Investment Concepts

A Collection of Articles

AllQuant

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Seasonality
Old and New January Effect

Written By

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Man's curiosity is insatiable. We need a reason for everything and can never take things as it is. To fulfill our thirst for answers, we will venture into the darkest corners and leave no stones unturned. But unfortunately, many phenomenon in this world, including some stock market anomalies, are still not well understood even today.

Seasonality in stock performance is one of them. Early investors observed that markets seem to behave in a certain way during specific times of the year. For example, in US, stocks tend to do better in January and worse in May. For the latter, there is even a common saying in the market "Sell in May and go away". Even though these seasonal or calendar effects have faded away, they are quite well documented. Among them, the January effect on the US market is probably the most prominent. However, these observations are mere hypothesis as deterministic evidence remain elusive.

What is the big deal about January?

January effect refers to the seasonal rally of the US stock market in, as the name says it, January. The impact seems to be more pronounced for small caps. No one knows exactly why the market behave the way it did. But analysts have postulated a few explanations:

1. Individual investors liquidate losing stocks in December to reduce capital gains tax, and then reinvest the proceeds in January.
2. People invest into the stock market in January after taking their year-end bonus.
3. The start of a new year has a bigger psychological appeal to commence new resolutions which include investing in stocks.

Anyone can try to rationalize and come up with a reason. But at the end of the day, no one can be sure what is really going on. And if you believe that markets are efficient, then such effects should not exist, or at least not for long.

Does January effect apply to the S&P 500?

Records of January effect centers around the outperformance of small caps against the broader market. So has it ever hold for the large cap S&P 500 stocks? To find out out, I used the historical price of S&P 500 index dating back to the 1950s to conduct some analysis. (Note: I am using the price index).

Periods	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1951-1960	0.36%	-0.52%	1.38%	1.53%	0.43%	1.67%	3.46%	-1.46%	-0.90%	-0.06%	2.90%	2.46%
1961-1970	0.89%	-0.19%	1.19%	1.05%	-2.06%	-2.58%	1.51%	0.96%	0.55%	1.50%	1.88%	0.75%
1971-1980	2.58%	-0.46%	0.35%	1.26%	-0.46%	1.26%	-0.33%	-0.19%	-0.88%	-0.19%	0.82%	1.36%
1981-1990	2.12%	0.71%	1.60%	0.99%	1.28%	1.20%	-0.10%	1.48%	-2.02%	0.18%	1.34%	1.49%
1991-2000	1.80%	1.24%	1.51%	1.30%	1.27%	0.94%	1.15%	-0.63%	0.81%	1.79%	0.91%	2.74%
2001-2010	-1.61%	-2.37%	1.05%	2.71%	0.72%	-2.26%	0.34%	-0.18%	-0.95%	0.50%	1.66%	1.24%
2011-2017	0.92%	2.20%	1.18%	0.85%	0.31%	0.19%	1.70%	-0.80%	-0.49%	3.45%	1.27%	1.00%

Average Return Each Month Since 1951 in 10-Year Blocks (except for 2011-2017)

The table above displays the average return of each month over its corresponding 10 year period. As an example, if we look at the period 2001-2010 for the month of January, we get -1.61%. This means that the average return for January over that period is -1.61%. At a glance, January looks fine, but it certainly does not seem to deserve all the attention it is getting. It might have done well from the 70s to 90s but results have since tapered off. If anything, the seasonality "champion" should be awarded to December, November, April or March. The average of these months were consistently positive throughout all the 10-year periods.

Performance Metric	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Monthly Return	1.0%	0.0%	1.2%	1.4%	0.2%	0.1%	1.1%	-0.1%	-0.6%	0.9%	1.6%	1.6%
Monthly Volatility	4.8%	3.5%	3.4%	3.7%	3.6%	3.4%	4.0%	4.6%	4.3%	5.6%	4.3%	3.1%
% Positive Months	60%	55%	64%	70%	58%	52%	55%	54%	43%	60%	69%	75%
Max Monthly Return	13.18%	7.15%	9.67%	9.39%	9.20%	8.23%	8.84%	11.60%	8.76%	16.30%	10.24%	11.16%
Min Monthly Return	-8.57%	-10.99%	-10.18%	-9.05%	-8.60%	-8.60%	-7.90%	-14.58%	-11.93%	-21.76%	-11.39%	-6.03%
Average Return of Up Months	4.22%	2.55%	3.15%	3.18%	2.63%	2.51%	4.00%	3.12%	3.17%	3.96%	3.72%	2.85%
Average Return of Down Months	-3.87%	-2.99%	-2.21%	-2.88%	-3.25%	-2.71%	-2.60%	-3.93%	-3.59%	-3.60%	-3.20%	-2.06%

Performance Metric for each Month Since 1951

And if we look at the entire period since 1951, it is also quite obvious that January is not the most outstanding month. In fact, December is the clear winner. November, April and March are also better off in many of the metrics. Why is December such a stellar month? Maybe investors start positioning themselves in December in anticipation of a rally in January. And when the bulk of the money are put to work in December, then January gets watered down, and the effect fizzles out. Instead, what you get now is a December effect. But by that reasoning, shouldn't December effect also disappear as investors shift to position themselves earlier in November and then in October and so on? To cut it short, I have absolutely no idea why.

It might also be worth to take a look at the month of May. It did not fare too well from the 60s-70s, but the picture turns rosier starting in the 80s. While May's performance looks mediocre, it is definitely not the worst month. August and September, without a doubt, look more miserable. So maybe they should change the saying to "Sell in August and don't come back till October".

How has each month performed since the 1951?

We can get a better picture of how each month performed by creating a NAV series for each month. To understand how these NAVs are created, let me use the January NAV as an example. The NAV of January is constructed by assuming we start with $1 in 1951. We then invest all our capital only during the month of January each year till 2017. In all other months, we sit on cash. For simplicity, let us also assume that these cash does not earn us any interest. The NAVs for the other months are constructed using the same approach.
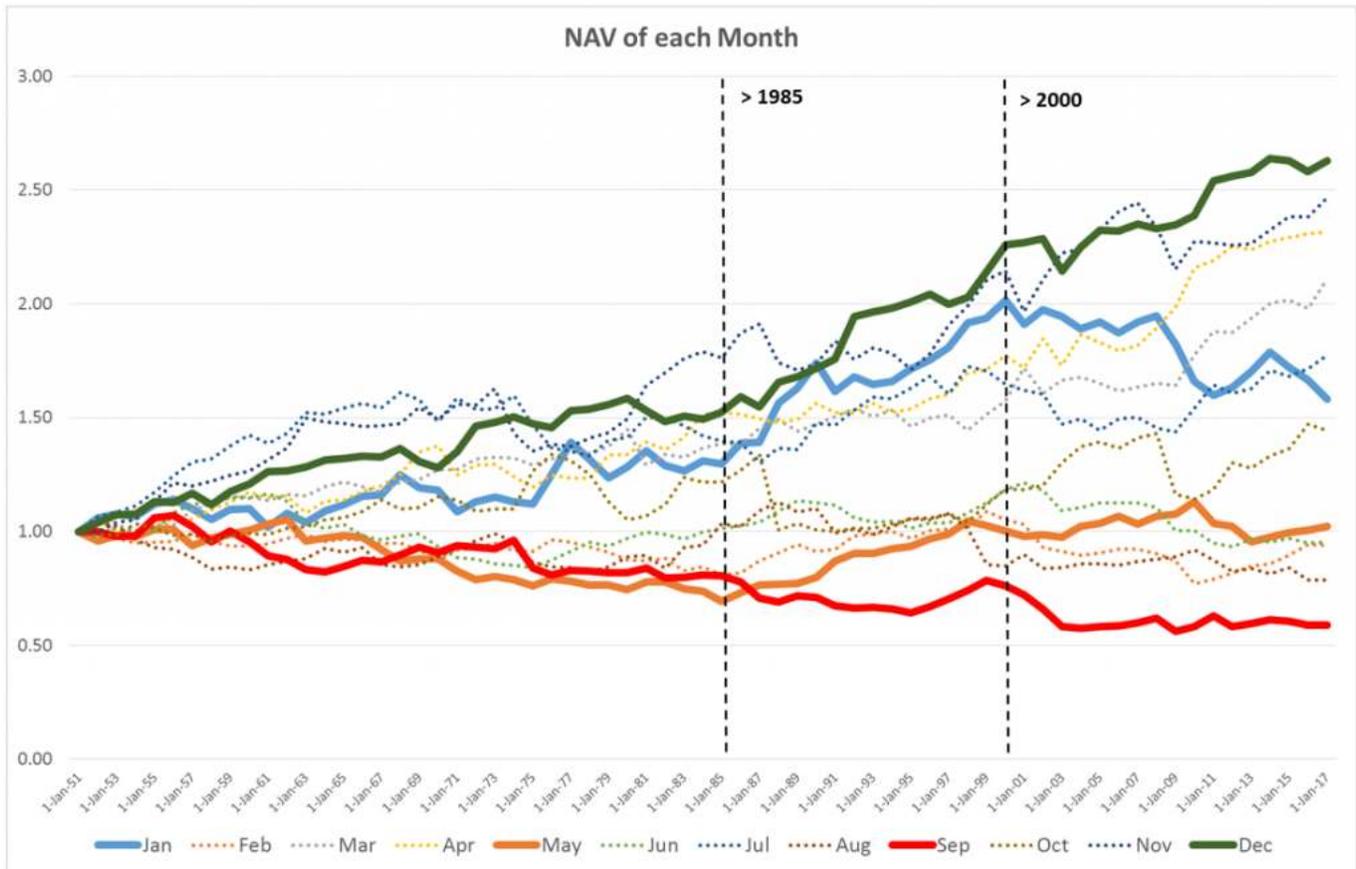
NAV of Each Month (1951-2017)

These NAV series paint a distinct picture. As noted earlier, December is undeniably the leader of the pack. September is also clearly the worst of the lot. Meanwhile, if we look at January, we will notice that all is well until a marked deterioration in its performance after year 2000. And as for the month of May, it is evidently the top loser until the mid-80s where it started trending up. Is it pure coincidence that January and May appear to have the most apparent and extended departure in their paths? Or is this the result of market obsession due to heightened publicity of these 2 months where everyone tries to exploit a known pattern?

