

Our Investment Philosophy



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Introduction

InvestEngine is the ETF investment platform for long-term investors.

We offer our clients professionally managed portfolios personalised to their risk tolerance, and constructed using Modern Portfolio Theory (MPT). Our portfolios are designed to provide attractive levels of return, through the use of a diversified set of asset classes and risk factors.

This article explores InvestEngine's investment philosophy and process in detail, breaking down both the theoretical and practical foundations for our portfolio construction methodology.

Modern Portfolio Theory

At InvestEngine, we believe that investment decisions should be guided by the available wealth of academic and empirical evidence. As part of this philosophy, our portfolio construction process is guided by one of the most influential investing theories - Modern Portfolio Theory (MPT).

One of the major tenets of MPT is that the risk and return characteristics of an asset should not be viewed in isolation, but rather in relation to the wider portfolio as a whole. The aim of MPT is to combine different assets to maximise a portfolio's risk-adjusted returns, by constructing a portfolio of multiple assets which results in greater returns without a higher level of risk. The economists who developed MPT, Harry Markowitz and William Sharpe, received the Nobel Prize in Economics in 1990 for their research.

MPT is a useful framework for constructing diversified portfolios. The growth of ETFs has made the application of MPT even more relevant today, with investors now having access to readily-diversified vehicles spanning a broad range of asset classes.

Our investment management process goes beyond a simple application of MPT, by embracing subsequent advancements based on that theory. As part of our evidence-based philosophy, we include in our portfolio construction process a consideration of other types of risk factors, commonly known as factor investing.

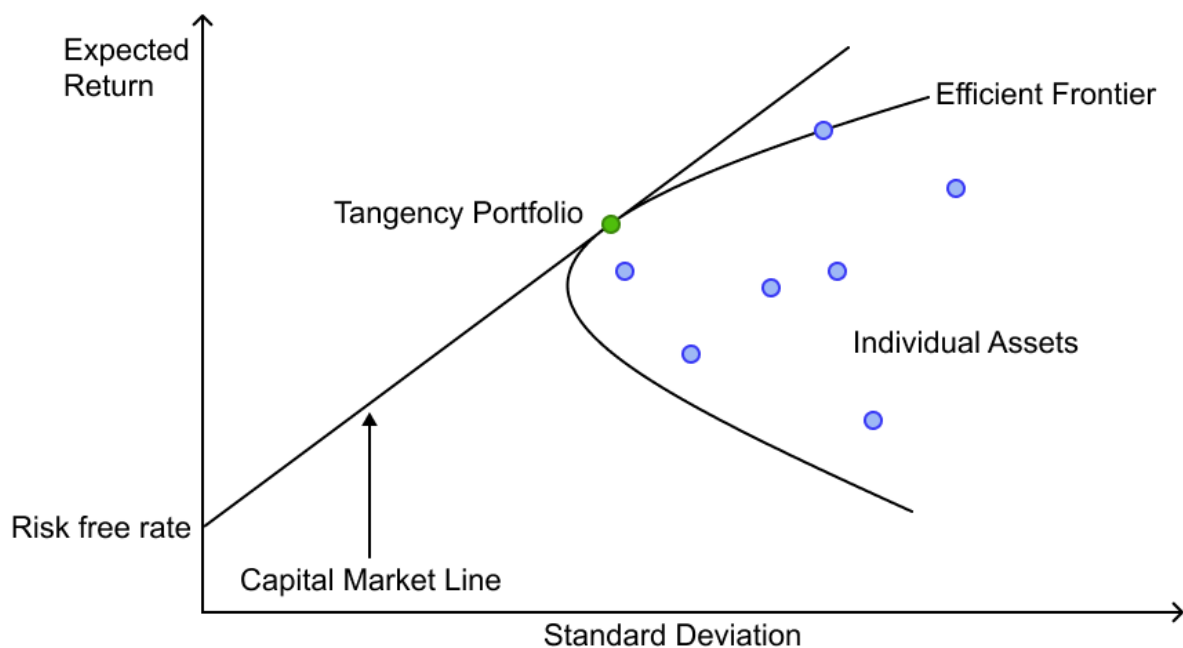
Modern Portfolio Theory and CAPM

The Capital Asset Pricing Model (CAPM) was the first formal asset pricing model, built on MPT ideas developed by Harry Markowitz in his seminal paper 'Portfolio Selection' in 1952's *The Journal of Finance*¹.

