A Portfolio of Exchange Traded Funds

Summary

- We manage a 'cautious' portfolio of ten global index trackers funds, following indices like the FTSE 100, the S&P 500 and BRIC. Our trackers are well-known exchange traded funds (or 'ETFs') operated by iShares.
- As an active overlay, we switch the amount allocated to each ETF between being 100% invested and 100% in cash. We buy an ETF when, to us, the underlying market appears to be weak; we then sell when, to us, the underlying market appears to be running ahead of itself.
- We expect to spend around half of the time in cash and half of the time invested, justifying a 'cautious' rating.
- Our 'aim' is to beat 3-month LIBOR by 5%.
- Our latest simulated results for the year to 31 December 2016 show an average return of 19.45%.

Age Profiling and Asset Allocation

According to conventional wisdom, as investors get older they should gradually switch their portfolios out of equities and into high grade fixed income. This asset allocation 'rule' made sense when fixed income funds were making 5% or 6%. The trouble is that those sorts of rates are all but forgotten.

Interest rates remain low. At the end of 2016, 10 year UK Government Bonds were yielding just over 1% and many fixed income investors were losing a little to inflation. We therefore feel justified in testing this particular aspect of conventional wisdom.

Actively Managed ETFs

Our alternative approach is to take a certain amount of equity risk with what would normally be our fixed income asset allocations, hoping to improve our returns. To compensate, our risk-adjusted target is to beat 3-month LIBOR by 5%.

As a UK investor, we like £-based ETFs. We particularly like iShares which track major indices like the FTSE 100, the S&P 500 and BRIC. We follow **ten** global equity markets, made up of **six** developed market trackers and **four** emerging market trackers. Our maximum exposure to each of these markets is **10%**, giving us all the diversification we need, plus instant liquidity.

We have developed a technique for buying various stock market trackers when we assess the underlying market is weak, in other words buying when (to us) the odds of losing seem diminished. While invested, we track the underlying index (up and down).

We sell when we believe a market is running ahead of itself, taking profits when we can. Periods spent in cash are designed to avoid market falls. When a market fall is successfully avoided, we generate 'alpha' (and vice versa). Sometimes our whole portfolio is in cash, sometimes our whole portfolio is 100% invested (when we hold all ten of our ETFs).

Most of the time we are in between these two extremes and we would expect to spend around half of the time in cash and half of the time invested, equivalent (in our mind's eye) to an equity risk of around 50%. To us, this is a 'cautious' approach; in contrast, passive index tracking represents a 100% equity risk.

Our technique is all about timing and it we accept it is not as easy as it sounds. Our process involves too many calculations to do all the sums quickly, so we've written a computer programme which does nearly everything for us. Technically, this makes Warnborough an algorithmic investor, a sort of quant.

The Risks

The pitfalls? Sometimes we miss a buy signal, thereby missing on an upswing which could last for months. This is what happened to us in the UK market in June 2016.

Similarly, when a market suddenly takes off, we can mistake early exuberance for the top of the market. Sometimes we sell before the real action stops and this is what happened in China in most of 2016.

We regard failing to buy and selling too early as 'sins of omission', comforting ourselves with the thought that it's difficult to lose money when you're in cash.

Our greatest fears concern sins of 'commission', typically buying too early and then watching a single market or even several markets collapse. Our arithmetic approach does not include any stop-loss mechanism (we have found that all too often stop-losses result in selling 'at the bottom'), so we can find ourselves holding a market all the way down, and our performance suffers accordingly. This is what happened when we invested in China in July 2015, just before the index fell by nearly 12.5% in August and September. Luckily, on that occasion, the market in China recovered substantially in October 2015, when we sold for a small loss. However, with our technique, book losses are frequent, and some realised losses are inevitable.

To balance against these risks, it's fair to say that sometimes our technique beats the returns available from just buying and holding a tracker, but this is not generally the case. Most of the time our trades record modest gains and losses.

Back Tests

One hidden risk is that once a year, in January, we 'rewrite history' by re-optimising our buying and selling margins to the previous-but-one December. So, at the beginning of 2017 we re-optimised the performance of our managed funds to the end of 2014, the latter date becoming the end of the 'learning period' of our most recent 'back test'.