I have no answer. But it does not really matters. If we want to make any deductions based on these observations, perhaps all we can say is that the seasonality effects are possibly present earlier from 70s-90s. But as of today, the game has changed and these effects have waned. This should not come as a surprise. If you carry a Nokia or Motorola mobile phone more than a decade ago, they are seen as the in thing. Today, after the advent of smart phones and rise of companies like Apple and Samsung, we hardly hear of Nokia and Motorola anymore. In fact, unable to move fast enough to tackle competition, both have sold off their mobile phone businesses.

A less well-known January effect

There is something a little less well known about January for S&P 500. And what is that?

January looks positively correlated to the total returns delivered by the remaining 11 months. That means that if January is up, there is good chance the total returns of the remaining 11 months is up. The S&P 500 is up 76% of the time between February to December from 1951 to 2017. But if January is a positive month, the odds increases to 88%. In total, there are 40 years with positive January, out of which 35 carry on to churn out profits for the remaining months.

The converse, however, does not seem to work that well. A negative January does not translate to a better chance of the index heading south for the rest of the year. Out of the 27 years that January produce negative returns, only 11 of these headed deeper into the red at year end. The results are summarized in the table below.

January Performance	> 0%	<0%
Number of Years	40	27
Number of Years With Profitable Feb-Dec	35	16
Number of Years With Losing Feb-Dec	5	11
% Profitable Years	87.5%	40.7%

Does statistics back this up?

For those who are interested in how the numbers for each year looks like, you can have a look at the table below. It shows you how much returns S&P 500 made in the period of January and collectively during February-December each year.

Year	Jan	Feb-Dec	Year	Jan	Feb-Dec	Year	Jan	Feb-Dec	Year	Jan	Feb-Dec
1951	6.12%	9.74%	1971	4.05%	6.48%	1991	4.15%	21.27%	2011	2.26%	-2.22%
1952	1.56%	10.07%	1972	1.81%	13.58%	1992	-1.99%	6.59%	2012	4.36%	8.67%
1953	-0.72%	-5.95%	1973	-1.71%	-15.93%	1993	0.70%	6.31%	2013	5.04%	23.38%
1954	5.12%	37.96%	1974	-1.00%	-29.00%	1994	3.25%	-4.64%	2014	-3.56%	15.50%
1955	1.81%	24.16%	1975	12.28%	17.16%	1995	2.43%	30.93%	2015	-3.10%	2.45%
1956	-3.65%	6.50%	1976	11.83%	6.54%	1996	3.26%	16.46%	2016	-5.07%	15.39%
1957	-4.18%	-10.58%	1977	-5.05%	-6.79%	1997	6.13%	23.44%	2017	1.79%	17.32%
1958	4.28%	32.40%	1978	-6.15%	7.69%	1998	1.02%	25.40%			
1959	0.43%	8.01%	1979	3.97%	8.02%	1999	4.10%	14.82%			
1960	-7.15%	4.50%	1980	5.76%	18.92%	2000	-5.09%	-5.32%			
1961	6.32%	15.81%	1981	-4.57%	-5.40%	2001	3.46%	-15.95%			
1962	-3.79%	-8.34%	1982	-1.75%	16.81%	2002	-1.56%	-22.15%			
1963	4.91%	13.32%	1983	3.31%	13.51%	2003	-2.74%	29.94%			
1964	2.69%	10.01%	1984	-0.92%	2.34%	2004	1.73%	7.14%			
1965	3.32%	5.56%	1985	7.41%	17.62%	2005	-2.53%	5.67%			
1966	0.49%	-13.51%	1986	0.24%	14.35%	2006	2.55%	10.80%			
1967	7.82%	11.38%	1987	13.18%	-9.85%	2007	1.41%	2.09%			
1968	-4.38%	12.60%	1988	4.04%	8.03%	2008	-6.12%	-34.48%			
1969	-0.82%	-10.63%	1989	7.11%	18.80%	2009	-8.57%	35.02%			
1970	-7.65%	8.39%	1990	-6.88%	0.35%	2010	-3.70%	17.11%			

January and Feb-Dec Performance from 1951 – 2017

To see if there is any linear relation between January and the total returns from the remaining 11 months of the year, we can run a simple regression using January as the independent variable (factor) and the following 11 months' returns as the dependent variable.

Seasonality - Old And New January Effect

Regression Statistics	
Multiple R	0.253499075
R Square	0.064261781
Adjusted R Square	0.049865809
Standard Error	0.140785024
Observations	67

	df	SS	MS	F	Significance F
Regression	1	0.088475835	0.088475835	4.463872154	0.038464297
Residual	65	1.288327502	0.019820423		
Total	66	1.376803336			

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.069830463	0.017526634	3.984248393	0.000173696
January	0.75605974	0.357849355	2.112787768	0.038464297

Regression Results from Excel

From 1951-2017, we will have a total of 67 observations. The regression results shows January has a positive coefficient with a p-value below 0.05. This is statistically significant. Basically, the lower the p-value is, the stronger the statistical significance. It suggests that the returns of January and the remaining months may have a positive linear correlation.

R Square is another metric people scrutinize. It measures how much of the dependent variable's moves can be attributed to the factor. It can range from 0% to 100%. 0% means the factor explains nothing about the moves of its dependent variable, while 100% means we absolutely nail the problem.

So if we look at our R Square of 6.4%, we may be led to believe that using January as a factor is a poor choice as it explains little of the subsequent 11-months' return variability. However, we have to bear in mind that we are doing predictions and not explanations here. The independent and dependent variables occur at different time periods. For stock market predictions, we can forget about getting high R squares. Those are only seen in academic examples for different applications. If we think about it, there is a good reason why people say stock market is unpredictable. In the investment industry, we work with and accept uncertainty as part and parcel of our daily lives. And more often than not, we make do with finding just that slightest edge instead of wasting time to look for holy-grail solutions.

Does trading using this new January effect improve performance?

A simple way to assess is to run a historical backtest. In this backtest, we will start investing in February whenever January is up. We then close off our position at the end of December and repeat the same for the next year. Let's call this the January Method, and doing this since 1951 delivered an annualized return of 6.7%. This is lower than what we would have received if we had just bought and hold an equivalent of S&P 500. For the same period, buying and holding S&P 500 returned an annualized 7.6%. But the January method fared better on a risk adjusted basis. It has a lower volatility of 9.5% and a higher Sharpe of 0.71 against 14.3% and 0.53 for the buy and hold method.

The results are not surprising. Lower volatility comes from sitting on cash for the 27 years where January was down. But to trail the market only less than 1% in annualized returns despite not being in it for that long is quite impressive. It is also good to have spare cash on hand that you can invest into other areas.

This is just one simple implementation. It does not mean it is the only way you can use this
information.

Seasonality - Old And New January Effect

Seasonality - Old And New January Effect

Performance	January Method	Buy & Hold
Active Years	40	67
Profitable Years	35	49
% Profitable Years	88%	73%
Total Returns	7667%	13000%
Annualized Returns	6.7%	7.5%
Annualized Volatility	9.5%	14.3%
Sharpe Ratio	0.71	0.53
Max Month	11.2%	16.3%
Min Month	-21.8%	-21.8%

January Method Vs S&P 500 Buy & Hold

Would I use such a strategy?

At the point of writing, I am not using it and has no near term intention to. Why?

1. The rationale is not strong enough.

I have touched on this point earlier. No one can explain why things happen the way it did. Just like I have no idea why the January effect seems to exist in the 70s-90s, I have no clue why it vanishes after 2000 either.

2. The sample size is quite small.

When fundamental reasoning fail, we turn to statistics. We have 67 years of data. It sounds like an awfully long period except that there is only 1 January per year. So there is only 67 observations to work with. There is no hard and fast rule for determining a good sample size. Basically, the more the merrier. This is so that we have a better chance of ruling out fluke results, in particular for cases that are not well understood.

3. One or two key events can shake up the results

Let's take October as an example. It is not a particularly impressive month. But if we dive a bit deeper, we will realize that 2 key events have a major responsibility for where it is today – (1) Black Monday, (2) continued fallout from the collapse of Lehman Brother after September 2008. If we removed these 2 events, October would jump and become one of the top performers. Such events could have happened to any of the months.

4. It is difficult to determine when to pull the plug

Knowing when to call it quits and cut losses should be an integral part of everyone's investment plan. This include answering fundamental questions like when to pull the plug on a strategy. In the case here, the premise of the strategy lies on using January as a predictor for the performance on the rest of the year. This is a one trade per year kind of strategy. To give such a strategy reasonable room to run, we are going to need many years before we can fairly decide if the premise is still valid. And none of us have that many years to give. So we may end up having to settle for less optimal criteria to decide whether the strategy goes or stay.

These are just my thoughts. It certainly does not represent what everyone thinks. For example, those with large portfolios and many different strategies may be less inhibited to try out new ideas as long as any fallout can be mitigated. At the end of the day, a lot boils down to our own investment philosophy and risk preference. There is no right or wrong answer. Meanwhile, we have strong a January this year, so let us see how this year is going to unfold.

Dancing With The Swans Tail Risks

Written By

Eng Guan Lim

The markets are fraught with perils. All investments entail a real risk of loss in return for potential upside. But what exactly are those risks? For that, you can refer to a fund prospectus. It actually gives you a good breakdown on the types of risks involved. Just to name a few, there are market risk, liquidity risk, operational risk, FX risk and valuation risk. What perhaps is not that explicit is the possibility of extreme loss as a result of extraordinary market events. Nassim Nicholas Taleb characterized these as Black Swan events. In this post, we will look at these events and how it can impact us.

What are Black Swan Events?

These are events that can wipe out entire accounts and send people into a state of utter despair. They happen often without warning and are capable of inflicting terrible damage in a very short span of time. But, despite the magnitude of their impacts, it is often overlooked due to 2 reasons. Firstly, people think the chance of such events happening are exceedingly low. Secondly, there is no way one can foresee when it is coming. So why bother wasting time and resource on it?

Such under emphasis is dangerous. This leads to situations where we underestimate the severity of the loss that can occur. And if you are in the market long enough, you will know that the probability of encountering such events are far from remote. In spite of that, most people force fit real world occurrences onto your typical bell curve or normal distribution. For example, our most widely used risk measure in the industry, volatility, assumes compounding stock returns (log returns) follow a normal distribution. There is actually nothing wrong in making model assumptions. As a systematic investor, I use such assumptions all the time. But the problem comes when we rely on these numbers like the gospel truth. Because, it gravely understates the probability of a catastrophic event. Real world distributions have fatter tails than what a normal distribution imply.

