evidence based investments

EBI MODEL PORTFOLIO SERVICE: AN INTRODUCTION

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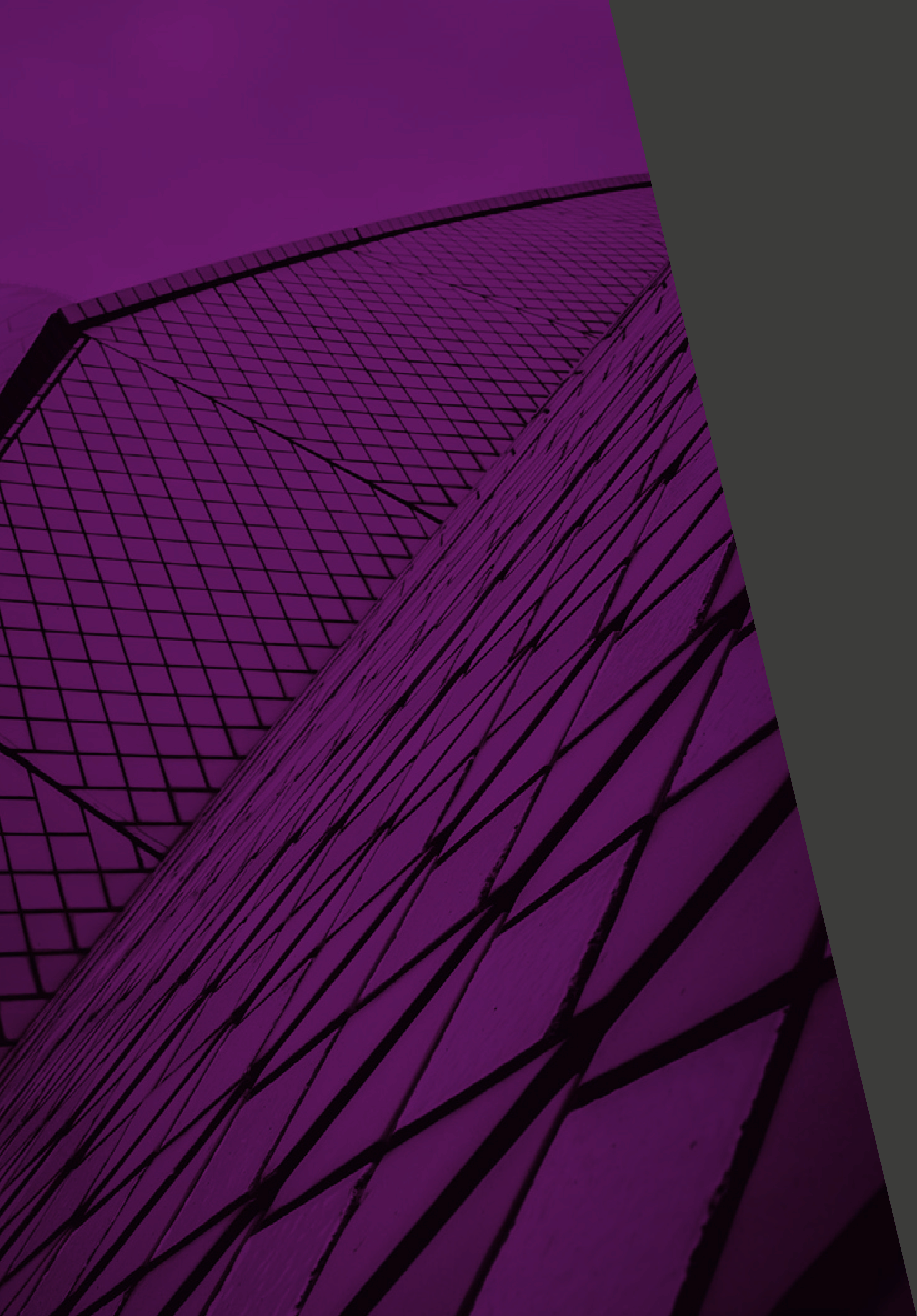

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01

A SUITE OF HIGHLY DIVERSIFIED, LOW COST PORTFOLIOS

EBI model portfolios are an evidence-based investment solution, giving investors access to a highly diversified and low cost suite of portfolios.

The evidence employed is the product of many decades of independent, peer-reviewed research and analysis by some of the world's leading academics, including numerous Nobel laureates.

In other areas of life, medicine or law for example, decisions are routinely based on evidence.

Yet much of the investment industry ignores academic research, relying instead on a blinkered belief that armed with enough information, sophisticated software and the smartest minds, they can beat the market and get well paid for their efforts. An evidence-based investor has science on their side, giving them peace of mind and, over time, higher expected returns.

Unlike many other investment solutions, EBI model portfolios are not constrained by an allegiance to specific academics or product providers. At EBI, we use only best-in-class funds, giving exposure to markets at the lowest possible price. We are committed to continuously improving our portfolios in line with the academic evidence, as better suited or more cost-effective funds become available.

> "When the facts change, I change my mind. What do you do, sir?"
>
> **John Maynard Keynes**

02

DIFFERENCES BETWEEN ACTIVE AND PASSIVE MANAGEMENT

“Investment management, as traditionally practised, is based on a single core belief: Investors can beat the market and superior managers will beat the market. However contrary to their often-articulated goal of out-performing the market average, investment managers are not beating the market; the market is beating them.” [1]

Charles D. Ellis

The fund management industry is constantly telling investors that they need to invest in actively managed funds to ‘beat the market’. Unfortunately, the evidence shows that, after costs, only a tiny proportion of fund managers succeed in beating their benchmark index over the long term.

Nor is there any reliable way to identify in advance those very few actively-managed funds that are going to outperform.