The CAPM theory states that a linear relationship exists between an investment's risk and its return. The model suggests that it is possible to calculate an investment's return based on its level of risk relative to the market (its beta).

¹ Markowitz, H., "Portfolio Selection". *The Journal of Finance*, Vol. 7, No. 1. (Mar., 1952), pp. 77-91

Using CAPM to create an optimal portfolio from several individual assets is achieved through the use of efficient frontiers.



The graph above shows that, starting with the risk-free rate, the expected return of a portfolio increases as the risk increases (the upward-sloping line). The Capital Market Line (CML) represents portfolios which optimally combine risk and return - they are the portfolios which maximise return for a given level of risk. Any portfolio which fits on the CML is optimal, as there can be no portfolio which achieves a higher return for the level of risk.

The curved line of the graph represents the 'efficient frontier', and the space within the frontier represents every possible combination of risky assets. The individual risky assets in isolation will likely sit beneath the frontier, but when combined with other risky assets into portfolios, it is possible to increase the level of return without increasing the level of risk - moving the portfolio upwards towards the edge of the efficient frontier.

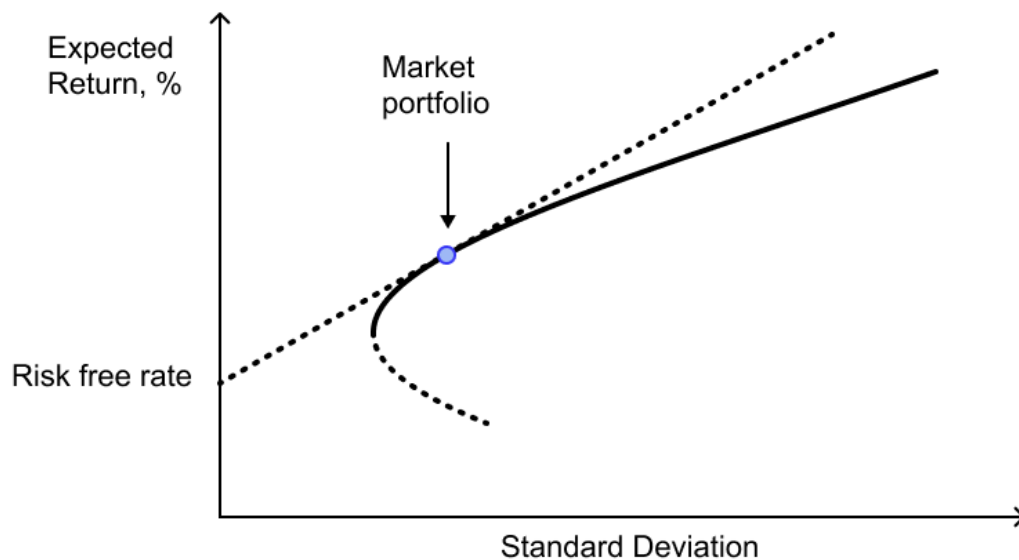
Those portfolios which sit on the efficient frontier therefore represent the optimal combinations of risky assets - those combinations which maximise returns at each level of risk.

As the aim of the portfolio construction process is to create portfolios which sit as close to the CML as possible, those combinations of risky assets which sit on the efficient frontier are considered to be optimal. The most optimal portfolio – that which sits closest to the CML - is the tangency portfolio. This is the portfolio which is created through the combination of risky assets which also sits on the CML.

If a risk-free asset is also available, the most efficient portfolios are those which sit directly on the CML from the y-axis intercept to the tangency portfolio – representing combinations of

the tangency portfolio and the risk-free asset. Those portfolios on the CML above and to the right of the tangency portfolio represent portfolios created through borrowing at the risk-free rate and investing into the tangency portfolio.

If an investor were to use CAPM as their chosen pricing model, then the globally market-cap weighted portfolio is the maximally-efficient tangency portfolio under MPT, and there is no need to seek further diversification within equities:



However, since the formulation of CAPM, much evidence has been published which calls this pricing model into question.

MPT and factor investing

One of the major criticisms of CAPM is that it views expected returns through a single-factor lens – it implies the sole determinant of a portfolio’s expected return is the level of risk taken in the form of market beta.