What are Fat Tails?

To understand, take a look at the diagrams below.
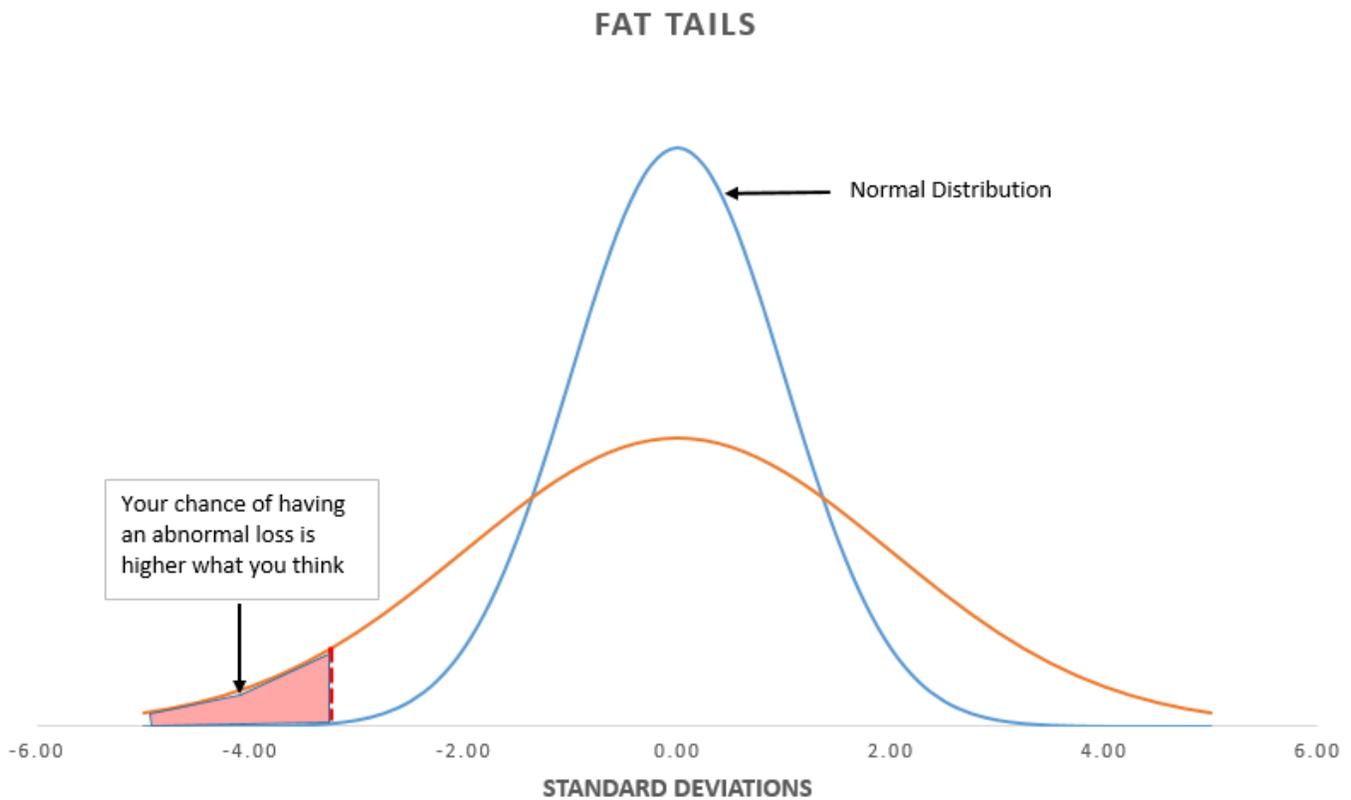
This is just to accentuate the concept of fat tails. For simplicity, I am actually still using a normal distribution here. But I have increased the standard deviation of the distribution denoted by the orange line. Not exactly a correct representation, but I just want to highlight the fat tails. Actual distributions will not look like this. Let us use the S&P 500 daily log returns as the example. If you plot the actual distribution and compare it against what normal distribution suggest, you will notice that actual returns are more concentrated around the mean. But it also comes with visibly higher tail occurrences in excess of 3 standard deviations or more.

S&P 500 Daily Return Disitrbutions: Actual Vs Normal Distribution
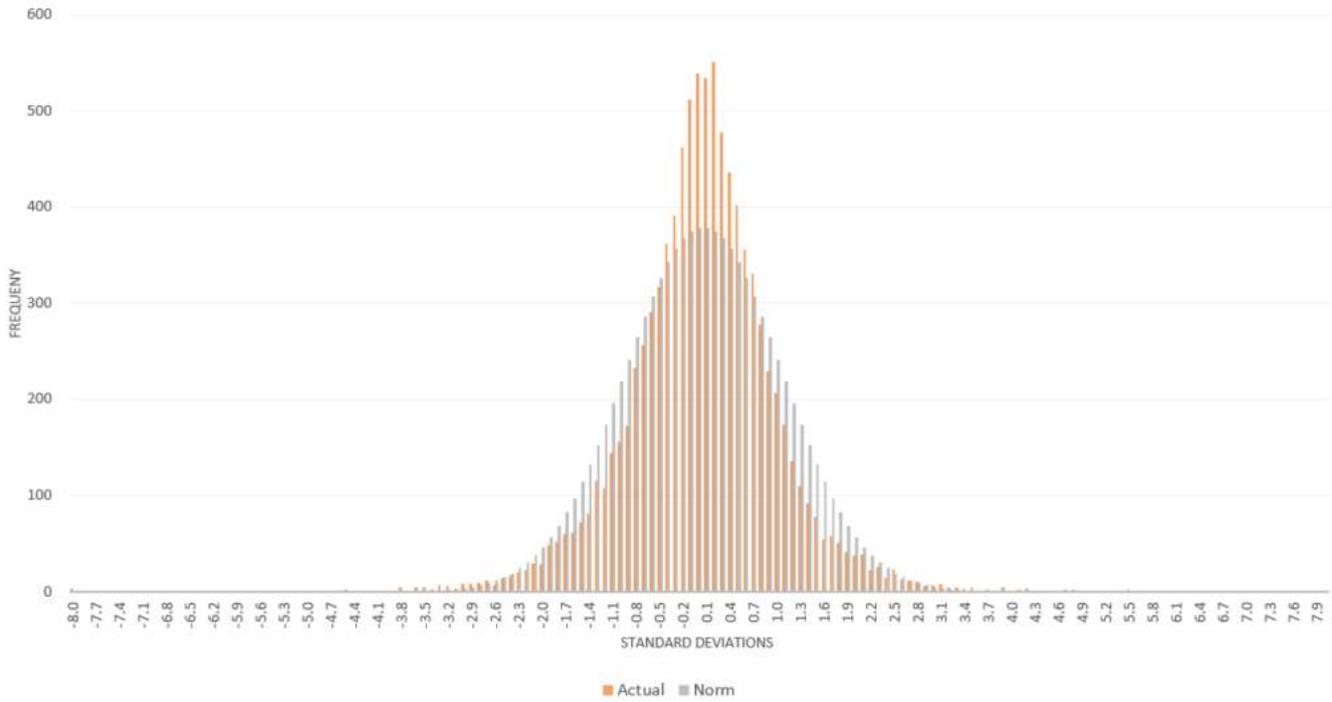
Frequency Difference Between Actual And Normal Distributions
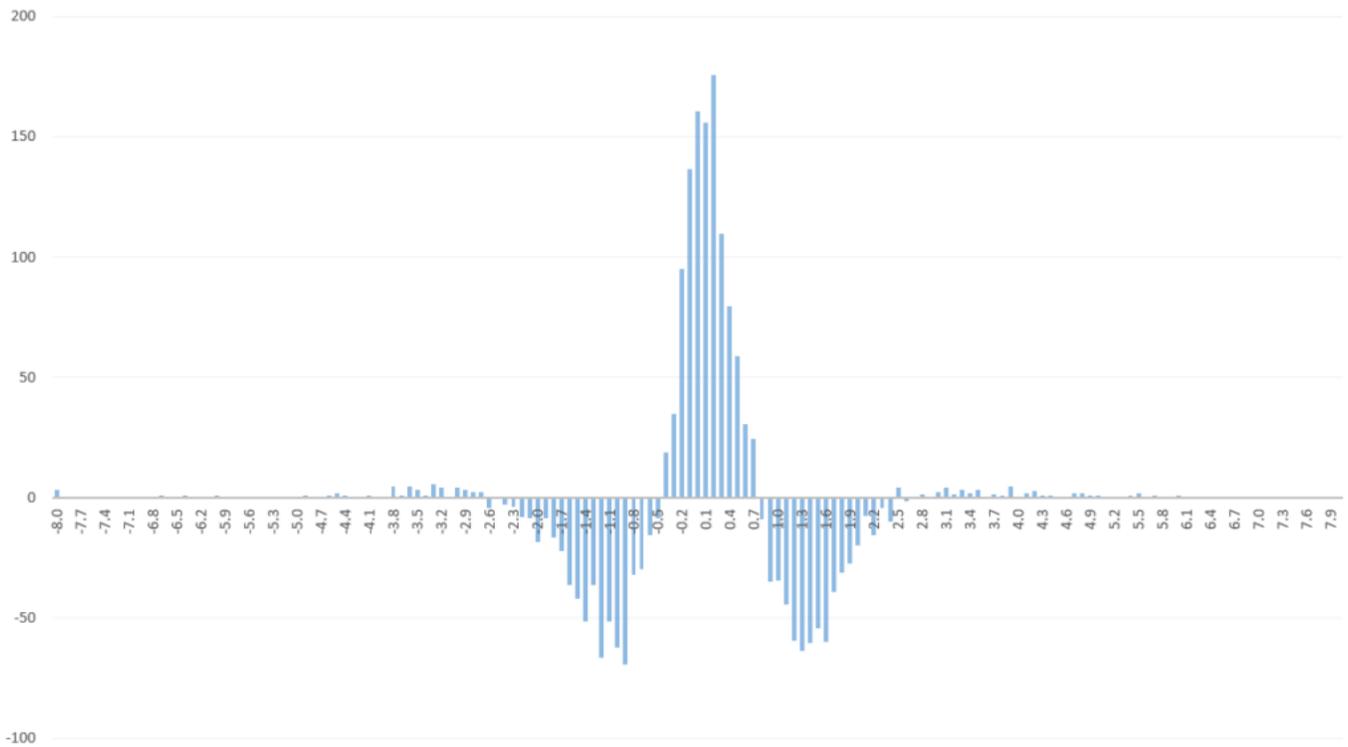
These fat tails explain why extreme profits or losses occur a lot more frequently than expected. In fact, many such spectacular events happen in the course of history. And after they strike, news about professional funds biting the dust will almost always follow.