Research shows that only about 1% of active fund managers beat the market over the long term. It also takes 22 years of data to be 90% certain that these managers are genuinely skilful, not just lucky. [2]

Past performance is not a reliable indicator of future results.

“Overall, our evidence suggests that actively-managed investments do not outperform their benchmark after costs... Investors may choose to invest in funds with higher charges in the expectation of achieving higher future returns. However, we find that there is no clear relationship between price and performance – the most expensive funds do not appear to perform better than other funds before or after costs.” [3]

Fund managers are generally highly intelligent and hard-working people, but there are now so many managers out there with access to the same information, all chasing a finite amount of alpha (excess return over the market), that it’s extremely difficult for them to outperform one another.

One interesting and largely over looked reason for that is the effect of positive skew. Simply put, the distribution of returns in the stock market is lopsided. The returns from equity benchmarks are so reliant on gigantic gains in just a handful of stocks that missing them, as most managers do, consigns the majority to failure.

“Your intuition is that you can randomly pick stocks and start at zero. But the empirical fact is if you randomly pick, you are starting behind zero.” [4]

J.B. Heaton

The only certain way to avoid being a victim of this asymmetry is to have a core holding of low-cost index funds that includes all of the stocks in the particular markets in which you are investing.

[1] Charles D. Ellis, *Winning the Loser’s Game*. First published 1985.

[2] D. Blake, T. Caulfield, C. Ioannidis, I. Tonks, *New Evidence on Mutual Fund Performance: A Comparison of Alternative Bootstrap Methods*. Journal of Financial and Quantitative Analysis. June 2017.

[3] FCA, *Asset Management Market Study Interim Report*. November 2016. p.15.

[4] Comment made by J.B. Heaton co-author, *Why Indexing Works*, Oct 2015.

THE FOUR CORNERSTONES OF EVIDENCE-BASED INVESTING

1. CAPITALISM WORKS

In a capitalist society, where individuals and companies own assets rather than the state, capital and labour are put to efficient use with the aim of generating the maximum wealth for those who take on the risk of enterprise. It is assumed that free markets price financial assets effectively and fairly based on supply and demand.

It is accepted that the UK and other developed nations in which clients may invest are broadly capitalist societies, where profits are ultimately expected to flow through to owners.

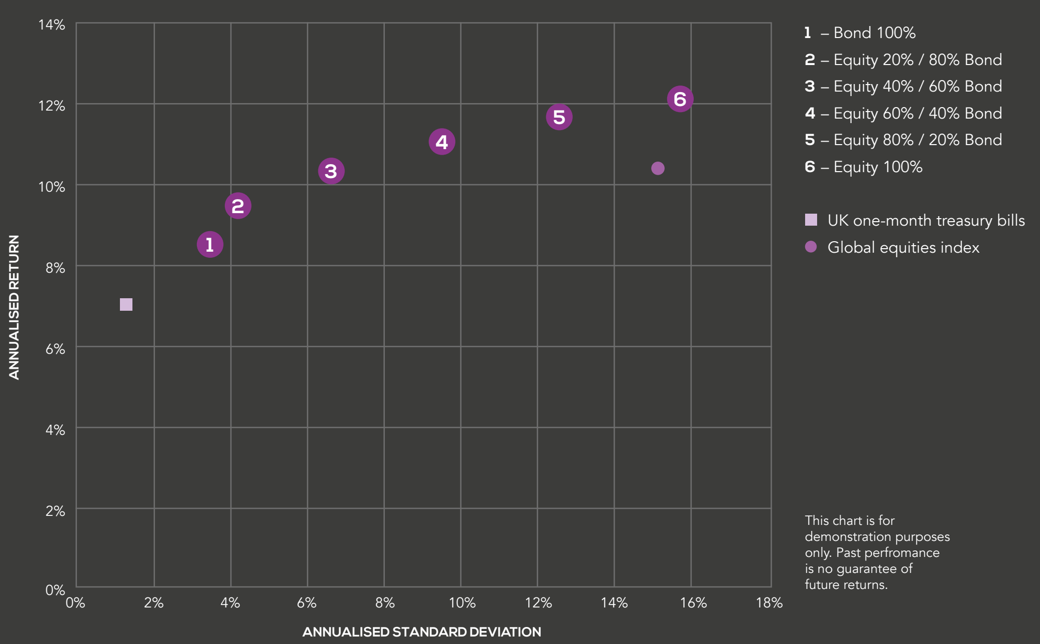
While this may not be the case for a small number of companies (the collapse of Enron, WorldCom, Lehman Brothers, Woolworths and Carillion left shareholders nursing large losses) or some emerging market economies, it is a fair description and expectation.

2. RISK AND REWARD GO HAND IN HAND

A basic underlying assumption is that to achieve a higher level of return an investor needs to assume a higher level of risk. Low levels of risk are often associated with low levels of returns. EBI provides a range of portfolios varying in equity content. Investors can decide which model fits their attitude to risk.

RISK-REWARD CHART

The chart opposite looks at a sample of EBI's World portfolios using simulated data (06/1973 to 05/2018). As equity content increases, the volatility (standard deviation) increases along with annualised returns.



This chart is for demonstration purposes only. Past perfromance is no guarantee of future returns.

3. DON'T PUT ALL YOUR EGGS IN ONE BASKET

Diversification is a risk management technique that mixes a wide variety of investments, covering multiple asset classes and with no bias to a specific industry or segment. The only certainty in financial markets is uncertainty; this really requires the astute investor to take advantage of the diversification benefits available.