Following re-optimisation, we have two years of ‘simulation’ to reassure ourselves that our revised back test results are not just flukes.

The theory is that these minor annual refinements should improve our decision-making ‘next time’. However, this annual rebasing causes divergence between our most recent simulations and our historic actual results, usually by including one or two fortuitous recent prompts that in real life were narrowly missed.

To return to our earlier examples, firstly, in June 2016, in real life we missed the post-Brexit rally in the UK market, but when we re-optimised in January 2017, our latest simulation shows us investing the week before the vote. However, when we re-optimised, we did not avoid the fall in China in August and September 2015 and we still sold too soon in 2016, as discussed above.

The nub of our research is to find out whether our timing algorithm is mainly wise in retrospect, post re-optimisation. Or will our technique will achieve its target of LIBOR plus 5% during the next prolonged downswing, when most stock market trackers will turn negative? As they say, we live in interesting times.

Simulations

The simulated results in this article are based on our latest back tests to 31 December 2014. The performance of most of our managed ETFs have been optimised over 8 years (the more recently launched ETFs can only be optimised over 7 years), and every year our ‘learning period’ increases. Up to the end of our ‘learning period’, our optimised results are unavoidably flattering and are therefore shaded grey in the attached appendices.

Because they have not been optimised and are therefore outside the ‘learning period’ of our algorithm, the results for 2015 and 2016 are ‘simulations’. However, our most recent ‘simulations’ for 2016 show better returns than our actual 2016 results.

In summary, our current simulation shows that for the year to 31 December 2016, we spent 55% of the time invested and 45% of the time in cash, thereby maintaining our ‘cautious’ aim.

The returns of our individual funds ranged between 39.79% in our LTAM Fund (maximum) and 5.34% in our China Fund (minimum). All our funds made positive returns and the average fund performance was a return of 19.45%.

During the same period, the average tracker performance was 27.00%. Only 3 of our managed funds exceeded the performance recorded by their underlying trackers. Overall, our managed funds underperformed the average tracker return by 7.55%. In steeply rising markets, like 2016, passive investing has few peers.

Track Record

For regulatory convenience, we only publish simulated results, noting that our simulated and actual results continue to converge as time goes on.

The results in the attached appendices are normally updated at the end of each quarter, and will reflect our actual trades in 2017.

Behind the scenes, we started running an internal demonstration portfolio at the beginning of 2015. In 2016, things worked out reasonably well for us. Our portfolio returned less than the simulated 2016 result discussed above, but our average total return was ahead of our target of LIBOR plus 5%.

Marketing

To engage with potential investors, we publish a ‘Morning Report’ and a ‘Weekly Report’, showing our simulated performance on a rolling one-year basis and including our current actual positions and latest trades. For enthusiasts, a more detailed daily ‘Evaluation Report’ is available on request.

Most investors need to see a three-year track record for a new algorithmic process before even considering investing, as algorithms always work better in back tests than in real time. Accordingly, we will continue to run our demonstration portfolio until further notice.

We have been recording our actual results since early 2015, based on decisions using whatever version of our algorithm was in force at the relevant time. These results can be made available on request.

Back Test: Monthly Results

Appendix 1 of 2

LTAM Fund - Year to end of Q4 2016: 39.79%

LTAM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	10.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.74%	-0.97%	11.71%
2013	0.00%	0.00%	0.00%	0.00%	0.00%	-1.19%	-0.55%	-5.34%	11.17%	0.00%	0.00%	0.00%	3.40%	-16.88%	20.28%
2014	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.59%	-0.81%	-8.99%	-6.49%	-10.53%	4.04%
2015	-2.81%	2.21%	-4.63%	7.34%	0.00%	0.00%	0.00%	7.10%	-8.05%	10.22%	0.00%	0.00%	10.37%	-29.89%	40.26%
2016	5.08%	7.20%	10.42%	0.00%	-1.18%	10.81%	0.00%	0.00%	0.00%	0.00%	-0.50%	3.16%	39.79%	54.95%	-15.16%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