Let's see a real event.

Black Monday 19 October 1987

What happened?

When it comes to Black Swan, there are hardly any rivals against Black Monday in terms of reputation. Global markets, which are already in the in the midst of a pullback, crashed violently on and after 19 October 1987. US S&P 500 plummet 20.5% on that single day, triggering a deep rout across Asia and Europe. At the end of the month, worldwide stock markets were swimming in a sea of blood. To give a sense of the damage, in just a month, US and Germany was down more than 20% while Hong Kong and Australia plunged over 40%. Markets spent the next few years nursing its wounds, and some did not emerge from its losses until the 90s.

What caused the crash?

Many theories abound regarding what triggers the plunge. Program trading bore the brunt of the blame. Others claim its high stock valuations, and some point their fingers on innovations such as portfolio insurance for aggravating the sell offs. All have probably contributed to that fateful day. But no one knows for sure what really sets off the "bomb".

It is always easy to look back and rationalize what happen. There is no lack of people who will rush to comment on the events after it has taken place. You will hear many things along the lines like "The warning signs are all there. It is basically screaming at us. It is so clear that the market is going to crash big time." All these post-event analysis may look sound on the surface, but it will do little to help anyone in forecasting the next black swan event.

What are the odds of such an event happening based on our conventional normal distribution?

Daily Returns	Lower	Upper	% of Returns Captured	Probability of Loss Below Lower Range	Frequency of Event (In Years / Event)
1 SD	-0.76%	0.82%	68%	0.16	0.03
2 SD	-1.54%	1.60%	95%	0.023	0.17
3 SD	-2.33%	2.39%	99.73%	0.0013	2.94
29 SD	-22.80%	22.86%	100.00%	3.29E-185	1.21E+182

Tail event probability and frequency as calculated using standard normal distribution

Let's use S&P 500 as an example. Prior to the event, the historical average daily log return since 1950 hovers around 0.03%. And the corresponding standard deviation is 0.79%. Mathematically, this means 68% of all possible returns fall within -0.76% (0.03%-0.79%) and 0.82% (0.03%+0.79%), or one standard deviation (1 SD) of the average. If we expand this range to 2 SD, -1.54% to 1.60%, we expect to capture 98% of the returns variability. And if we go even higher to 3 SD, -2.33% to 2.39%, then we cover 99.7% of the daily returns. By now, you should get the gist of it.

So, what does a -20.5% (translates to a log return of – 22.9%) move on 19 October 1987 represents? This is an event outside of 29 SD. Way off the charts by any counts. And if we go by normal distribution, the probability of it occurring is an infinitesimally small number 3.29 E-185. Or put it in another perspective, we expect such events to occur once every 1.21E+182 years. This is enough time to go way back even before our universe is born. Well, you might actually have better luck finding extraterrestrial life.

But we know that such events, while rare, definitely occur a lot more frequently than what our typical model suggests.

Other Notable Black Swans

Besides Black Monday, there are other notable black swan events. For some, their effects may be more constrained to certain asset classes or markets.

2015 Currency Shock – Swiss Central Bank Scrapped Franc's Peg to Euro

On 15 January 2015, Swiss National Bank (SNB) suddenly abolish its peg of 1.20 swiss francs against the euro. That sent a massive shock wave across the currency markets. Swiss francs jumped more than 30% against the Euro at one point before easing some of its gains. This is one classic example of how a perceived low risk trade transformed into a fearsome black swan due to an unexpected policy decision.

FX trades are among the most highly leveraged. Some FX brokers offered leverage as high as 400 times what retail clients had in their accounts. All is well until disaster strikes. Those on the winning side made enormous gains. But those on the opposite side of the trade had their worst nightmares. Many accounts were wiped out in an instant. Unable to shoulder losses from clients that were unable to pay up, FX brokers like Alpari and Global Brokers went into insolvency. Even professional funds were not spared. Everest Capital, a veteran hedge fund manager, had to close its $830 million Global Fund after having most of its assets erased.

Dancing With The Swans - Tail Risks

Visual look at the EURCHF's move on the day swiss franc was unpegged to the euro

2016 Brexit – Fear of Contagion to EU

On 23 June 2016, United Kingdom (UK) held a referendum to determine whether they should stay in or leave the European Union (EU). And the referendum result – UK voted to leave. Anyway, it is a complicated process and matters are still being sorted out at this point. But what is the big fuss about one nation leaving the 28-member EU? The implication is never just on UK alone. Markets fear Brexit will trigger a contagion that leads to more members leaving the EU amidst growing tensions and divides. EU is one of the largest economy and many member states shared a unified currency – euro. A wider EU breakup can have tremendous repercussions.

The fear was amply felt in the markets. The front month VIX futures moved violently. It rocketed up more than 60% from its prior close during Asian hours following Brexit. Global stock markets pulled back sharply over 2 days. US S&P 500 is down more than 5%. Europe, which is at the center of the storm, fared much worse. Germany DAX and France CAC sank almost 10% while Spain IBEX nosedived 14%. These 2-day moves from 24-25 Jun 2016 were in stark contrast against how the market had been behaving before the vote took place. Prior to it, markets complacently discounted the possibility of a UK departure. Although a sharp recovery followed thereafter, many markets closed in the red for the month.

	24-25 Jun 2016	Jun-16
S&P 500	-5.3%	0.1%
NK 225	-5.7%	-9.6%
ASX 200	-2.7%	-2.7%
HSI	-3.1%	-0.1%
HSCEI	-2.5%	0.1%
DAX	-9.6%	-5.7%
CAC	-9.8%	-6.0%
IBEX	-14.0%	-9.6%

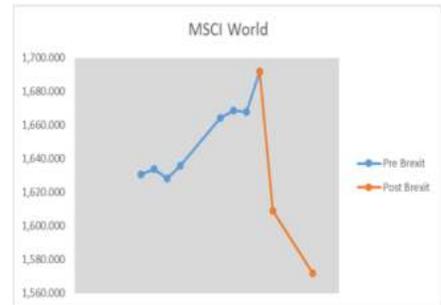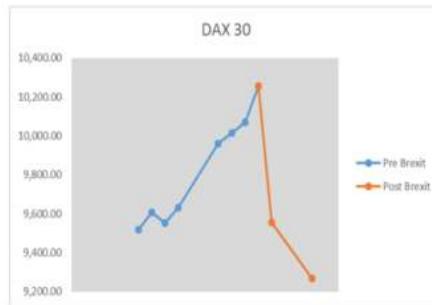*Table showing the performance of the stock markets during Brexit and the month of June 2016*

Dancing With The Swans - Tail Risks
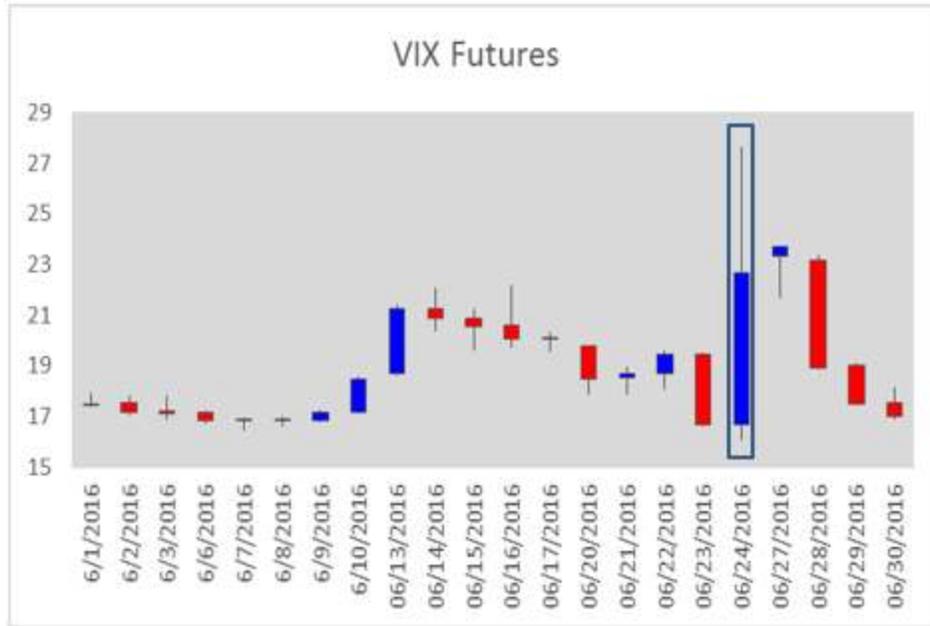
1-day move of the front month VIX futures contract during Brexit

Pre and Post Brexit Stock Markets

2018 Vol-mageddon – Demise of the XIV ETN

For those who traded through February this year, the events that unfolded should still be firmly etched into your mind. Before this, global stock markets had one of their best runs in 2017 riding on the back of record low volatility. The party continued into 2018 with markets staging a euphoric rise that see new record highs in January. But all good things eventually come to an end. A strong labor report in February sparked renewed fears in faster interest rate hikes. A massive sell-off across all asset classes ensued over the next few days, leading to an unprecedented surge in volatility. This caused an after market squeeze where inverse volatility ETNs rushed to cover their shorts exacerbating the situation.

On 5 Feb 2018, VIX surged over a 100%, and the largest inverse volatility ETN – XIV, collapsed, trading more than 90% below its prior close. To fully appreciate the enormity of the event, XIV rose more than 1400% since its inception in 2010 over a period of more than 7 years. And in a matter of a few days, all these gains were wiped out and more. The markets dealt a severe blow to many funds. LJM Partners, which managed more than half a billion dollar in assets, shuts down after losing more than 80% for the month. At the back of their minds, I assume professional asset managers are cognizant of the possibility of such an event. But as always, being aware is one thing, and what you do about it is another.