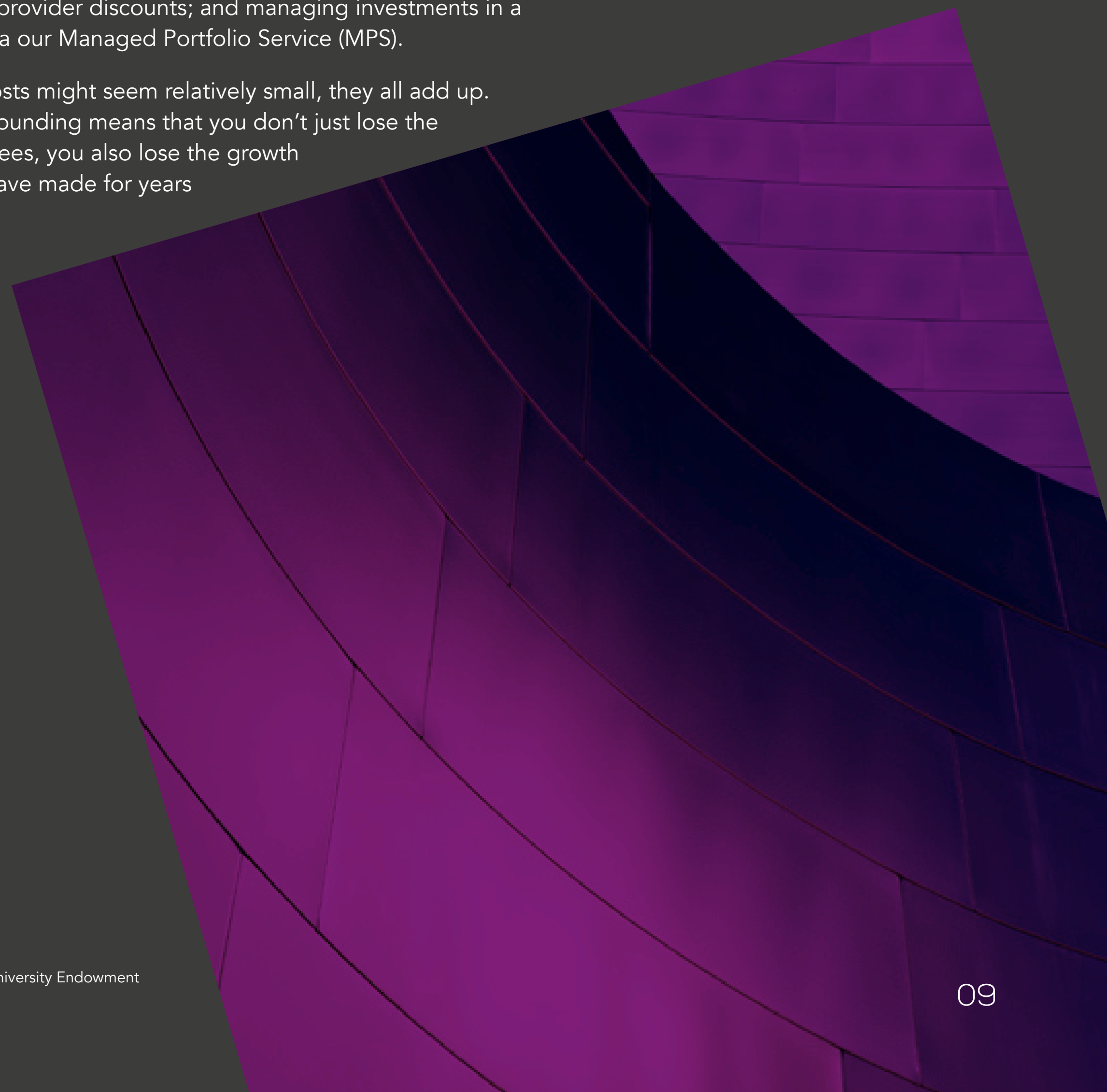
EBI portfolios are highly diversified across 23 developed and 24 emerging market countries, as well as more than 20,000 individual equities and bonds, to increase the opportunity of capturing the benefits provided by capitalism around the world.

> “Sensible investors prepare for a future that differs from the past, with diversification representing the most powerful protection against error in forecasts of expected asset class attributes” [1]
>
> **David Swensen**

4. IDENTIFY AND MINIMISE COSTS OF ALL KINDS

EBI focuses on minimising costs in their widest sense: avoiding the cost of underperformance by an active manager; using low-cost passive strategies; negotiating service provider discounts; and managing investments in a tax aware manner via our Managed Portfolio Service (MPS).

While investment costs might seem relatively small, they all add up. The power of compounding means that you don't just lose the amount you pay in fees, you also lose the growth that money might have made for years to come.



