

The impact of being out of the market

Vanguard Research Note | July 2018

- Although equity market volatility can prompt interest in market-timing strategies, empirical research suggests that these strategies have generally failed.
- We conducted a simulation that sheds additional light on the challenges of market-timing and its probability of success.
- The top performers in this simulation delivered excess returns as high as 1.6%–2% per year, but the median investor underperformed a buy-and-hold strategy. The worst performers underperformed by more than 3.5 percentage points per year. The best strategy for the typical investor is to remain invested year round.

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When equity markets tumbled in January, many investors might have been tempted to withdraw from equities altogether. The fact is that there can often be significant pressure to enter the market as it rallies and exit during times of high volatility (Vanguard, 2016).¹ We know this can greatly affect an investor's returns. So, what is the right thing to do? Ride out the storm? Or time the market?

An extensive body of academic (e.g. Henriksson, 1984, Graham and Harvey, 1996, Barber and Odean, 2000) and industry research (Shtekhman *et al.*, 2014) demonstrates that investors have, in general, failed to successfully time the markets.² We conducted a simulation that sheds additional light on these empirical results. The simulation highlights both the potential rewards that motivate these largely unsuccessful efforts and the very low probabilities of success.

In this research note, we define market-timing as moving money in and out of the equity market. We explore the possible range of outcomes for investors engaged in market-timing and compare those outcomes with the performance of a buy-and-hold investor. We estimate the probability of success in meeting different excess return targets and quantify the number of days out of the market that would maximise this probability. The results reinforce the conclusions of earlier research: investors who attempt to time the market face long odds.

¹ See "Vanguard's principles for investing success", United Kingdom, 2016. Vanguard Asset Management, Limited.

² Henriksson, Roy D., 1984 "Market timing and mutual fund performance: An empirical investigation", *The Journal of Business*, Vol. 57, No. 1; Graham, John, Campbell Harvey, 1996 "Market timing ability and volatility implied in investment newsletters' asset allocation recommendations", *Journal of Financial Economics*, Vol. 42, No. 3; Barber, Brad M., Terrance Odean, 2000 "Trading is hazardous to your wealth: The common stock investment performance of individual investors", *The Journal of Finance*, Vol. 55, No. 2; and Shtekhman, Anatoly, Kimberly A. Stockton, Brian R. Wimmer, 2014 "Broader opportunities, same limited results: An analysis of 'go-anywhere funds'", Valley Forge, Pa.: The Vanguard Group.

Data and assumptions

Using data from Morningstar, Inc., we started by considering daily returns of the FTSE All-World Index for a 24-year period (January 1994 through December 2017) and making the following simplifying assumptions:

Being out of the market means investing in cash

Periods where an investor would be considered to be out of the market were assumed to give a 0% return. Whilst investors may typically move out of equities into another asset class such as bonds, we wanted to specifically assess the effect of being out of the equity market.

No transaction costs

In the real world, there would be a series of expenses such as trading costs, brokerage fees and management fees, which would lower an investor's overall return. We assumed no costs involved in entering or leaving the equity market. As a result, the outcomes of our analysis can be considered "best-case scenarios". Actual returns would likely be lower.

Consecutive periods only

We followed an "annual consecutive period" approach, whereby being out of the market would entail a consecutive number of days per year. For example, an investor would be out for 20 consecutive days each year. We considered this to be a reasonable approximation of a typical market-timing strategy.

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Approach and methodology

We randomly sampled an increasing number of consecutive days per year for a hypothetical investor to have been out of the equity market and compared the return at the end of the 24-year period with the actual FTSE All-World total return. We then repeated this for a total of 25,000 simulations to generate a distribution of possible outcomes following the outlined approach. For example, for each simulation we randomly sampled 20 consecutive days per year and assumed the investor to be out of the market for that period. We would then compare the return that this strategy achieved with the return of the overall market.

Results

Our results are shown in **Figure 1**. The median excess return (black dashed line) starts at the origin and is negatively sloped. The intuition is simple: Over a long investment horizon (24 years in our simulation), the equity market will most likely produce a positive nominal return and therefore, on average, a greater number of days out of the market will result in a lower return.