The first high-profile questioning of CAPM came in 1992, with Kenneth French and Eugene Fama’s now famous paper ‘*The Cross-Section of Expected Stock Returns*’², which summarised all the market anomalies which had been found to date. The conclusion of their paper was that CAPM only explained about two-thirds of the differences in returns of

² Fama, E. and French, K., (1992). "The Cross-Section of Expected Stock Returns". *The Journal of Finance*.47 (2): 427.

diversified portfolios, and that a better model could be built using more than just the single factor of market beta.

Their follow-up paper, *'Common Risk Factors in the Returns on Stocks and Bonds'*³ proposed a new pricing model, called the Fama-French Three-Factor model. This model proposed that in addition to the market beta factor, exposure to the size and value factor premia further explained stock returns, raising the explanatory power of CAPM from about two-thirds of differences in returns, to around 90%. By identifying these new factors, they discovered two new sources of risk – small-cap stocks and value stocks – which were compensated for in the form of higher expected returns.

Importantly, they found that while small and value stocks were riskier than the market, the risks inherent in these stocks were separate to the risk of market beta. This means from a portfolio construction standpoint that allocating to these factors results in investing in additional sources of return-compensated risk, providing diversification benefits over simply investing in the market.

The table below summarises the historic correlations between the original Fama-French factors, demonstrating the unique nature of their risks⁴:

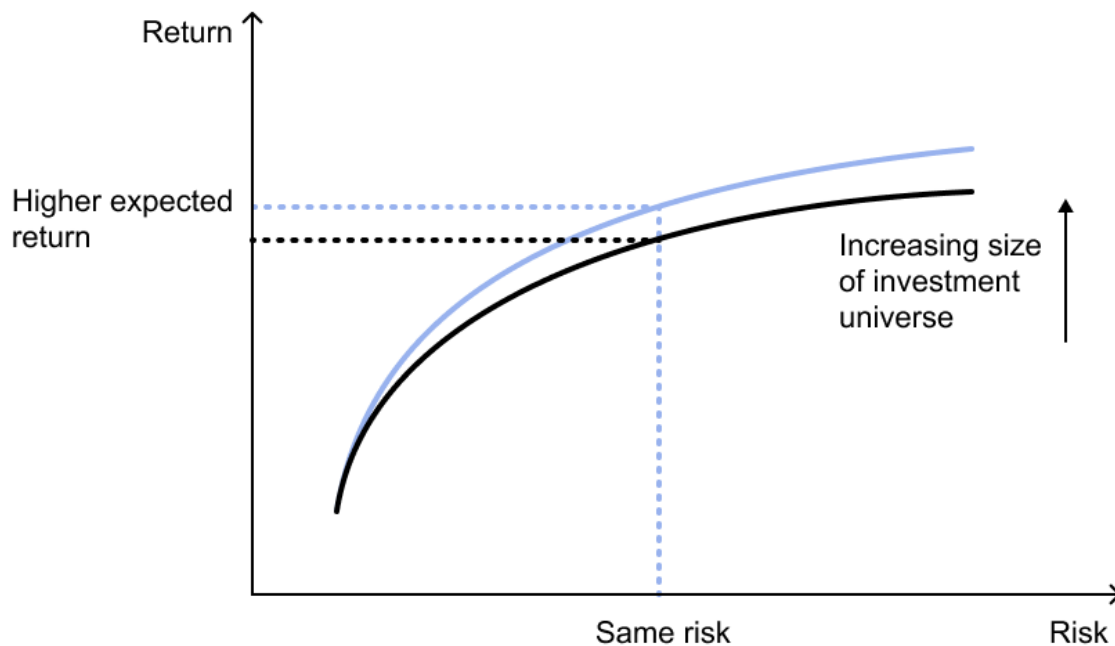
	Market Beta	Size	Value
Market Beta	1.0	0.3	-0.2
Size	0.3	1.0	0.0
Value	-0.2	0.0	1.0

From an MPT standpoint, incorporating factors, which are additional unique sources of risk premia, into portfolios expands the efficient frontier beyond what is suggested by a simple CAPM pricing model.

³ Fama, E. and French, K., (1993). "Common Risk Factors in the Returns on Stocks and Bonds". *The Journal of Financial Economics*, 3–56.

⁴ Swedroe, L., (2016). *Your Complete Guide Factor-Based Investing*. BAM Alliance Press.