[1] David Swensen, CIO Yale University Endowment

03

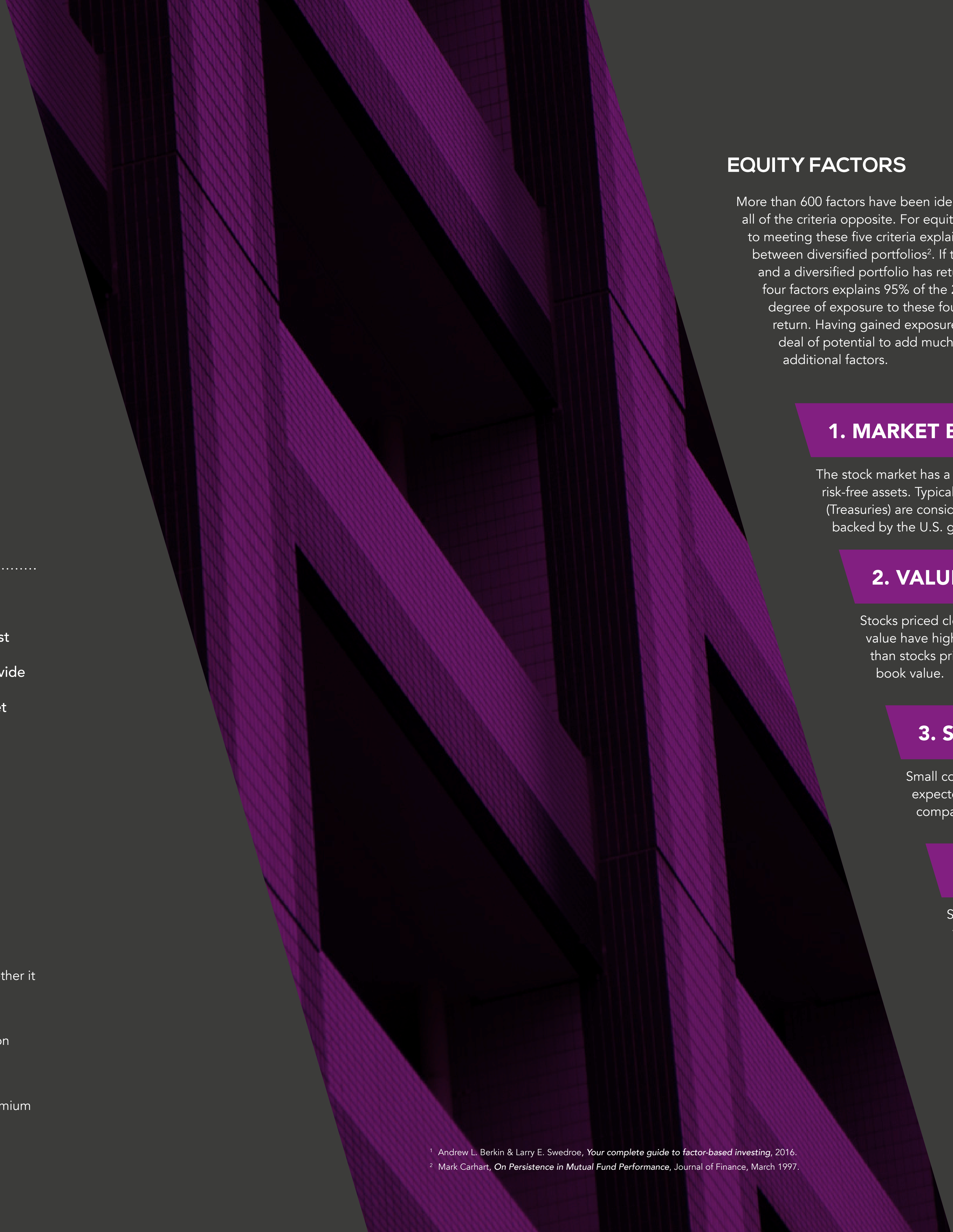
FACTOR-BASED INVESTING

Since the early 1960s, the academic community has been on a quest to uncover the 'secret sauce' of investing – the characteristics of stocks and other securities that both explain performance and provide premiums above market returns. Such characteristics are called factors, which are simply a set of properties common to a broad set of securities. A factor is a quantitative way of expressing a qualitative theme.

Contrary to popular belief, it is the exposure to these factors, and not fund management skill, that determines performance.

To be worthy of exposure, a factor must be[1]:

- PERSISTENT
  It holds across long periods of time and different economic regimes.
- PERVASIVE
  It holds across countries, regions, sectors and even asset classes.
- ROBUST
  It holds for various definitions (for example, there is a value premium whether it is measured by price-to-book, earnings, cash flow or sales).
- INVESTABLE
  It holds not just on paper, but also after considering actual implementation issues, such as trading costs.
- INTUITIVE
  There are logical risk-based or behavioural-based explanations for its premium and why it should continue to exist.



EQUITY FACTORS

More than 600 factors have been identified so far, but only a handful meet all of the criteria opposite. For equities, the four factors that come closest to meeting these five criteria explain 95% of the differences in returns between diversified portfolios[2]. If the market has returned 10% in a year and a diversified portfolio has returned 12%, the exposure to these four factors explains 95% of the 2% difference. Put another way, the degree of exposure to these four factors explains 11.9% of the 12% return. Having gained exposure to these factors, there is not a great deal of potential to add much, if any benefit, through exposure to additional factors.

1. MARKET BETA

The stock market has a higher expected rate of return than risk-free assets. Typically, US short dated government bonds (Treasuries) are considered *risk-free* because they are backed by the U.S. government.

2. VALUE

Stocks priced closer to their book value have higher expected returns than stocks priced far above their book value.

3. SIZE

Small companies have higher expected returns than larger companies.

4. MOMENTUM

Stocks that have performed well tend to continue to perform well, at least for a short period of time.*

* Momentum factor is only available via EBI World portfolios

[1] Andrew L. Berkin & Larry E. Swedroe, *Your complete guide to factor-based investing*, 2016.
[2] Mark Carhart, *On Persistence in Mutual Fund Performance*, Journal of Finance, March 1997.

BOND FACTORS

Academics have also created a factor-based asset pricing model for bonds. However, the bond model is much simpler because only two factors are needed to explain the vast majority of the differences in returns amongst bond portfolios.

1. TERM

Longer-term bonds have higher expected returns than shorter-term bonds.

2. DEFAULT

Bonds with lower credit ratings have higher expected returns than those with higher credit ratings.

The role of fixed income (bonds) is to dilute the volatility of a portfolio. Investors are able to choose a blend of equities and bonds to meet their attitude to risk. Characteristics of the bond element of EBI's portfolios are:

- Globally diversified with more than 10,000 unique securities
- A high average credit quality
- A short average term/duration
- Hedged to avoid currency volatility

EBI avoids excessive exposure to the two factors responsible for higher returns in bonds. This is in line with the evidence that shows using bonds to reduce volatility in an equity/bond portfolio is a superior strategy to chasing returns.