UK Fund - Year to end of Q4 2016: 26.97%

ISF	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	2.18%	2.91%	0.00%	2.23%	-8.38%	5.22%	3.99%	3.18%	4.05%	0.00%	3.16%	0.08%	19.45%	5.90%	13.55%
2013	3.08%	0.00%	0.00%	2.59%	4.74%	-3.18%	6.09%	0.00%	0.00%	5.38%	0.00%	2.48%	22.87%	13.58%	9.29%
2014	-0.08%	4.52%	0.59%	3.02%	0.00%	0.00%	0.00%	3.37%	-2.35%	-1.53%	2.54%	2.53%	13.09%	-2.33%	15.42%
2015	2.84%	0.41%	0.00%	0.00%	1.53%	-5.99%	2.22%	-7.33%	-2.53%	4.88%	0.81%	3.12%	-0.78%	-5.41%	4.63%
2016	-2.64%	1.11%	0.87%	2.53%	3.33%	6.80%	4.36%	2.05%	2.10%	1.53%	0.23%	2.13%	26.97%	14.11%	12.86%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Japan Fund - Year to end of Q4 2016: 25.39%

IJPN	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	3.39%	4.41%	1.07%	-5.90%	-3.82%	3.30%	-3.20%	-0.78%	-0.89%	-1.12%	3.15%	3.36%	2.36%	2.37%	-0.01%
2013	5.39%	7.09%	1.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.34%	23.77%	-9.43%
2014	-1.40%	0.02%	-1.53%	-4.20%	4.95%	2.11%	1.08%	-0.12%	1.87%	3.48%	-0.94%	-2.16%	2.81%	-1.66%	4.47%
2015	5.85%	3.94%	7.37%	0.00%	1.97%	-4.16%	1.05%	-3.45%	-5.97%	6.49%	2.76%	0.61%	16.59%	13.47%	3.12%
2016	-2.73%	-1.97%	1.09%	-2.08%	3.91%	7.36%	4.52%	2.49%	3.47%	4.62%	2.06%	0.60%	25.39%	21.76%	3.63%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

USA Fund - Year to end of Q4 2016: 23.71%

IUSA	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	1.53%	3.04%	2.96%	-2.21%	-1.88%	2.20%	2.40%	0.38%	0.27%	-1.90%	0.89%	-2.22%	5.35%	5.35%	0.00%
2013	9.93%	5.68%	3.07%	-0.74%	6.45%	-2.76%	3.87%	-0.80%	-1.43%	5.75%	0.57%	0.82%	33.97%	29.24%	4.73%
2014	-2.41%	2.30%	0.83%	-0.81%	2.92%	0.32%	0.42%	4.61%	1.49%	2.90%	0.75%	0.00%	13.94%	19.95%	-6.01%
2015	0.00%	0.00%	0.00%	0.00%	0.00%	-1.50%	2.74%	-4.32%	-2.31%	7.06%	2.87%	-0.23%	3.93%	3.87%	0.06%
2016	-2.71%	3.91%	0.13%	0.00%	2.02%	8.50%	3.01%	0.00%	0.00%	0.00%	3.91%	3.14%	23.71%	31.71%	-8.00%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Euro 450 Fund - Year to end of Q4 2016: 21.52%

IMEU	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	0.00%	0.00%	0.00%	0.00%	-0.50%	5.89%	0.04%	2.84%	4.08%	0.00%	0.00%	0.00%	12.81%	10.74%	2.07%
2013	0.00%	0.00%	0.00%	0.00%	0.00%	3.57%	6.04%	-3.00%	2.28%	4.56%	0.00%	0.00%	13.93%	19.37%	-5.44%
2014	0.87%	4.96%	0.00%	0.00%	0.00%	0.00%	0.00%	4.54%	1.68%	1.12%	3.07%	1.68%	19.26%	-2.77%	22.03%
2015	3.32%	3.38%	2.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.09%	14.20%	-0.06%	14.26%
2016	-3.24%	-0.46%	3.19%	3.42%	3.45%	4.23%	4.85%	3.01%	0.00%	0.00%	-2.62%	4.23%	21.52%	15.19%	6.33%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Warnborough (results calculated on 5 January 2017)
Benchmarks: Passive holdings in the relevant underlying ETF

In these Appendices, the results up to and including 31 December 2014 are from optimised long term back tests (and are shaded grey; subsequent simulations are not shaded). Results are shown after representative dealing costs and spreads but before any theoretic fees or other external fund management costs. Cash returns of 0% are assumed throughout.