Dancing With The Swans - Tail Risks

Vix Index spiked more than 100% on 5 Feb 2018

XIV ETN collapsed more than 90% from its prior close on 5 Feb 2018

Fighting The Swans

Our conventional risk measure are sorely inadequate to address tail risks from black swan events. Unfortunately, we have no other means to quantify such risks at the moment. From a statistics point of view, there is just insufficient data to make any sense out of it. But that does not mean we should ignore it, or are entirely defenseless against it. There may be no foolproof way to eradicate such risks, but as always, we can take steps to mitigate the impact should we run into one. Here are a few general ideas.

1. Understanding your strategies and knowing your black swans

Black swans can hit anyone, anywhere, anytime. However, its impact varies for different people. It depends a lot on the person's investment strategy and positioning. What is a black swan for you may turn out to be a windfall for some, and nothing more than a scratch for others. For example, the currency shock in 2015 might have decimated those with large FX exposure on the wrong side of the trade. But those not in FX space may hardly feel anything. The same goes for Vol-mageddon in February 2018. If you are not directly shorting US volatility, say through VIX futures, ETNs or options, it may be nothing more than a market correction for you, albeit a rapid one. As an investor, you should know the strengths and weaknesses of your strategies before you administer any "treatment". This is to make sure you are guarding against the right swan.

2. Diversification – your first line of defense

Diversification is your first line of defense in mitigating a fallout from drastic events. Though there are traders that think otherwise. They believe that they can navigate out of any crisis and prefer taking concentrated bets. Diversification, they felt, involves no skills and dilutes the returns. In addition, it tends to fail when you need it most as everything gets more correlated during a crisis. Their concerns are not unfounded. But taking concentrated bets only expose you to an even higher risk of tail loss. With each bet capable of costing you dearly during such a scenario, you have almost zero room for mistakes. So to rely solely on "skills" to tackle unpredictable black swan occurrences, while commendable as a brave effort, leaves your fate very much in the hands of luck.

To be clear, we are not talking about run of the mill diversification where you just spread your bets across a few more stocks. That only help in a stock specific black swan. For example, one of the companies you held was discovered to commit serious fraud in cooking its financial numbers. And as a result, its share price plummets. Spreading your bets among more companies here helps to isolate the impact to that particular stock. But it will provide you little protection against more extensive events like Black Monday. Because when it comes to the crunch, equities all head in the same way. We need a more robust and holistic approach that involves different asset classes, strategies and time frames.

Assets

Different assets classes, while linked in one way or another, have their own dynamics. Their lower correlations with each other makes them useful for diversification. For instance, a stock market crash can lead to funds flowing into safe haven assets like bonds and gold. So while the former decline, the latter may buffer some of these losses.

The diagram below shows how the S&P 500 ETF and the 20+ Yr Treasury bond ETF move since 2002. Over the long term, both have appreciated but their paths are markedly different. During critical periods such as the 2008 subprime meltdown and a few other sharp corrections, both head in the opposite directions. Their 60 day rolling correlations is negative most the of time, and ranges from around -0.8 to +0.4. A simple composite portfolio comprising 50% SPY and 50% TLT rebalanced daily produce decent results. It has the lowest volatility and one day loss among all 3.

SPY (S&P 500) , TLT (20+ Yr Treasury Bond) & 50% SPY - 50% TLT
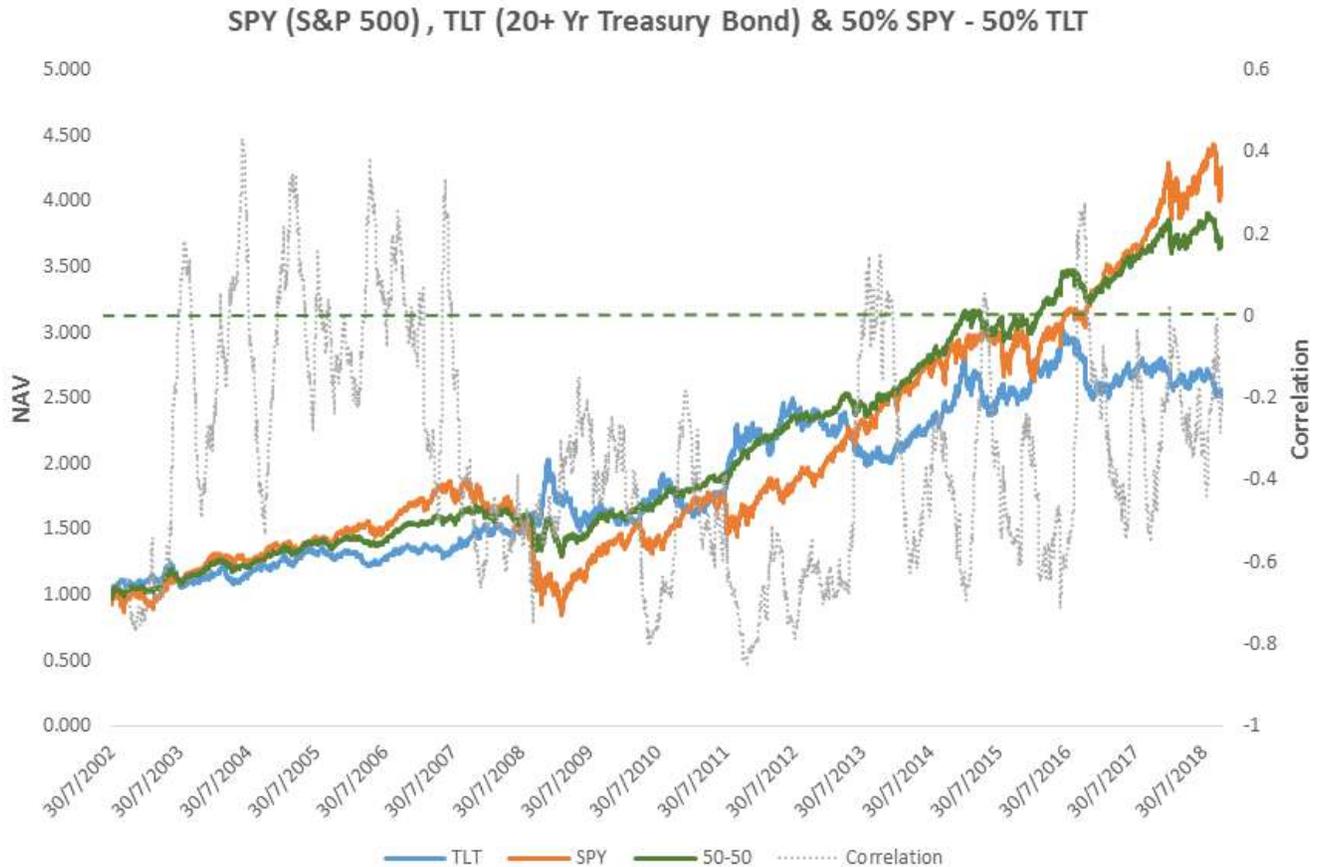
NAV of SPY vs TLT and their rolling 60-day correlations

	TLT	SPY	50-50
Annual Returns	5.9%	9.1%	8.3%
Annual Volatility	13.4%	18.5%	9.0%
Maximum Drawdown	-26.6%	-58.2%	-36.4%
Worst Day	-5.0%	-9.8%	-4.4%

Performance of SPY, TLT and 50% SPY – 50% TLT (rebalanced daily)

But note that asset diversification is fully capable of failing as well when you need it. Correlation risks is its a Achilles heel. A lot hinges on what is driving the market at the moment. You can see for yourself from the chart that correlations is not a static number. It changes. For instance, an unexpected tightening regime can send both bonds and equities tumbling over a period, driving up their correlations. A strengthening USD in a rising rates environment can also exert downward pressure on commodities like oil and gold.

Strategies and Time Frames

Besides asset classes, we can also diversify across different strategies and time frames. Every single strategy have their own drawbacks. A trend-based strategy can be heavily whipsawed in wild market swings. A counter-trend, on the other hand, can be caught sizing up on the wrong side of a tsunami. Spread based or market neutral strategies, that typically apply high leverage, run the risk of huge losses in the event of extreme divergence. Naked option selling strategies looks good until the "bomb" explodes and you end up losing much more than the premium you collect. There is no perfect strategy, but they can complement each other and reduce the impact of tail risks from any single one. A calibrated blend of lowly correlated and profitable strategies can make your portfolio much more robust than one using a single concentrated strategy.

3. Asymmetric hedge – fighting a swan with a swan

Hedging is another useful defense. But you need a hedge with a swan-like or asymmetric pay off. One that pays you big time when a black swan hits you. Volatility products such as vix futures, long volatility ETNs, and options are possible candidates. But of course, such protections do not come for free. Over the long haul, they will impose a drag on your portfolio and you may never recoup all that has been sunk in. However, it is important to know what it means to hedge. When you hedge, you are not aiming for profit, you are paying for protection against the possibility of sudden financial ruin.

For professionals running a fund, you will be able to appreciate the importance. Black swans are events that will pull the tide back and reveal who has actually been swimming naked. Being down 20% in a day or month is a whole world of difference against being down 20% in a year. It says a lot about the real risks behind your portfolio and approach.

Conclusion

Black swan events are a reminder that we all live in the real world, not a theoretical one. Modern science and math may have come a long way in helping us understand the markets. But many things remain out of reach for the lack of deterministic data. We would love to have thousands of well documented black swan events for our analysis. However, we know that is not going to happen. This will remain one of the many uncertainties that all investors have to grapple with. And a prudent investor should be mindful of that and temper his approach with a good dose of "common sense". If there is one statement about the market everyone should take away here, it is "Never say it will not happen". Because if you are in the market for the long haul, the Black Swan will pay you a visit one day.

Dollar Cost Averaging (DCA)
To Average Or Not?

Written By

Eng Guan Lim

Dollar Cost Averaging (DCA) is not alien to most people. It is a nice sounding name for a simple regular fixed investment approach frequently sold to the retail mass. And it is sometimes touted as the panacea for flaws such as self screwing human emotions and futility of market timing in investments. I am sure many sat in talks on, or even bought into DCA type investment plans. Majority of these are pure equity or equity heavy plans. But, as discerning investors, rather than just take what the so called pundits said as the truth, we should look at it in more detail.

What is Dollar Cost Averaging (DCA)?