Equities provide a more reliable source of higher expected returns and when equity values fall, shorter dated, higher quality bonds provide more reliable downside protection than longer dated and lower quality bonds.

The bond element of EBI portfolios therefore has a typically shorter duration and higher average credit quality compared to other funds.

Exposure to term risk is limited because the evidence indicates that going beyond four to five years duration yields little more return for considerably greater volatility. Non-investment grade securities are not included and around half of the fund's holdings are rated AAA or AA.

> Diversification is the only free lunch in finance.
>
> **Harry Markowitz**

By diversifying, an investor gets the benefit of reduced risk at no loss in returns. Harry Markowitz's work expounding this notion won him a Nobel Prize and laid the foundations for modern portfolio theory. As the table below shows, diversifying through factors is no different.

Model Portfolio

	1 factor			2 factors			3 factors			4 factors		
Global Equities	100%			80%			60%			40%		
Global Value Equities	0%			20%			20%			20%		
Global Small Co Equities	0%			0%			20%			20%		
Global Momentum Equities	0%			0%			0%			20%		
	£	€	$	£	€	$	£	€	$	£	€	$
Annualised Compound Return	10.39%	7.52%	8.79%	10.63%	7.75%	9.03%	11.46%	8.56%	9.85%	12.12%	9.20%	10.49%
Annualised Standard Deviation	15.10%	15.37%	14.73%	15.05%	15.32%	14.64%	15.10%	15.41%	14.76%	14.86%	15.20%	14.57%
Growth of £1	£85.52	£26.07	£44.31	£94.31	£28.75	£48.87	£132.08	£40.26	£68.43	£171.91	£52.40	£89.07
Worst 12-month Drawdown	-36.6%[1]	-39.4%[2]	-47.1%[3]	-34.5%[1]	-39.7%[2]	-47.5%[3]	-34.0%[1]	-38.8%[2]	-48.0%[3]	-32.7%[1]	-38.2%[2]	-47.7%[3]
Worst 36-month Drawdown	-18.1%[2]	-21.9%[2]	-18.4%[2]	-17.1%[2]	-20.9%[2]	-17.4%[2]	-16.0%[2]	-19.8%[2]	-16.3%[2]	-16.5%[2]	-20.3%[2]	-16.8%[2]

1) UK market Crash 1973/74 2) Tech Wreck 2000/03 3) Credit Crunch 2008/09

Data based on monthly rebalanced portfolios with 100% equity content, June 1973 – May 2018. No costs included. Designed to be used to illustrate historical benefits of diversification using four indices representing returns of four factors. Allocations do not represent those of the EBI portfolios. Advisers should assess the level of equity content to be included in client portfolios. Past performance is not a guide to future returns.

All four equity factors have experienced long periods of under - and over - performance. However, as can be seen here, combining all four factors has not only produced a significant premium in excess of the market – as the evidence tells us to expect – but also with similar volatility. The momentum factor tends to be driven mostly by larger growth stocks. These can often lead to negative correlation with value and small stocks, which helps to smooth returns and lower volatility.

In addition to employing these four factors, EBI portfolios are also further diversified with significant exposure to emerging markets, which have a higher expected return and often have low or negative correlation with developed markets. The portfolios also include global property real estate investment trusts (REITs), whilst not having a higher expected return than developed markets, they do often have low or negative correlation with other equities.

04

BUY-AND-HOLD VERSUS TACTICAL ASSET ALLOCATION

Numerous studies over the past 60 years have shown that successful tactical asset allocation, otherwise known as market timing, is incredibly difficult.

In 1986, a landmark study[1] showed that asset allocation was the overwhelmingly dominant contributor (91.5%) to the total returns of an investment portfolio. Choosing the right stocks or mutual funds was not the main factor (4.6%), while market timing played an even smaller part (1.8%).

Trying to judge when a bear or bull market is about to start or end or when one asset class will perform better than another is futile. To repeatedly succeed at doing this net of the costs incurred by buying and selling securities is nigh on impossible. Investors, including the professionals, typically harm their returns by trading on these sorts of market calls. Research available on the S&P Indices Versus Active (SPIVA) website[2] repeatedly demonstrates this year in, year out.

Many investment managers who claim to be passive, simply by virtue of the fact that they use index funds, are in fact making active investment decisions. Typically, for example, their portfolios have a tactical asset allocation overlay. Regardless of whether you invest via index funds, active funds or individual shares, there is no reliable evidence that tactical asset allocation will deliver higher returns.

Based on this evidence EBI portfolios employ a buy-and-hold policy, only trading to maintain strategic asset allocation within pre-set tolerance bands, or to replace funds with lower cost alternatives. From time to time EBI may look to incorporate new funds to gain exposure to a new factor, but all in all these activities lead to very little trading, reducing transaction costs and thus enhancing returns for investors.