This therefore increases the level of expected return for any given level of risk:



This simple theoretical example demonstrates the value of diversifying by risk factor:

If we assume an investor holds a 50/50 portfolio of equities and bonds, then with 7% returns on equities, and 5% returns on bonds, the investor has an expected return of 6%. But if this investor needs to meet a target return of 6.5%, they must increase equities to 75%:

$$(75\% * 7\%) + (25\% * 5\%) = 6.5\%$$

However, by expanding the pricing model beyond CAPM, the target return can be achieved without taking on additional beta.

If the investor instead decides to split their 50% equity allocation between market beta and the size and value factors, for example, which come with higher risk, but also higher expected returns, the investor can achieve their desired return:

$$(25\% * 7\%) + (25\% * 11\%) + (50\% * 5\%) = 7\%$$

This portfolio has the same stock allocation, and although the addition of small value stocks have higher risk than market beta, the uncorrelated

nature of the risk means the return of the portfolio has increased by more than the additional risk taken.

However, the investor only needed 6.5% return, not 7%. To match the return requirement, using a multi-factor approach means they can reduce the equity allocation while maintaining a similar level of expected return. Lowering the stock allocation to 40% takes the expected return down to being in line with the target return:

$$(20\% * 7\%) + (20\% * 11\%) + (60\% * 5\%) = 6.6\%$$

This portfolio now only has 40% stocks, versus the 50% which would have been required under a simple-factor CAPM model. With a higher allocation to bonds (60%) the multi-factor portfolio will likely fare better during market drawdowns than the initial portfolio.

Although this is a simplified example which includes exaggerated factor premia return assumptions and ignores many real-world considerations for implementing a factor-based strategy, it demonstrates the theoretical diversification benefits of including multiple sources of unique risk in portfolios.

Not only does incorporating factors into portfolios increase the potential for higher risk-adjusted returns, it also increases the reliability of long-term outcomes by reducing the variations in an investor's long-term potential portfolio values. By diversifying by risk factor, investors reduce the risk of a single risk premium (e.g. market beta) underperforming for extended periods of time.

Academic evidence has shown that even when factor premia expected returns were reduced by 50% (greater than the 30% post-publication shrinkage found in several papers⁵), they still provide substantial benefit in reducing the distribution of terminal wealth outcomes⁶.

Factor investing has been the subject of much academic research since the original Fama-French study, with the aim of identifying the factors which exist over multiple time periods, regions, countries, and asset classes. While there is still much research being

⁵ McLean, R. D., & Pontiff, J., (2016). "Does Academic Research Destroy Stock Return Predictability?" *The Journal of Finance* February 2016, 71 (1), 5-32 and Jensen, T., Kelly, B., & Pederson, L., (2021). "Is There a Replication Crisis in Finance?" *NYU Stern School of Business*

⁶ Scott, L., & Cavaglia, S., (2017). "A Wealth Management Perspective on Factor Premia and the Value of Downside Protection". *The Journal of Portfolio Management* Spring 2017, 43 (3) 33-41

conducted, a small number of factors have been shown repeatedly in academia to be persistent across time, robust to various definitions, investable, and intuitive.

It is these factors, which have the highest weight of academic evidence behind them, which we employ in our managed portfolios.

While traditional active managers demonstrate skill by case-by-case view-taking, factor investors do this by identifying systematically rewarded risk premia. Multi-factor investors diversify across many rewarded premia, while diversifying away uncompensated risk. This is why InvestEngine focus on systematic, long-term, process-driven investing, rather than focusing on short-term tactical decisions.

Our investing process is designed to increase returns and reduce risk within portfolios by targeting unique sources of risk over and above that offered by investing in the global market. By adopting a factor investing approach, we diversify portfolios not just by asset class, sector, geography, and currency, but also by risk factor. We pursue a systematic approach to exploit these so-called market anomalies efficiently and effectively. This means InvestEngine's portfolios are diversified across multiple unique sources of risk, with a higher potential for superior risk-adjusted returns and lower variation in terminal wealth outcomes versus a traditional beta-focussed investing approach.

Identifying asset classes

The first step in the portfolio construction process is to identify which asset classes will be used in portfolios.

Empirical evidence has shown that asset allocation policy explains over 90% of the variability of returns over time⁷, and over 100% of the absolute level of returns over time⁸. The fact that asset allocation has been responsible for more than 100% of returns can be explained by security selection and market timing detracting from returns in aggregate.