Of more interest is the 99th percentile of returns (the top dark blue line), which represents the performance of an investor who ended up in the top 1% of the distribution of returns. This result, presumably, is what motivates investors to time the market. In our simulation, this “top 1%” investor could have outperformed a buy-and-hold portfolio by 1.8 percentage points annually by being out of the market for roughly 30–40 days each year. (However, note that the median expected outcome is an underperformance of 1 percentage points per year. In addition, if investors instead ended up being in the bottom 1st percentile, they would have underperformed by more than 3.5 percentage points per year.)

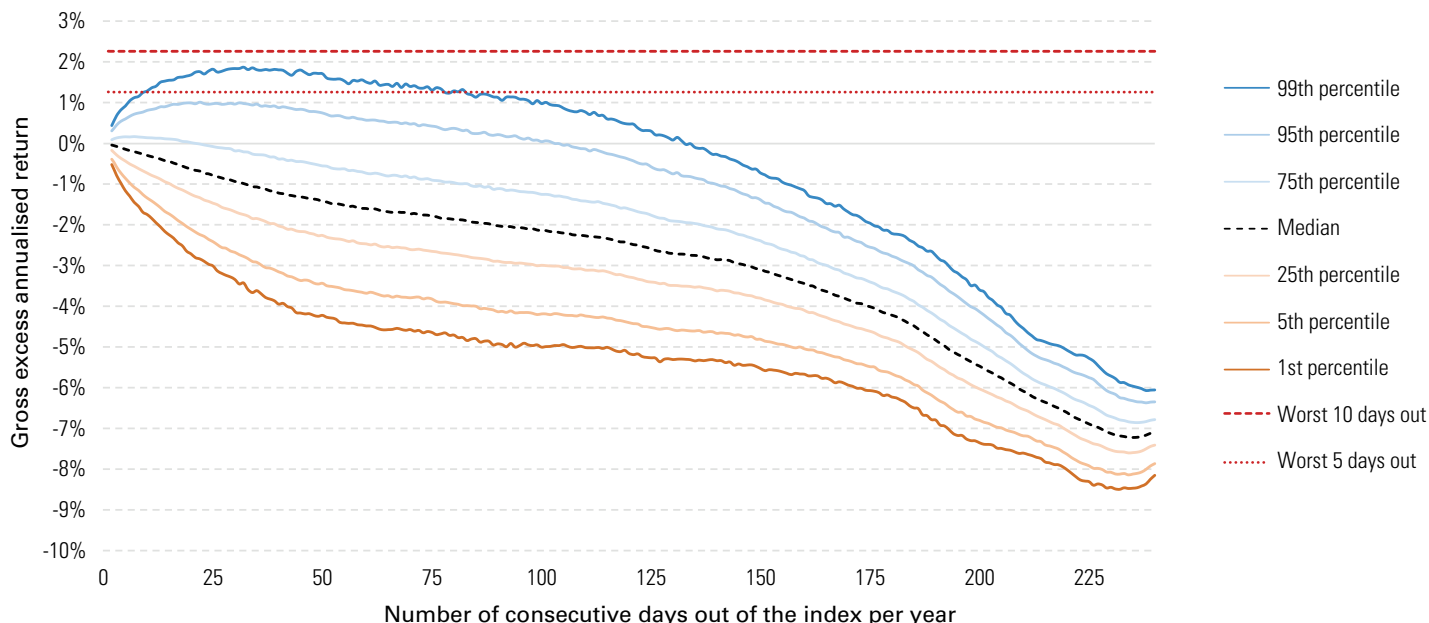
After roughly 135 days, the 99th percentile line in our simulation falls below the buy-and-hold results. This indicates that past a certain point, an investor who is either very lucky or skilled in picking the days out of the index would still have struggled to beat the market.

What does it actually mean to be in the 99th percentile? A review of what this strategy would imply in the real world underscores the challenge.