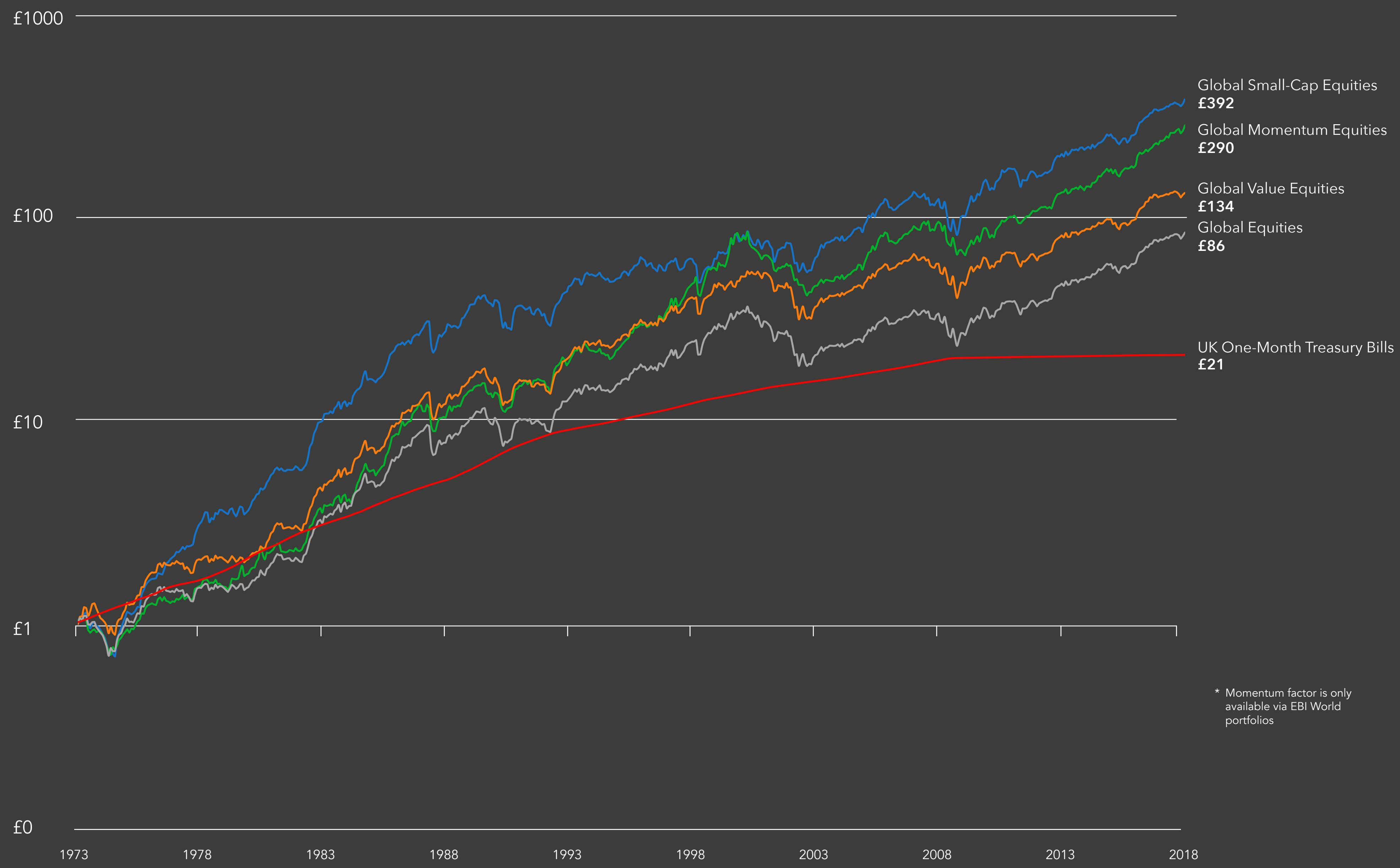
[1] G. P. Brinson, L. R. Hood, G. L. Beebower, ***Determinants of Portfolio Performance***. Financial Analysts Journal. July/August 1986.

[2] S&P Dow Jones Indices, SPIVA. https://us.spindices.com/spiva. Accessed August 2018.

Factor Persistence In US Data, 1927 - 2015 (%)[3]

	1 - YEAR	3 - YEAR	5 - YEAR	10 - YEAR	20 - YEAR
MOMENTUM	73	86	91	97	100
MARKET BETA	66	76	82	90	96
VALUE	63	72	78	86	94
SIZE	59	66	70	77	86

[3] A. L. Berkin, L. E. Swedroe, ***Your Complete Guide to Factor-Based Investing***. 2016.
Past performance is not a reliable indicator of future results.



* Momentum factor is only available via EBI World portfolios

Past performance is not a reliable indicator of future results.

05

BEST-OF-BREED SOLUTION

EBI portfolios are built around a core of ultra low-cost index tracker funds that provide access to most of the world's publically available equities and bonds – the kind of funds that active fund managers have repeatedly been shown to struggle to beat. These core index tracker funds are typically sourced via the world's largest asset managers who have the economies of scale to drive prices down to levels that most fund managers could not achieve. Vanguard and iShares, the two largest asset managers in the world with $9.4 trillion of assets under management between them[1], feature heavily in EBI portfolios.

Index tracker funds typically aim to replicate a benchmark index. In their most efficient form, they track a complete index such as the MSCI Emerging Markets Index or FTSE All Share Index. They can do this with incredible accuracy and for very low cost – as little as 0.05% per annum.

In addition to these 'core' funds, EBI includes additional funds to gain access to various 'factors'. Often index tracker funds can be used to facilitate this, but there is an argument for simply tracking an index not being the most efficient way to gain exposure to a particular factor. For instance, with small cap stocks there may be a good reason not to buy certain stocks on any given day; they may be in short supply and to obtain them (to match the index you are tracking) you may have to pay a sizeable premium.

Dimensional Fund Advisors have been a pioneer since the early eighties in running funds that look to capture factors. They do so not simply by replicating an index, but by employing trading rules that avoid the potential high costs and inefficiencies of clinical benchmark tracking.

What Dimensional Fund Advisors pioneered, and other fund managers such as Vanguard now offer, is not index tracking, but equally it's not active management. They are not looking at any stocks and deciding they like the prospects of one company more than another. Instead, they employ rules-based quantitative stock selection, which over time aims to deliver higher returns (net of fees) than a simple index tracker fund.

EBI model portfolios* include best-in-class funds from Vanguard, iShares, Dimensional and State Street.