Back Test: Monthly Results

Appendix 2 of 2

World Fund - Year to end of Q4 2016: 21.52%

IWRD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	2.78%	3.46%	1.25%	-2.95%	-4.52%	3.37%	1.95%	0.53%	0.53%	-0.52%	1.34%	-0.37%	6.70%	6.70%	0.00%
2013	8.83%	4.20%	2.07%	0.50%	4.66%	1.32%	5.36%	-4.76%	0.42%	5.10%	-0.61%	0.54%	30.54%	22.89%	7.65%
2014	-3.01%	3.04%	0.45%	-0.38%	2.26%	0.00%	-0.15%	2.94%	0.07%	1.72%	4.00%	-0.66%	10.54%	10.54%	0.00%
2015	1.16%	2.65%	2.67%	-1.35%	0.17%	-4.86%	2.22%	-4.91%	-3.11%	6.25%	2.22%	-0.68%	1.84%	1.84%	0.00%
2016	-2.83%	2.34%	1.12%	0.00%	1.89%	5.17%	0.00%	0.00%	3.17%	3.88%	1.90%	3.27%	21.52%	26.84%	-5.32%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Emerging Fund - Year to end of Q4 2016: 12.78%

IEEM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	9.43%	0.00%	0.00%	0.00%	0.62%	3.14%	2.00%	3.04%	0.00%	0.00%	0.00%	0.00%	19.35%	9.54%	9.81%
2013	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	1.39%	-4.78%	2.92%	5.46%	-3.29%	-2.07%	-0.51%	-7.35%	6.84%
2014	-7.72%	2.20%	4.28%	0.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.96%	5.13%	1.06%	4.07%
2015	3.36%	1.25%	1.81%	6.78%	0.00%	0.00%	0.00%	1.78%	-2.01%	4.58%	-0.27%	-2.42%	15.46%	-13.65%	29.11%
2016	-2.34%	2.76%	9.10%	-1.93%	-3.10%	4.58%	0.00%	0.00%	0.00%	0.00%	2.08%	1.53%	12.78%	31.66%	-18.88%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Euro 50 Fund - Year to end of Q4 2016: 10.26%

EUE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	0.00%	0.00%	0.00%	-2.63%	-8.55%	8.40%	8.67%	5.63%	3.82%	0.00%	6.18%	0.06%	22.21%	11.65%	10.56%
2013	0.00%	0.00%	-0.75%	3.90%	2.34%	4.21%	5.98%	1.73%	6.52%	0.00%	0.00%	0.00%	26.30%	20.52%	5.78%
2014	-0.46%	4.50%	1.21%	0.53%	2.10%	-1.63%	-6.31%	1.36%	1.99%	-1.22%	2.61%	3.86%	8.38%	-5.03%	13.41%
2015	2.49%	3.84%	3.05%	0.00%	1.27%	-4.60%	1.74%	-5.67%	-4.50%	7.31%	0.00%	2.89%	7.22%	-1.94%	9.16%
2016	-3.42%	-1.62%	4.76%	0.00%	1.92%	2.58%	3.43%	0.00%	0.00%	0.00%	-2.02%	4.54%	10.26%	16.94%	-6.68%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

BRIC Fund - Year to end of Q4 2016: 7.28%

BRIC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	11.33%	0.00%	0.00%	0.00%	1.64%	3.17%	2.08%	-2.67%	2.64%	-0.56%	0.73%	5.42%	25.71%	4.18%	21.53%
2013	3.89%	0.00%	0.00%	0.00%	0.00%	-0.36%	2.86%	-2.85%	4.33%	1.81%	-1.20%	-3.72%	4.53%	-7.73%	12.26%
2014	-8.41%	1.51%	2.01%	-2.96%	7.04%	1.39%	3.42%	5.19%	5.10%	0.00%	0.00%	7.87%	23.20%	-0.16%	23.36%
2015	4.90%	4.43%	0.57%	11.12%	0.00%	0.00%	0.00%	4.65%	-3.21%	3.82%	-1.50%	-2.19%	24.03%	-9.99%	34.02%
2016	-4.68%	0.92%	6.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.95%	0.82%	7.28%	37.09%	-29.81%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

