporary losses.

**Figure 4: Cumulative return over time BH vs RB**



**Figure 5 : Full-period drawdown chart BH vs RB**



Over the full sample, the buy-and-hold versions of the 3 portfolios deliver slightly higher annual returns than their rebalanced counterparts, while volatility stays very similar in each pair. As a result, risk-adjusted performance is almost the same for BH and RB. However, the 60/20/20 mix stands out as the strongest configuration overall and this ranking is essentially unchanged whether we rebalance annually or not.

On the downside, rebalancing brings a modest benefit. For each allocation, the deepest loss experienced over the period is a little smaller in the RB version than in the BH version and the worst monthly setback is also slightly reduced in the most equity-heavy portfolio. In short, annual rebalancing in this sample slightly softens the worst drawdowns, but at the cost of a small reduction in long-term return.

# Discussion

## Insights from regime-specific performance

A key contribution of our analysis lies in our sub-period decomposition. The data show that portfolio behaviour varied significantly across market regimes, highlighting the regime-dependent nature of diversification benefits.

During the high-volatility phase of 2020-2022 marked by the COVID-19 crash, the rebalanced portfolios consistently outperformed their buy-and-hold counterparts across all configurations. While absolute returns were lower (2-5% annually), the rebalanced strategies delivered better Sharpe ratios and reduced maximum drawdowns, particularly for gold-inclusive portfolios. This supports the view that rebalancing can function as a stabilising mechanism.

In contrast, during the recovery phase (2023-2025), the buy-and-hold strategies performed better during the bull market phase. Portfolios achieved significantly higher annualised returns (15-21%) and Sharpe ratios above 1.8, particularly in the Three Pillar and More Conservative allocations. Rebalancing in this period slightly constrained upside potential by systematically reducing exposure to overperforming assets. Thus, while RB portfolios retained some volatility benefits, they underperformed in terms of growth.

## Evaluating the role of Gold

Gold appears to have added tangible diversification benefits across all scenarios. Its inclusion improved both absolute and risk-adjusted returns relative to the standard 60/40 configuration. These benefits were most pronounced during the stress period, where gold helped cushion drawdowns without adding significant volatility. However, during the recovery phase, gold allocations clearly reduced upside performance. This asymmetry supports the view that gold is most effective as a crisis stabiliser rather than a consistent return enhancer.

Importantly, the Three Pillar portfolio (60/20/20) emerged as the best overall performer, striking a balance between growth and downside protection. Its performance remained robust across regimes and rebalancing strategies, suggesting it may represent a more resilient baseline allocation for diversified investors in uncertain macroeconomic environments.

## Strategic limitations

That said, some limitations must be acknowledged. The sample period, while rich in macroeconomic shifts, remains relatively short. The study also focuses exclusively on US markets and a narrow set of asset classes. Additionally, transaction costs and tax implications of rebalancing were excluded from the analysis, which may impact real-world implementation.

# Conclusion

This study explored whether augmenting the traditional 60/40 equity-bond portfolio with gold could improve performance and risk characteristics during a highly turbulent period (2020-2025). Through a comparative analysis of 3 portfolio structures: Classic Balanced (60/40), Three Pillar (60/20/20) and More Conservative (50/30/20) (under both buy-and-hold and annual rebalancing strategies), we examined outcomes across full-sample and regime-specific windows.

The evidence is clear: portfolios incorporating gold achieved superior risk-adjusted returns over the full period, particularly the 60/20/20 “Three Pillar” structure. While rebalancing offered modest improvements in drawdowns and volatility, its overall impact was secondary to the portfolio's asset composition.

Our sub-period analysis added nuance. During the 2020-2022 stress phase, rebalanced portfolios (especially those including gold) effectively limited volatility. Conversely, in the post-2023 bull market, buy-and-hold strategies captured stronger upside, as rebalancing systematically reduced exposure to outperforming assets. This highlights the regime-dependent nature of diversification and the contextual benefits of rebalancing.

Gold's role emerged as asymmetric: it helped cushion downside risk during periods of market distress but modestly diluted returns during strong equity rallies. This aligns with its profile as a crisis hedge rather than a growth driver. Ultimately, the Three Pillar portfolio stood out for its resilience across regimes, providing a strong case for a more diversified baseline allocation in modern multi-asset portfolios.

## Final thought from the ESFS Quantitative Research Team

What if the real risk in portfolio construction today is not volatility, but rigidity?

The past 5 years have made one truth undeniable: market regimes can shift faster than allocation models. In this light, the most dangerous assumption may not be overconfidence in equities or underestimation of inflation but the belief that yesterday's diversification still works tomorrow.

This study is not just about gold or rebalancing. It's a reminder that in a world defined by shocks, resilience demands adaptability. The best-performing portfolios weren't the ones with the highest return in a single moment but those that adapted wisely as market conditions changed.

As we, asset allocators, face the next cycle, the question isn't whether to adjust... but how often, how thoughtfully and with what signals. The future of diversification may lie not in static blends, but in dynamic thinking.

# Appendix & Bibliography

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For each portfolio–rebalancing combination, and for each period considered, we compute:

- Annualised average return:  $R_{ann} = (\prod_{t=1}^T (1 + R_t^{(p)}))^{\frac{12}{T}} - 1$
- Annualised average volatility:  $\sigma_{ann} = stdev(R_t^{(p)}) \times \sqrt{12}$
- Sharpe ratio:  $Sharpe = \frac{R_{ann}}{\sigma_{ann}}$
- Maximum drawdown:  $MDD = \min_t \left( \frac{W_t}{\max_{s \leq t} W_s} - 1 \right)$

If you're interested in exploring the results in more detail, we invite you to try our interactive dashboard, where you can change assumptions, tickers and portfolio mixes and see the charts update in real time. The code and instructions are available on our GitHub repository:

<https://github.com/EsfsQuantitativeResearch/Shares-Bond-Gold-Optimization---ESFS-Quant-Research>.