To maximise the returns from asset allocation and minimise the higher likelihood of negative returns from security selection and market timing, InvestEngine does not engage in either

⁷ Brinson, G. P., Hood, L. R., & Beebower, G. L. (1986). "Determinants of Portfolio Performance". *Financial Analyst Journal*, 39-44.

⁸ Ibbotson, R.G. & Kaplan, P.D. (2000). "Does Asset Allocation Policy Explain 40, 90, or 100 Percent of Performance?" *Financial Analyst Journal*, 26-33.

security selection or market timing. We prefer to construct portfolios on an asset-class level, taking a long-term view.

In keeping with InvestEngine's evidence-based philosophy, we will only invest in asset classes which have been scrutinised through academic research, and have well-defined track records, risk-return characteristics, and behaviour. In keeping with MPT, we assess each asset class not on how it functions as a standalone asset class, but on how it interacts with the other components of the portfolio.

The primary building blocks of our portfolios are equities and bonds.

Portfolio construction – equity

Equities are the major return engine in our portfolios.

Despite their higher volatility, equities provide investors with the opportunity for both long-term capital growth and inflation protection. Although they come with the potential for large drawdowns – the global market fell over 40% in the dot-com crash – historical data supports the higher return potential of equities over the long-term.

When it comes to how InvestEngine constructs the equity allocations of portfolios, we consider the following:

1. **Diversification.** To ensure the equity component of portfolios is sufficiently diversified, we use broad based index-tracking funds, which results in a portfolio holding thousands of individual stocks across the globe. We ensure our equity allocations are adequately diversified by country, region, sector, and currency. We also diversify by risk factor, ensuring portfolios maintain exposure to empirically-vetted alternative sources of risk premia, which increase expected risk-adjusted returns.
2. **Cost.** We use cheap index-trackers to keep costs low. By combining cheaper regional ETFs, we are able to capture beta for lower cost than a single global market-tracking fund. We also aim to keep the costs on our factor ETFs as low as possible, without compromising on factor exposure.
3. **Hedging.** We prefer to leave our equity funds unhedged for the following reasons:
 - Unhedged share classes are cheaper than hedged equivalents, whose higher costs erode returns over time. The costs of hedging are also increasing as the world moves into a higher interest rate environment (hedging costs are determined by differences in countries' short-term interest rates).
 - By leaving equity exposure unhedged, InvestEngine clients will be more diversified by currency. Given our clients' major assets will likely be predominantly based in GBP

(e.g. their income and home), introducing foreign currency exposure in portfolios ensures spending power is not solely based on the strength of the British Pound. By introducing non-GBP exposure, these foreign currencies will perform well when GBP-denominated assets perform poorly due to GBP weakness.

- Currencies are generally believed to behave differently from equity and fixed income securities, as they tend to move in cycles around a long-term equilibrium rate. Longer term, currencies should mean-revert towards this rate based on structural economic drivers, such as differences in trade balances, economic growth, and inflation. While currencies are prone to fluctuations in the short-term, in the long-term currencies have an expected return of zero. Hedging therefore comes with a higher cost, without increasing long-term total returns.
- GBP tends to weaken when markets fall, as investors migrate to owning 'safer' currencies including the USD, CHF, and JPY. By owning some foreign currencies, this has the potential to cushion portfolios from losses when markets fall and GBP weakens.

Alongside these, we consider other factors including tracking error, liquidity, replication method, and securities lending - refer to the 'Selecting investment vehicles' section for further details.

Portfolio construction – bonds

Bonds are the other building block of our portfolios.

Although bonds tend to have lower expected returns than equities, they are less volatile, and have historically demonstrated low correlations with equities. As a result, they are an effective way to reduce the risk of portfolios and provide a cushion against market drawdowns.

To ensure maximum diversification within the bond allocation, we include exposure to several asset classes within bonds.

As part of the portfolio construction process, we consider the following:

- **Credit quality.** We have a preference for high-quality government bonds over corporate bonds for several reasons:
 - High-quality government bonds have a lower correlation with equities, providing superior diversification benefits over corporate bonds.
 - As the return on offer from corporate bonds is linked to the health of their issuing companies, they have more similar risk factors to equities than government bonds,

whose ability to repay is less based on corporate health or the business cycle. To maximise diversification by risk factor, government bonds present a better opportunity to capture a unique source of risk than corporates.