DCA is an approach where an investor invests a fixed amount of money periodically over time instead of pumping it in all in one shot. For instance, you can split $100,000 into $500 chunks and use it to purchase mutual funds or ETFs every month. And there you go, you got your own DCA investment program! With a fixed dollar amount each month, you will buy more shares or units when the price is low, and less when the price is high. And over time, your entry price averages out. You will not get the best price, but neither will you end up with the worst. The central idea is to spread out your bets to avoid concentrating everything at a single point in time. And hence, the name Dollar Cost Averaging.

Is Dollar Cost Averaging Your Miracle Formula?

For those who are not familiar with DCA, you should know by now that it is not some awfully complex concept. Like any other strategies conceived in history, DCA is not without its own flaws. But they are often overlooked. Many adopted this approach not because they do not have the money, but rather, breaking up a large investment into bite size makes it easier for them to stomach. On top of that, to make it easier to sell, there are professionals actively pushing the benefits of DCA as if it is a miracle solution. And what are some these claims?

Dollar Cost Averaging (DCA) – To Average Or Not?

1. Instill discipline and consistency to overcome emotions.

This is probably the only point I have no contention against. Under a DCA program, you are "forced" to put your money to work regardless of what you feel about the markets. And because you are only parting with a small amount each time, this takes stress off your mind. Under such conditions, you are less susceptible to emotion driven irrational decisions that can sabotage your efforts.

2. No one can time the market, so don't time.

I agree with the statement in general. In fact, I alluded to the same point in my earlier post on investment philosophy : Your Market View Is Not As Important As You Think. But let's be very clear about this. Not being able to time the market does not mean not timing it is your magic sure-win formula. Neither does it imply you are free of market timing element. People tend to focus on the averaging aspect of DCA, but forgot that this come with systematically increasing your position size and risk. A 20% move in the market late in the game has a lot more impact on your total portfolio than early on. With a DCA approach, you are just deferring your risk to a later stage and with each new investment, the averaging effect gets diluted.

3. DCA has a lower risk compared to a lump sum investment

That depends on the perspective you are coming from. If we are talking about volatility. Of course, it will be lower. That is a no brainer. Why? Because you are taking smaller risks and dialing it up gradually over time. A simple risk measure such as volatility is not meaningful enough. How a DCA performs boils down to how much downside it avoids against how much upside it gives up. With markets generally trending up and bulls outlasting bears, DCA tends to lag significantly behind the markets over the long term. But to be fair, we should adjust at least for risk e.g. Sharpe ratio.

DCA is highly dependent on the market path

Let's see how DCA perform with respect to different scenarios. In order to highlight the points, I created fictional scenarios bordering on the extremes. Now, let's get started. You have a $100,000 and are looking to invest and harvest your returns after 10 years. At this point, you are deciding between investing either through a single lump sum, or using a DCA approach. For the latter, you will put $10,000 to work at the start of each year over the 10 years. And in the meantime, let's take it that the excess cash sitting around gives you 2% a year.

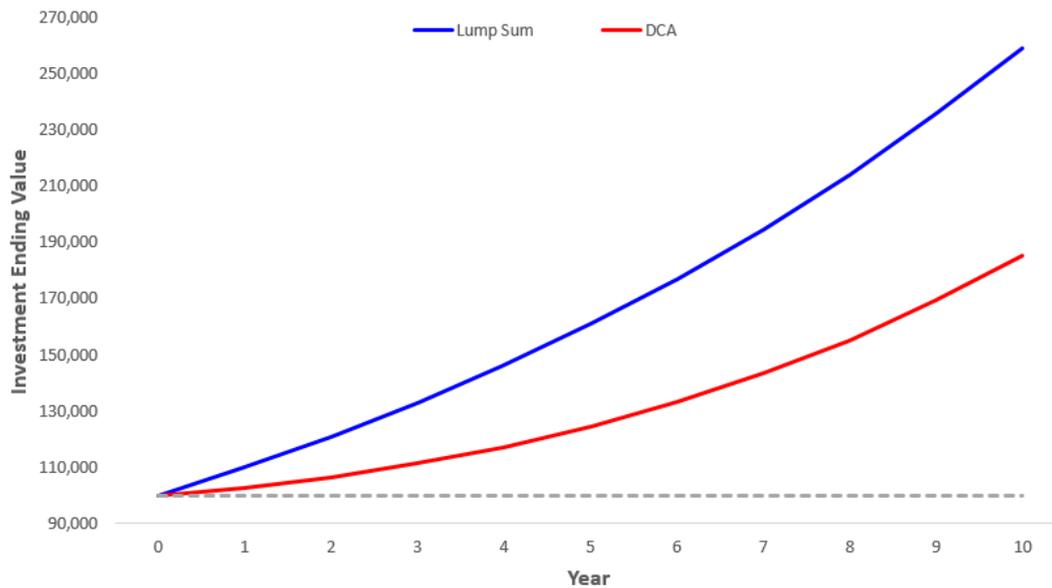## Scenario 1: Market moves up in a straight line

If market moves up in a straight line, it is pretty obvious that the DCA approach will lag behind since every purchase you make gets increasingly more expensive. But you will still make money.

Dollar Cost Averaging (DCA) - To Average Or Not?

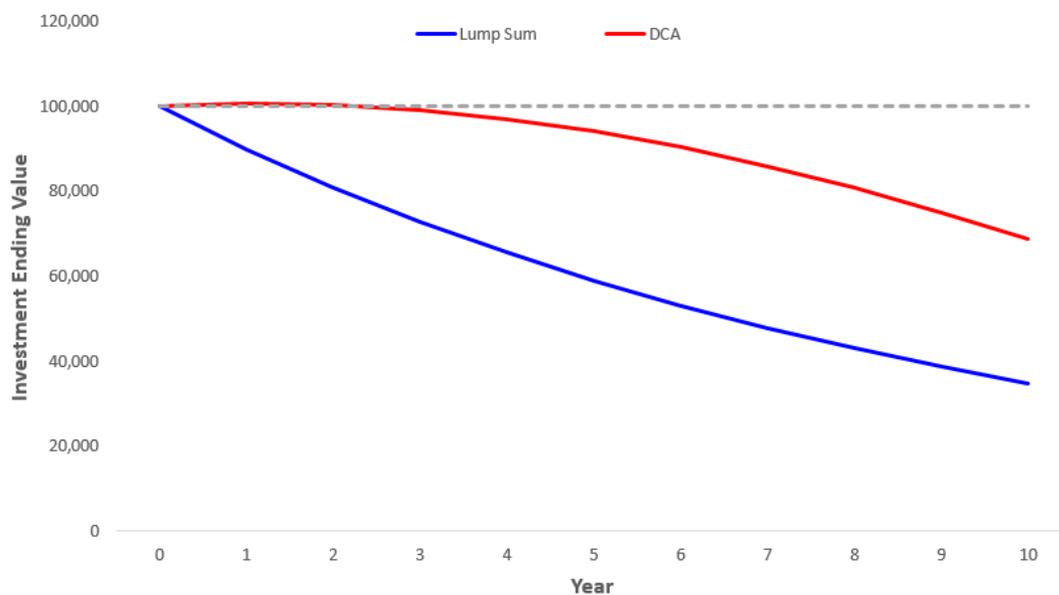| Year	Market	Lump Sum Investment	DCA		
			Cash	Investment	Total
0		100,000	90000	10000	100,000
1	10%	110,000	81,800	21,000	102,800
2	10%	121,000	73,436	33,100	106,536
3	10%	133,100	64,905	46,410	111,315
4	10%	146,410	56,203	61,051	117,254
5	10%	161,051	47,327	77,156	124,483
6	10%	177,156	38,273	94,872	133,145
7	10%	194,872	29,039	114,359	143,398
8	10%	214,359	19,620	135,795	155,414
9	10%	235,795	10,012	159,374	169,386
10	10%	259,374	212	185,312	185,524

Growth of $100,000 in a straight trend up market

Scenario 2: Market moves down in a straight line.

If the market moves down in a straight line, then it is also quite clear that DCA will outperforms. Because it picks up bargains along the way and loses less than the lump sum approach.

Year	Market	Lump Sum Investment	DCA		
			Cash	Investment	Total
0		100,000	90000	10000	100,000
1	-10%	90,000	81,800	19,000	100,800
2	-10%	81,000	73,436	27,100	100,536
3	-10%	72,900	64,905	34,390	99,295
4	-10%	65,610	56,203	40,951	97,154
5	-10%	59,049	47,327	46,856	94,183
6	-10%	53,144	38,273	52,170	90,444
7	-10%	47,830	29,039	56,953	85,992
8	-10%	43,047	19,620	61,258	80,878
9	-10%	38,742	10,012	65,132	75,144
10	-10%	34,868	212	68,619	68,831

Growth of $100,000 in a straight trend down market

Scenario 3: Market moves down in the first 5 years then up the next 5 years.

This is the ideal scenario for a DCA approach. It loses less at the start as the risk is small. Then it capitalizes on the up move later as market recovers and its position piles up. So while the lump sum is below water in this scenario, DCA still holds up.