Figure 1 shows two red dashed lines: these indicate the excess return achieved should an investor have avoided the worst five and ten days out of the market over the entire investment period. We highlight these results to provide context for the equivalent levels of skill in the randomly sampled percentiles. For example, an investor who is in the top 1% of the returns distribution and was out of the market for 40 consecutive randomly picked days a year would have achieved a return higher than that of someone who avoided precisely the worst five downturns and just slightly lower than someone who avoided the worst ten downturns seen by the market over a 24-year period.

It's not impossible, of course, but such clairvoyance is hard to imagine. Such an investor would have a return comparable to that of an investor who avoided some of the worst days of the global financial crisis; a couple of Asian crisis sell-offs; the 2011 Black Monday following Standard & Poor's downgrade of the US sovereign debt, and one of the worst days after the collapse of the dotcom bubble. In effect, this is a tremendous amount of foresight. The key takeaway here is that it requires great skill to provide the level of outperformance that is consistent with the top return percentiles of our randomly picked out-of-the-market days.

Figure 1. Percentile distribution of the gross annualised excess return for 1 to 240 days out of the index each year



Past performance is not a reliable indicator of future results.

Notes: Data cover 1 January 1994 through 31 December 2017.

Sources: Vanguard analysis, using FTSE All-World Index return data from Morningstar, Inc.

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Figure 2. Historical probabilities of outperformance

Days out/ Target	0bps	10bps	50bps	100bps	150bps	200bps
1	43.1%	25.6%	0.7%	0.0%	0.0%	0.0%
5	36.4%	29.3%	9.3%	1.3%	0.1%	0.0%
10	31.8%	26.9%	11.8%	3.2%	0.6%	0.1%
15	28.8%	25.1%	12.9%	4.6%	1.2%	0.3%
20	25.2%	21.9%	11.8%	4.8%	1.8%	0.5%
25	22.6%	19.9%	11.2%	4.9%	1.7%	0.5%
30	20.8%	18.5%	11.0%	5.0%	2.0%	0.7%
35	18.5%	16.4%	9.7%	4.4%	1.8%	0.7%
40	16.6%	14.7%	8.9%	4.3%	1.7%	0.7%
45	15.2%	13.6%	7.9%	3.8%	1.6%	0.6%
50	13.7%	12.1%	7.0%	3.1%	1.3%	0.5%
60	11.0%	9.7%	5.6%	2.5%	1.0%	0.4%
70	9.8%	8.6%	4.9%	2.1%	0.9%	0.3%
80	8.1%	7.0%	4.0%	1.7%	0.6%	0.2%
90	6.7%	5.8%	3.0%	1.2%	0.4%	0.1%
100	5.5%	4.8%	2.5%	1.0%	0.4%	0.1%
110	3.8%	3.2%	1.5%	0.5%	0.1%	0.0%
120	2.3%	2.0%	0.9%	0.3%	0.1%	0.0%
130	1.4%	1.1%	0.5%	0.1%	0.0%	0.0%
140	0.5%	0.3%	0.1%	0.0%	0.0%	0.0%
150	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%

Figure 2 provides a second perspective on the results in Figure 1. In the table, we quantify the probability of outperforming by a given annualised excess return target for a series of days out of the market each year. Using the market returns over our 24-year horizon, we show the historical probabilities of outperforming the market by 0, 10, 50, 100, 150 and 200 basis points (bps) per year. With no skill and by just randomly choosing days out, the probability of beating the market is always lower than 50%. The probability decreases as an investor stays out of the market for longer. However, if a hypothetical investor has a specific excess return target (e.g. 150 bps) and they are willing to take a gamble, the ability to identify the roughly 30 best consecutive days would have maximised the probability of meeting this target. Even so, the probability is just 2%.

Conclusions

The biggest takeaway from our analysis is that the probability of being lucky and outperforming the benchmark is already less than 50% when taking just a few days out of the market. This probability then decays rapidly as the number of days out of the market increases. Unless an investor has great skill and/or luck and the conviction to act on these insights, the most effective approach is to remain invested. Our simulations indicate that, in almost all cases, exiting the market in order to avoid potential downturns will likely produce sub-par results.



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