*As of July 2019

[1] *Top 400 Asset Managers 2018*, IPE. https://www.ipe.com. Accessed August 2018.

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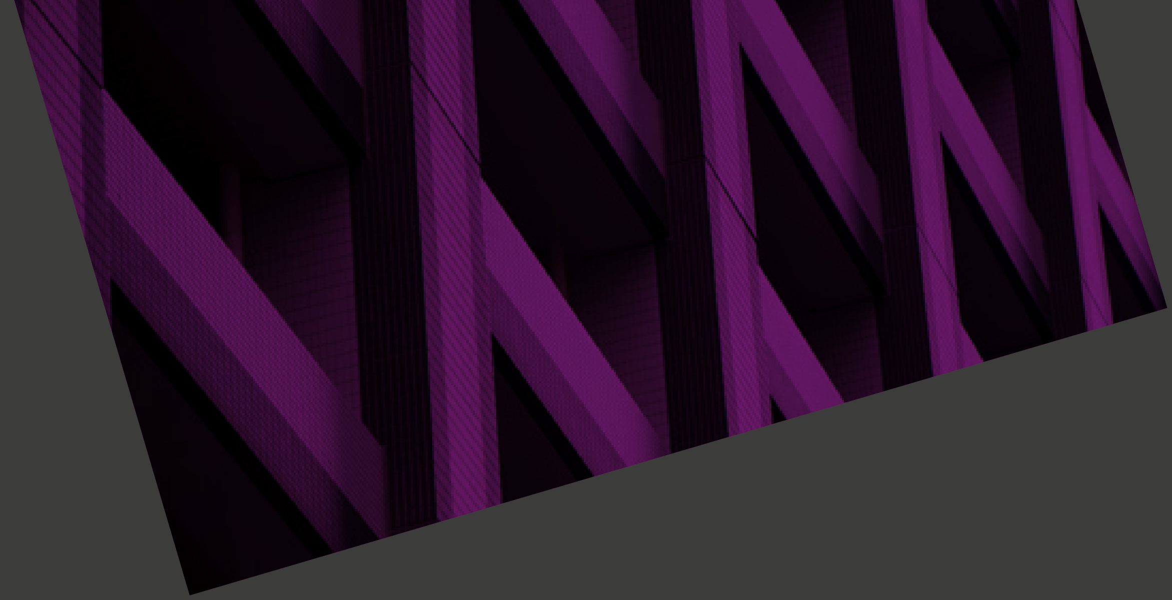


EBI'S PORTFOLIO SOLUTIONS

EBI's portfolio solutions began in 2010 when the UK Bias suite of portfolios was launched. Since then, research, evidence and adviser demand has helped us evolve to create the four low cost, highly diversified suites opposite.

Global portfolios were launched mid-2017 to capture the globally diversified market. The World suite was launched shortly after to additionally capture the momentum factor available via ETFs and further reduce the underlying fund costs.

The latest addition to our range of solutions is the World (Lux) suite of portfolios, providing an offshore solution to advisers overseas.

FIRST A FEW COMMENTS ABOUT THE USE OF ETFS

Portfolios that include ETFs are available via a limited number of platforms* that allow access to ETFs; they can often have prohibitive charging structures. ETFs can also present problems for regular buys and sells and smaller account sizes as they can only be traded as single shares, which means trades can fail.

The UK wrap platform market is slowly reducing the trading costs for ETFs and there is an emerging technology to enable investors to hold fractions of an ETF share, albeit this functionality is only available via a limited number of smaller platforms.

*As of September 2018

1. UK BIAS

The portfolios with a UK bias invest exclusively in collective investment funds, including both open-ended investment companies and unit trusts, but not exchange-traded funds (ETFs). There is no specific need for ETFs as all asset classes can be accessed via mutual funds. The equity portfolio has a bias to UK holdings and is further diversified with exposure to emerging markets and global property.

The portfolios have a significant weighting to value and small cap stocks. There is no exposure to momentum stocks as no suitable funds are available.

Due to the limited availability of UK value, UK small cap and international value (ex-UK) factor funds, Dimensional Fund Advisors features heavily in this suite of portfolios as it is the sole provider of such funds.

These portfolios are suitable to investors who would prefer to have a significant weighting in UK stocks, which is how most portfolios for investors residing in the UK have traditionally been built. As there are no ETFs in these portfolios, they are also suitable for smaller portfolio sizes and smaller regular buys or sells.

2. GLOBAL

The Global portfolios, as the name suggests, invest more broadly throughout the world with the allocation to UK stocks being reduced closer to its market cap.

Global portfolios have the same allocation to emerging markets, global property, value and small cap stocks as the UK Bias portfolios. They also have no exposure to momentum stocks and therefore do not include ETFs.

These portfolios will appeal to investors who would prefer to have a more globally diversified portfolio; this is now generally regarded as a superior strategy to having an overweight holding in any given country, such as the UK. Again, as there are no ETFs, these portfolios are also suitable for smaller portfolio sizes and smaller regular buys and sells.

3. WORLD

The World suite of portfolios builds on the Global suite by including ETFs. This gives access to a wider range of funds and helps to reduce costs. In addition, these portfolios also allow access to the momentum factor, which is only available via ETFs.

Because of the inclusion of ETFs, careful consideration should be given to the appropriateness of using the World suite; often the UK Bias or Global portfolios are a more suitable option.

World portfolios will appeal to investors who would prefer to have a more globally diversified portfolio including momentum equities. World portfolios are only likely to be suitable for larger investments and where smaller regular buys or sells are not required.

4. WORLD (LUX)

Available via Pictet (a globally recognised custodian), these portfolios are very similar to the World suite and are suited to clients who require their portfolios to be invested offshore. By partnering with Pictet to provide custody, EBI meets strict Luxembourg rules on managing assets for investors who are investing via offshore bonds provided by life insurance companies.