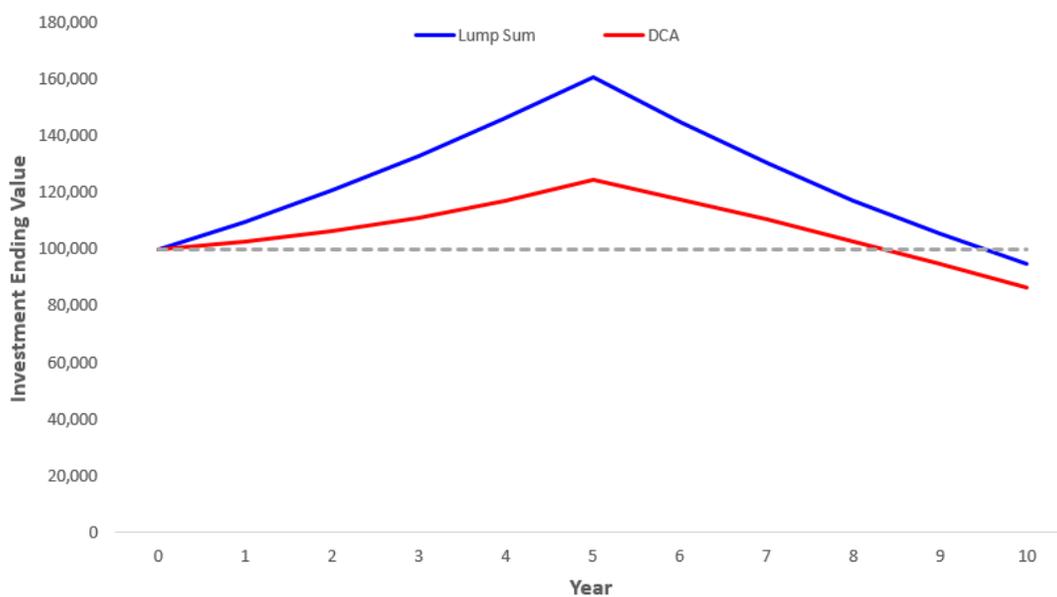| Year	Market	Lump Sum Investment	DCA Cash	DCA Investment	DCA Total
0		100,000	90000	10000	100,000
1	-10%	90,000	81,800	19,000	100,800
2	-10%	81,000	73,436	27,100	100,536
3	-10%	72,900	64,905	34,390	99,295
4	-10%	65,610	56,203	40,951	97,154
5	-10%	59,049	47,327	46,856	94,183
6	10%	64,954	38,273	61,541	99,815
7	10%	71,449	29,039	77,696	106,735
8	10%	78,594	19,620	95,465	115,085
9	10%	86,454	10,012	115,012	125,024
10	10%	95,099	212	136,513	136,725

Growth of $100,000 in a down then up market
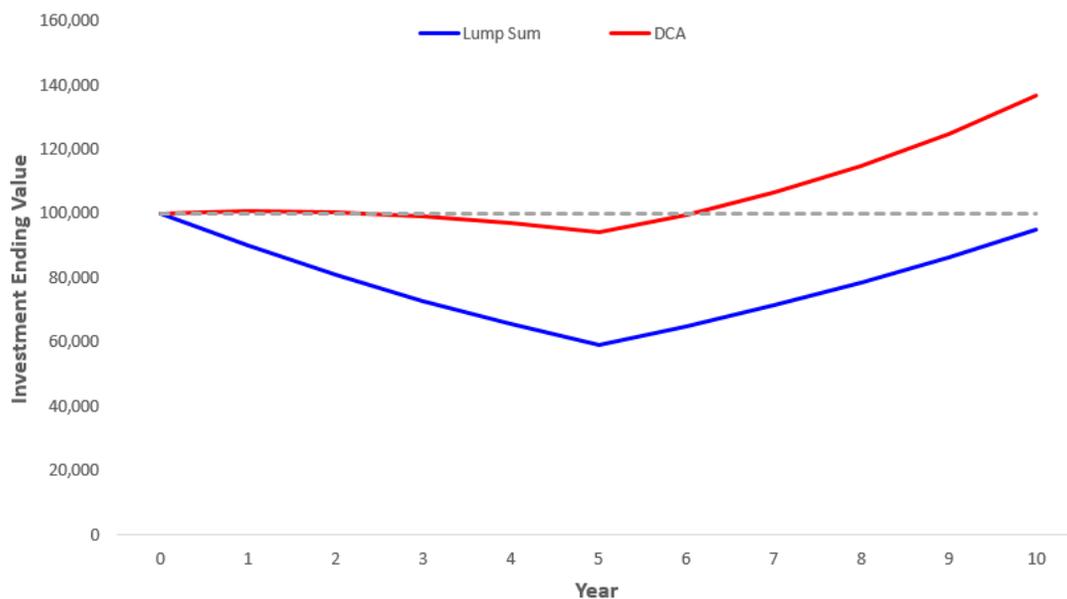
Dollar Cost Averaging (DCA) - To Average Or Not?

Scenario 4: Market moves up in the first 5 years then down the next 5 years.

This is the worst scenario for a DCA. It did not make much on the initial trend up as the position is small. And just when it builds up to a more decent size, market heads south and it takes a bigger hit.

Year	Market	Lump Sum Investment	DCA Cash	DCA Investment	DCA Total
0		100,000	90000	10000	100,000
1	10%	110,000	81,800	21,000	102,800
2	10%	121,000	73,436	33,100	106,536
3	10%	133,100	64,905	46,410	111,315
4	10%	146,410	56,203	61,051	117,254
5	10%	161,051	47,327	77,156	124,483
6	-10%	144,946	38,273	79,440	117,714
7	-10%	130,451	29,039	81,496	110,535
8	-10%	117,406	19,620	83,347	102,966
9	-10%	105,666	10,012	85,012	95,024
10	-10%	95,099	212	86,511	86,723

Growth of $100,000 in a up then down market

Even without the tables and diagrams, it is not hard to visualize the scenarios. They are quite straightforward. But please do not get optimistic here thinking that DCA has a 50% chance to outperform simply because it has 2 favorable scenarios out of the 4. By doing that, you are assuming that each scenario has an equal probability of playing out. Given that stock markets generally rise over the long term, the scale seem more likely to tip in favor of a lump sum approach. Let's see some real market action.

Real Market Action: DCA Vs Lump Sum

Let's test it out on the US, Hong Kong and Japan stock markets from 1987 to end 2018. For simplicity, I will use the stock market price indices as proxies for market performance. Both dividends and transaction costs are excluded. And as per what I did for the scenarios earlier, let's assume idle cash generates an annual return of 2% but this time compounded daily. For the DCA approach, you will split $100,000 into equal monthly amounts instead and invest them into the market at the start of each month.

US Market – S&P 500 (1987 – 2018)

	Lump Sum	DCA
Beginning Value	100,000	100,000
Ending Value	1,035,161	359,322
Total Returns	935%	259%
Annual Returns	7.58%	4.08%
Annual Volatility	18.07%	11.21%
Max DD	-56.78%	-44.42%
Sharpe Ratio	0.42	0.36

NAV

LUMP SUM — DCA

US markets rose more than 10 times (excluding dividends) from 1987 to 2018. A single lump sum investment of $100,000 at the start of 1987 would turn into $1,035,161 at the end of 2018. This translates to a yearly compound return of 7.58%, a fairly decent figure. A DCA approach, on the other hand, ended up with $359,322 or a compound annual return of 4.08%.

In terms of risks as measured by volatility, DCA is indeed much lower. However, it is pointless to look at risk on its own. If we compare the Sharpe ratios instead, which gives the returns per unit risk, the lump sum approach still holds the upper hand. DCA's draw down of more than 40% is also not that far off from the lump sum approach.

Hong Kong Market – Hang Seng 50

NAV

The Hong Kong market is lot more volatile than US, but the results are very similar. Like US, it has an overall up trend. Over the period from 1987 to 2018, Hang Seng also grew to more than 1000% of its starting value turning a lump sum of $100,000 to more than a $1 million. The compound annual returns stands at 7.52%. This is much better than the DCA approach yielding only 3.72% annualized return over the same period. Again, DCA also loses out on a risk adjusted basis.

Japan Market – Nikkei 225

	Lump Sum	DCA
Beginning Value	100,000	100,000
Ending Value	106,345	153,316
Total Returns	6%	53%
Annual Returns	0.19%	1.34%
Annual Volatility	23.47%	10.31%
Max DD	-81.87%	-36.71%
Sharpe Ratio	0.01	0.13

NAV

Japan displays a different behavior from US or Hong Kong. Unlike US or Hong Kong, which have been on an up trend, Japan is the reverse as it went through an extended period of economic stagnation in the 90s. As at end 2018, it is still well below its peak in 1989. In fact, it barely made anything at all between 1987 and 2018. A lump sum investment in 1987 will make you a measly total return of 6% or an annualized return of 0.19% after more than 30 years. For those who are fixed with the notion that stock markets will always rise in the long term, you are probably right most of the time. However, do be aware that things can always go wrong and Japan is one example. And in this instance, DCA outmaneuver a lump sum approach.

Approach Investment With DCA's Discipline And Lump Sum Perspective

It would seem that a lump sum investment trounces DCA in products that appreciate over the long term. And given that stock markets typically exhibits such a behavior, a lump sum approach looks like the way to go. But in practice, is this really the case?

DCA has its own merits. What we have considered are situations where you already have the money and are deciding between investing a significant lump sum or splitting it up using the DCA approach. But, one may not have the luxury of such a choice. It is not like everyone can write a $100,000 check anytime they want. Then the question to ask is "Do I start small now and invest at regular intervals or wait till I have sufficient money and then invest at one go?" This will then have a different implication. Waiting has a price and the longer it is, the less likely it will be in your favor.

Actually, DCA and lump sum does not have to mutually exclusive. We can instill the discipline of a DCA into a lump sum approach. In real life, your cash flows are likely to change and not going to come in all at one point in life. The important thing is to have a plan where you regularly examine and build up your investments. And why restrict ourselves to some fixed amount each time? Why not see things from a lump sum perspective and go with what works for you at that point in time taking into account your cash flow situation, investment horizon, objective and risk preference.

Buy The Dip (BTD)
To Buy Or Not To Buy?

Written By

Eng Guan Lim

Market goes up … PRICE IS TOO HIGH! DON'T BUY NOW! WAIT FOR THE DIP!

Market keeps going up … I REPEAT : WAIT FOR THE DIP!

Market plunge … NOW BUY THE DIP!

Market head further south … THEN BUY SOME MORE!

Market just keep going down … OK, STOP BUGGING ME AND JUST KEEP BUYING! MARKET WILL GO BACK UP EVENTUALLY!

Sounds familiar? Yes, this is the legendary 'BUY THE DIP' strategy.

What Is 'Buy The Dip' (BTD) Strategy?

Buy The Dip (BTD) is an age old market timing strategy that is simple to grasp and easy to sell. You see both experts and common people strongly advocating all to load up on equities whenever the market experience a significant fall. For instance, some may buy when the market falls every 5%, others 10% or 20%. While exact executions can vary, the underlying premise is the same. And that is the market will eventually recover and go up over the long run. It is a straightforward and popular strategy. Buying something you want that is currently cheaper than what it once was definitely has its appeal. But I do need to add a caveat here. How much cheaper or is it even cheaper hinges on how far back you are looking.