- Higher-quality government bonds offer superior protection against equity market downturns than corporate bonds, whose ability to repay is linked to the economic cycle. Corporate bonds are most likely to default when stocks fall, reducing their diversification potential.
- The academic research shows that the higher yields on offer from corporate bonds, while attractive, are not always likely to be earned by investors. Bond downgrades, defaults, and calls from bond issuers all reduce the return realised by investors compared to a corporate bond fund's stated yield.
- **Inflation-linked versus nominal bonds.** An inflation-linked bond differs from a regular (aka 'nominal') bond in that the return of an inflation-linked bond is dependent on the level of inflation. We maintain a higher allocation to inflation-linked bonds in lower risk profiles:
 - To protect against short-term unexpected inflation. Because their returns are structurally linked to inflation, inflation-linked bonds can be useful for providing protection against short-term inflation. This is particularly useful for those clients who rely on their portfolio to fund their shorter-term spending needs, as unexpectedly high inflation is one of the most significant risks to investors who rely on their portfolio to fund their spending. These investors are more likely to be investing on the lower end of the risk spectrum.
 - As an additional diversifier. Inflation-linked bonds also have the potential to help protect portfolios from equity market selloffs, due to their high credit quality. Those clients in lower risk portfolios which maintain higher allocations to fixed income will likely benefit more from additional sources of diversification within the bond element of their portfolios.
 - Portfolios with higher equity weightings generally have less need of short-term unexpected inflation protection. Due to their longer time horizon, more equity-heavy portfolios can more reliably combat long-term inflation using equities, which are a strong long-term inflation hedge. Investors in more equity-heavy portfolios also tend to have a longer investment horizon, and so are further able to combat inflation through their human capital – ensuring their income keeps up with rising inflation.
- **Duration.** A bond's duration is a measure of how sensitive the bond is to interest rate moves. The higher the number, the more the bond or bond fund will fall when rates rise, and vice versa. For example, if rates were to rise 1%, a bond with a five-year average duration would lose approximately 5% of its value. It is also a measure of how long it takes, in years, for an investor to be repaid the bond's price by the bond's total cash flows. In lower-risk portfolios, we aim to keep duration low to ensure large interest rate movements do not result in large losses in the bond element of the portfolios. In portfolios containing a higher equity weighting, investors are able to hold longer duration bonds to match their longer time horizon, which allows them to benefit from the higher yields on

offer from longer-dated bonds. Holding bonds with a duration close to the investor's time horizon also helps reduce interest rate risk, as price and reinvestment risk are balanced.

- **Diversification.** We aim to diversify broadly across the bond universe, using broad based global index trackers. This results in a portfolio holding hundreds of high-quality individual bonds across the globe. We also diversify through the addition of inflation-linked bonds, and bonds of varying duration.
- **Cost.** We use cheap index-tracking ETFs to keep costs low.
- **Hedging.** We prefer to use hedged share classes for all of our fixed income exposure. As bonds are designed to be the safer element of portfolios, we do not want unpredictable FX returns to overwhelm the returns from bonds.

Alongside these, we consider other factors including tracking error, liquidity, replication method, and securities lending – refer to the 'Selecting investment vehicles' section for further details.

Excluded asset classes

We exclude some asset classes from InvestEngine portfolios whose risk/return characteristics outweigh the potential benefit gained from their inclusion.

Commodities

One of the primary drawbacks of commodities is their low historic returns. This is generally thought to be caused by two factors. Firstly, commodities produce no cash, which limits their ability to generate attractive long-term returns. Secondly, commodity prices tend to be cyclical over the longer term, as any temporary increases in price will either be met with increases in supply to fill the extra demand or alternatives being sought by consumers - both resulting in a mean-reverting price, again limiting their ability to compound over the long-term.

While some baskets of commodities can provide short-term inflation protection, such protection is unreliable, and more stable alternatives are available, including inflation-linked bonds. Their attractive returns in some academic studies do not always translate into real-world returns, as differences in the futures contracts owned by the indices, their weighting, their constraints, their method for rolling contracts, and their approach to rebalancing all contribute to divergent returns. Commodities also have a low contribution to a global stock/bond portfolio's risk-adjusted return, so would at best only form a small weight in a globally diversified portfolio.