China Fund - Year to end of Q4 2016: 5.34%

FXC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Benchmark	Alpha
2012	10.92%	0.00%	-6.59%	1.84%	-7.35%	0.92%	3.16%	1.60%	1.62%	5.65%	2.33%	6.11%	20.55%	8.91%	11.64%
2013	2.62%	0.00%	0.00%	2.30%	3.51%	1.34%	4.97%	4.00%	0.00%	-0.09%	4.28%	-5.64%	18.19%	-5.76%	23.95%
2014	-8.86%	1.02%	1.79%	-0.56%	6.40%	0.44%	10.55%	0.48%	0.00%	0.00%	0.00%	0.00%	10.63%	17.48%	-6.85%
2015	0.00%	0.00%	8.23%	0.00%	0.00%	0.00%	0.09%	-10.98%	-1.65%	9.73%	0.00%	0.59%	4.68%	-11.86%	16.54%
2016	-8.52%	0.17%	7.81%	4.08%	4.02%	1.87%	0.00%	0.00%	0.00%	0.00%	0.73%	-4.02%	5.34%	19.74%	-14.40%
2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Warnborough (results calculated on 5 January 2017)
Benchmarks: Passive holdings in the relevant underlying ETF

In these Appendices, the results up to and including 31 December 2014 are from optimised long term back tests (and are shaded grey; subsequent simulations are not shaded). Results are shown after representative dealing costs and spreads but before any theoretic fees or other external fund management costs. Cash returns of 0% are assumed throughout.

Notices

The performance figures shown in this article refer to **simulated holdings** only in exchange traded funds ('ETFs') managed by Warnborough Asset Management Limited ('**Warnborough**') using the latest version of its own proprietary decision making software, as modified from time to time, collectively referred to as its 'timing algorithm'. An ETF managed using this algorithm is referred to as an 'actively managed ETF' or one of 'our funds'. A new fund of actively managed ETFs is postulated but it has **not** been launched. The simulated performance figures shown here do not purport to be an indication of the potential returns of such a new fund.

Past performance is not a reliable guide to future performance. The value of investments and the income derived from them may go down as well as up. Any new fund may be affected by changes in currency exchange rates. Investors may not get back the amount originally invested.

The opinions expressed here should not be relied upon as indicating any guarantee of return from an investment in any new fund. The information contained in this document is for illustrative purposes only and should not be viewed as a recommendation to buy or sell stocks.

The following risk factors would probably apply to any new fund:

- Any new fund would invest in ETFs run by major financial companies and these institutions would represent the fund's main counterparty risk. All ETFs carry their own structural, financial and replication risks. In particular the investment return and principal value of an ETF will fluctuate with changes in market conditions. Shares in ETFs may be worth more or less than they cost at time of redemption. Small and mid-cap stocks held by ETFs are more volatile than large-cap stocks. There are additional risks associated with international investing, such as increased custodial risks, currency fluctuations, economic and political instability, and more volatile markets. These risks may be even greater in emerging markets. Emerging market ETFs are generally not as diversified as other ETFs in developed markets, and as a result tend to be more volatile.
- Any new fund would invest its temporary cash balances in deposits with a panel of banks, making such banks the fund's second most important counterparty risk.
- Wherever reasonably possible, our funds avoid derivative risk. While the use of derivatives can be beneficial, derivatives can also involve risks which are greater than the risks presented by more traditional investments. On balance, Warnborough believes derivatives are best avoided.
- **The success of any new fund would be highly dependent on the ability of Warnborough's employees to design and run a timing algorithm and the success and longevity of Warnborough's proprietary decision making software.**

For more information, please contact Warnborough. Warnborough is **not** a regulated company in the UK. Warnborough has **not** been registered under the United States Investment Company Act of 1940 (as amended), nor the United States Securities Act of 1933 (as amended). **None** of the shares in any new fund would be offered or sold, directly or indirectly, in the United States or to any US Person. A US Person is defined as (a) any individual who is a citizen or resident of the United States for federal income tax purposes; (b) a corporation, partnership or other entity created or organized under the laws of or existing in the United States; (c) an estate or trust the income of which is subject to United States federal income tax regardless of whether such income is effectively connected with a United States trade or business.

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