These portfolios are typically suitable for non-domiciled investors living outside the UK and for UK investors who require their investments to stay offshore. Typically, depending on the source of the funds (offshore bond, QROPS, 401k, direct investment) the minimum portfolio size is between £250k and £1m.

SUMMARY OF PORTFOLIOS AVAILABLE FROM EBI

	UK Bias	Global	World	World (Lux)
Number of portfolios available	11[i]	11	11	5[ii]
Income and accumulation versions	Yes	Yes	Yes	No
Available currencies	£	£	£	£, €, $
Includes ETFs	No	No	Yes	Yes
Widely available on UK wrap platforms[iii]	Yes	Yes	Limited	No
Typical OCF for 60% equity portfolio	0.24%	0.22%	0.19%	0.21%

[i] An all bond portfolio, followed by 10% increments of equity and an all equity portfolio
[ii] 20%, 40%, 60%, 80% and 100% equity portfolios
[iii] Contact us for a current list of wrap platforms on which EBI portfolios are available

07

SOURCES AND DESCRIPTION OF DATA

Global Value Equities. 06/1973 – 12/1974; Fama French US Value Research Index. 01/1975 – 06/2018; World Value Index

Global Small Co Equities; 06/1973 – 05/1994; Dimensional Global Small Cap Index. 06/1994- 05/2018 All Country World Small Cap Index

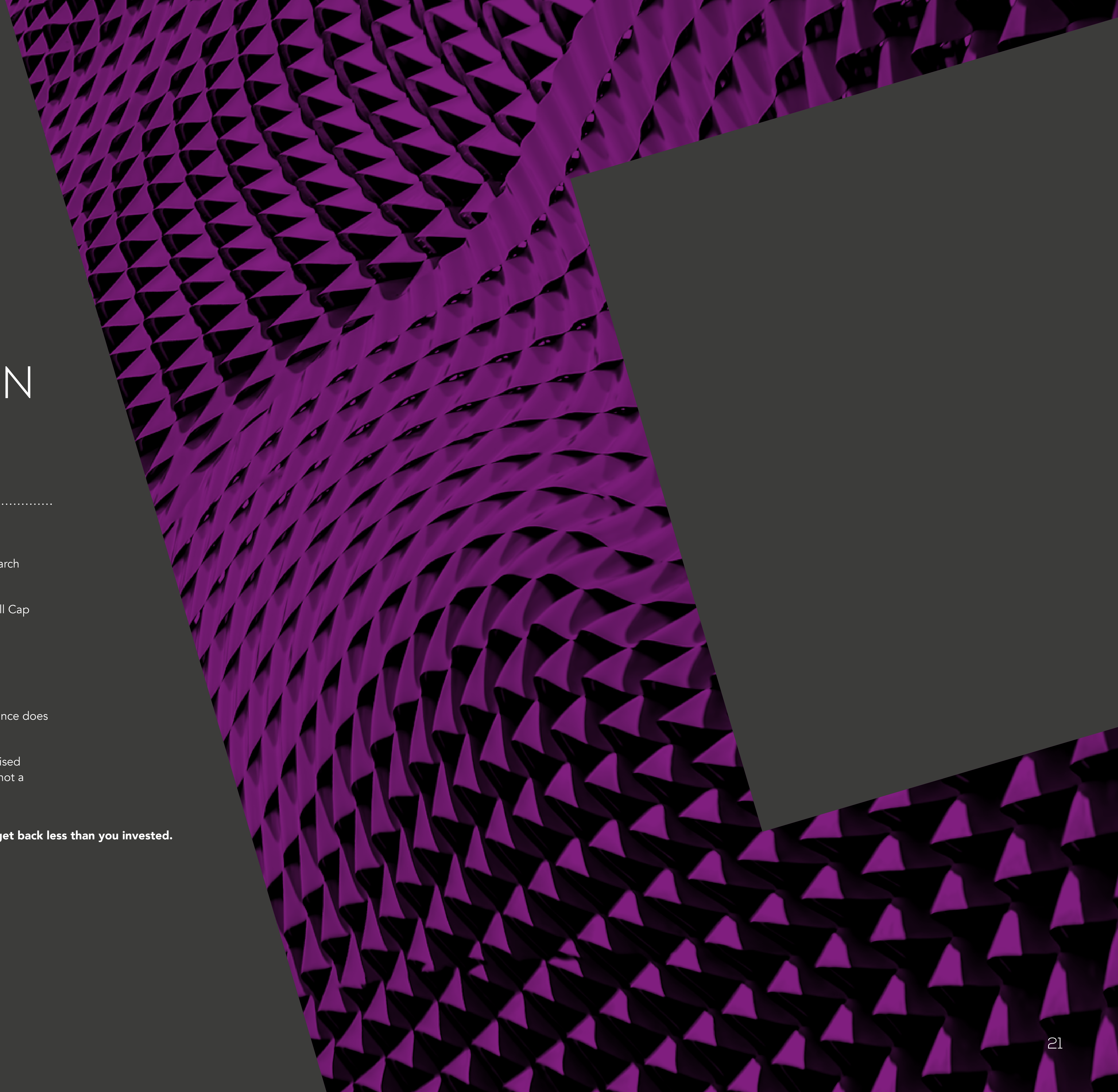
Global Momentum Equities; World Momentum Index

Global Equities; World Index

Indices are not available for direct investment; therefore, their performance does not reflect the expenses of investing via an index fund.

This material has been distributed by EBI Portfolios Ltd, which is authorised and regulated by the Financial Conduct Authority. Past performance is not a guarantee of future returns.

The value of investments can go down as well as up, so you could get back less than you invested.



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MORE INFORMATION

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