Gold

Despite its reputation, gold has shown very little real-world evidence of being a reliable hedge against inflation. For portfolios requiring a higher level of unexpected inflation protection, inflation-linked bonds are likely to be a more reliable hedge. In addition, while gold has provided some cushion during past market crashes, high credit-quality bonds have also provided protection, and come with higher long-term expected returns.

Real estate

InvestEngine portfolios maintain exposure to real estate within equities, with property companies and REITs already included in all the major indices. Adding further real estate exposure through a direct allocation would be overweighting the asset class relative to the overall market. Also, although property ETFs are highly liquid, the underlying property held by the ETFs is not, which can result in liquidity and pricing mismatches between the ETF and its underlying holdings.

Mean-Variance Optimisation

InvestEngine determines the relative asset class weightings using a constrained Mean-Variance Optimisation (MVO) approach.

MVO forms part of MPT, consistent with the idea that owning many types of assets is less risky than owning only one type, and that an asset's risk and return should not be assessed by itself, but by how it contributes to a portfolio's overall risk and return.

An MVO approach involves combining different asset classes to form an efficient frontier of portfolios which maximise returns for a given level of risk (see the 'Modern Portfolio Theory and CAPM' section above for more details). By identifying those combinations of assets which result in maximally-efficient portfolios (those which sit on the efficient frontier), it is possible to make more informed asset allocation decisions.

MVO does, however, come with several limitations. Two major weaknesses of MVO are, firstly, that using unconstrained MVO results in concentrated, un-diversified portfolios, and secondly, any MVO analysis is particularly sensitive to small changes in inputs - particularly the expected return assumptions.

To mitigate these weaknesses of MVO, we impose standard constraints prohibiting the use of leverage or shorting, as well as additional constraints around resultant asset class weightings. This ensures all resulting portfolios remain diversified, and are not overly-optimised towards any single asset.

To maximise the reliability of the estimated return input, multiple expected return assumptions are gathered from various market participants. These are then probability weighted and averaged. We will also only optimise assets which have the highest volume of empirical evidence supporting their return predictability. This provides a more robust estimate of forward returns compared to extrapolating historical returns, and ensures portfolios are tilted towards regions and styles which maximise expected risk-adjusted returns.

Selecting investment vehicles

InvestEngine uses low cost, index-based exchange traded funds (ETFs) to represent each asset class.

A significant amount of research has been published showing the majority of active mutual funds not only underperform the market, but those which outperform in one period are unlikely to outperform in subsequent periods.

The S&P Dow Jones 'SPIVA' report for mid-year 2022 indicates that over 80% of GBP-denominated UK equity funds underperformed their benchmarks on a risk-adjusted basis over the last 20 years, as did 97% of domestic US equity funds⁹.

Their 'Persistence Scorecard' shows that regardless of asset class or style focus, active management outperformance is typically short-lived, with few funds consistently outranking their peers or benchmarks. For example, of the top-quartile performing domestic US funds in 2017, only 1.66% remained top-quartile at the end of 2021¹⁰.

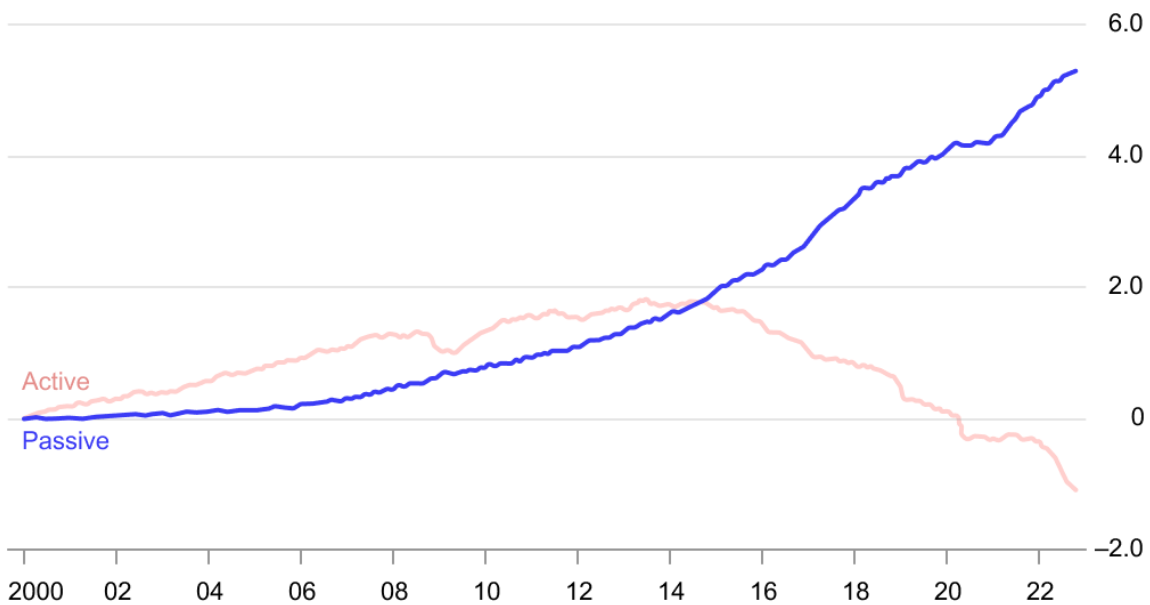
As a result, passive index-tracking funds have grown enormously in popularity over the past 10 years, mirrored by increasing flows out of active funds:

⁹ <https://www.spglobal.com/spdji/en/research-insights/spiva/>

¹⁰ <https://www.spglobal.com/spdji/en/spiva/article/us-persistence-scorecard/>

Money is pouring out of active funds and into passive

US domiciled cumulative fund flows, \$n (to August 2022)



Source: JPMorgan © FT

Source: JP Morgan via the [Financial Times](#)

Contributing to the rise in passive investing's popularity, ETFs have grown to over \$6tn, and now account for 23% of the US fund market, up from 9% in 2011¹¹.

One of the primary reasons for the underperformance of active funds versus their index-tracking counterparts, and hence the significant migration of flows away from active funds, is fees. Index-tracking funds, including ETFs, are usually cheaper than actively managed funds, and the cumulative impact of paying lower fees has a significant impact on performance over an investing lifetime.

However, while we remain aware of the importance of keeping fees low, when it comes to selecting ETFs for InvestEngine's portfolios, we must bear in mind that cheaper is not always better. We assess each ETF on a range of additional criteria before deciding on whether it should be included in portfolios. Alongside the asset-class specific criteria mentioned in the 'Portfolio construction' section, we also consider:

1. **Tracking error.** An ETF's tracking error is a measure of how closely its performance matches the index it was designed to track. We will ensure tracking error is sufficiently low when balanced against the other ETF selection criteria.

¹¹ *Investment Company Institute Factbook 2022*

2. **Liquidity.** We will assess an ETF's liquidity, to ensure it can be easily traded. Illiquid ETFs can not only take significant time for trades to settle, but can incur higher trading-related costs, hampering a major benefit of using a low-cost ETF.
3. **Replication method.** ETFs can adopt a variety of methodologies to replicate the performance of the underlying index. The most common are full physical replication (the ETF invests in the securities represented in the index in accordance with their index weighting), optimised physical replication (a.k.a. 'sampling' – the ETF invests only in those securities represented in the index that are needed to achieve a performance very close to that of the index), and synthetic replication (the ETF invests in a securities portfolio and exchanges its performance for that of the index).
4. **Currency.** We will consider whether the foreign currency exposure within the ETF should be hedged. In addition, to minimise foreign exchange fees on transactions, all ETFs included on the InvestEngine platform are traded in GBP.
5. **UCITS compliance.** UCITS is a set of voluntary rules which many ETFs follow. ETFs which are UCITS compliant must follow certain rules designed to protect investors, including minimum standards on diversification, risk management, and transparency.

Rebalancing and ongoing monitoring

Typical market movements will naturally cause assets to deviate from their target weightings in portfolios. Over time, higher-return assets (equities) will tend to become a larger weighting in portfolios, and lower-return assets (bonds) will tend to become a smaller weighting. The result is that portfolios gradually become less and less aligned with investors' original risk profiles, and must be rebalanced back towards their original weightings.

InvestEngine monitors our clients' portfolios daily, and will rebalance them if their relative allocations exceed certain thresholds to ensure portfolios remain appropriate for clients' circumstances.

It is important to note that a client's asset allocation will need to be adjusted over time, as their risk profile will inevitably change due to developments in their life circumstances. InvestEngine recommends clients review their investment plans at least annually to ensure their portfolio remains appropriate.

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