I know some of you who are more investing savvy maybe thinking along the lines of a value strategy where you load up on specific bargain counters that are deeply oversold against your valuations during panic selloffs. But no, this is not what I am referring to here. The dips I am talking about is with reference against the absolute price level, and on broad based instruments like an index ETF. So when I say buy the S&P 500 when it dipped 10%. I mean literally a drop in its price by 10%. As an example, if S&P 500 trades at a high of 2500, you will start picking it up when it drops to 2250. It does not matter whether the drop is due to deteriorating fundamentals or economic conditions resulting in lower valuations. Nothing brain wrecking here.

Does market always go up in the long run?

First of all, how long is your long run, what market are you looking at, and when did you enter the market? For some 10 years is long, while others are looking at 20 years or even 30 years and more. Depending on the time frame you are looking at, which market you are vested in, and when you enter the market, it may not necessarily always be headed up. But in general, according to history, the longer you hold, the more likely this thesis pan out. There are always outliers though. As an example, Japan has a draw down period measured in decades since its peak in 1989. And I can assure you it definitely feels anything but good to know that you made virtually nothing on your hard earned money after almost 30 years.

Strategy: Buy The Dip When Market Pull Back Every 10%

In one of my previous post, I looked at Dollar Cost Averaging (DCA) where I compared DCA against a lump sum approach. As an extension, I will now include Buy The Dip into the exercise. The settings remain unchanged. You are looking to invest $100,000 in the stock markets for the long term. But you are undecided about whether you should put it all in right now, implement a DCA approach, or to divide it up and invest the money only when the market dips. For the latter, lets take

Buy The Dip (BTD) - To Buy Or Not To Buy

Market
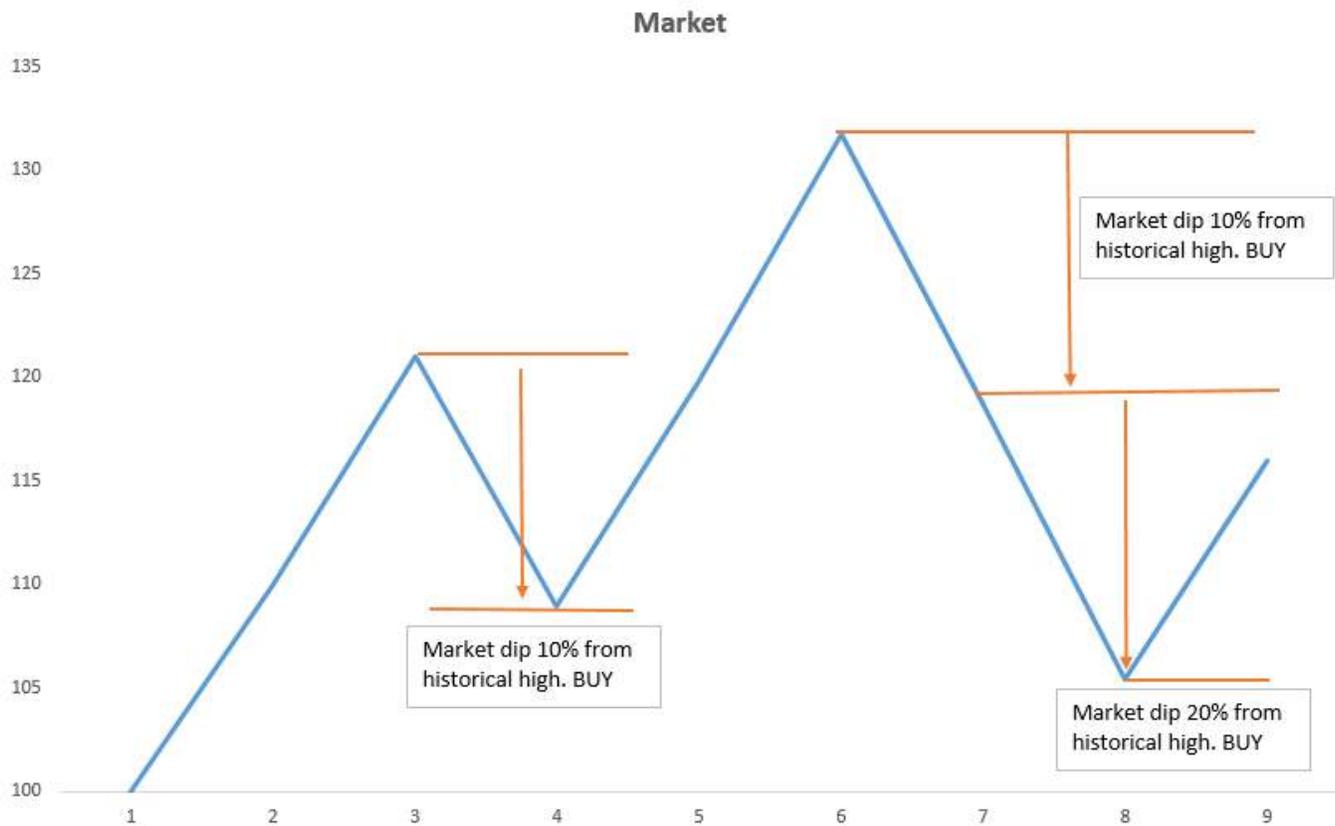
Sounds simple? But there is a problem. Because unless you can see into the future, you have no idea how many 10% retracements there are going to be. To simplify matters, lets assume the best case, albeit unrealistic, scenario where you are somehow able to get that number. And lets call this the BTD strategy.

Lets get ready to see BTD in action.

Real Market Action: BTD Vs Lump Sum And DCA

As per what I have done in my post on DCA, I will test BTD out on the US, Hong Kong and Japan stock markets from 1987 to 2018. Again, I will use the stock market price indices as the proxies for market performance. So dividends are excluded. And lets also assume transaction costs are negligible and idle cash sitting around earns you an interest of 1.5% per year compounded daily.

US Market – S&P 500

	BTD	Lump Sum	DCA
Beginning Value	100,000	100,000	100,000
Ending Value	372,276	1,035,161	359,322
Total Returns	272%	935%	259%
Annual Returns	4.19%	7.58%	4.08%
Annual Volatility	11.64%	18.07%	11.21%
Max DD	-45.74%	-56.78%	-44.42%
Sharpe Ratio	0.36	0.42	0.36

NAV

US is one of the strongest equity market. At the end of 2018, BTD yielded an annualized return of 4.2% or about $370,000 against 7.6% and $1,000,000 for lump sum method. While it under performs the lump sum approach, BTD managed to edge out DCA marginally. I don't think anyone is surprised by the results given how strong US equities have performed. But what if I started in 2000 right before the internet bubble burst?

	BTD	Lump Sum	DCA
Beginning Value	100,000	100,000	100,000
Ending Value	215,509	172,266	195,272
Total Returns	116%	72%	95%
Annual Returns	4.13%	2.91%	3.59%
Annual Volatility	10.92%	19.15%	8.91%
Max DD	-33.53%	-56.78%	-27.71%
Sharpe Ratio	0.38	0.15	0.40

Between 2000 and 2018, the US S&P 500 only delivered 2.9% annualized returns thanks to the dot com crash in 2000 and the subprime crisis that followed in 2008. During each of this bear markets, S&P 500 lost about 50% from the highs. This presents the most opportune time for BTD strategies. And indeed, BTD emerge as the top performer with 4.1% annualized return while DCA takes the second place with 3.6% annualized returns.

Now lets do one more tweak and start after the market bottomed out in 2009 and see how things turn out.

Buy The Dip (BTD) - To Buy Or Not To Buy

	BTD	Lump Sum	DCA
Beginning Value	100,000	100,000	100,000
Ending Value	159,841	370,545	163,247
Total Returns	60%	271%	63%
Annual Returns	4.90%	14.29%	5.13%
Annual Volatility	7.65%	15.95%	8.27%
Max DD	-20.80%	-19.78%	-19.15%
Sharpe Ratio	0.64	0.90	0.62

NAV

Post 2009, US experiences one of its strongest and longest bull run in history, delivering a stellar 14.3% annualized return. Meanwhile, BTD trailed far behind with just 4.9%. In this scenario, the opportunity cost of waiting for the dip is anything but trivial. There are not that many 10% dips during this unprecedented bull run. Two such dips happened during the initial volatile recovery period from 2009-2011 . Thereafter, the next 10% dip did not come till 2015. This experience can be liken to passing up opportunities to buy water because of the price, only to end up walking into a vast desert with no water in sight and no chance of turning back.

Hong Kong Market – Hang Seng 50

Now, lets look at the Hong Kong stock market from 1987-2018.

	BTD	Lump Sum	DCA
Beginning Value	100,000	100,000	100,000
Ending Value	348,163	1,017,507	321,700
Total Returns	248%	918%	222%
Annual Returns	4.06%	7.52%	3.72%
Annual Volatility	17.76%	25.97%	15.72%
Max DD	-60.93%	-65.18%	-56.59%
Sharpe Ratio	0.23	0.29	0.24

Despite HK being more volatile than the US market and having more dip buying opportunities, the end results are not that different. BTD lost to a lump sum approach by a wide margin while outperforming DCA slightly. But again if I start BTD right after the market peaked in 2007 then I will definitely be better off. It is unnecessary to show any charts and tables here as the Hang Seng 50 is still clearly below its 2007 peak at the end of 2018..

Japan Market – Nikkei 225

Now lets move on to a more exceptional market – Japan. And why do I say its exceptional? At its height in 1989, Nikkei 225 hovers near a level of 39,000. And almost 3 decades later at the end of 2018, Nikkei is just half of that.

Wait a minute, didn't experts say that equities can only rise over the long term? So what the heck is this? Or is 30 years still too short? I don't know where these experts hail from, but humans have a penchant for turning generalized observations into one-sided "facts". And in this case, an improbable event is conveniently brushed aside as an impossible one.

So how will BTD fare this time from 1987 – 2018? It did only a little better than the lump sum approach and worse off than DCA because Nikkei 225 first doubled from 1987 to 1989 before the long journey south begins. So the price can dip a steep 50% before it goes back to the level at the start of 1987.

	BTD	Lump Sum	DCA
Beginning Value	100,000	100,000	100,000
Ending Value	118,231	106,345	153,316
Total Returns	18%	6%	53%
Annual Returns	0.54%	0.19%	1.34%
Annual Volatility	18.57%	23.47%	10.31%
Max DD	-63.08%	-81.87%	-36.71%
Sharpe Ratio	0.03	0.01	0.13

So Should We Buy The Dip?

BTD's performance, like DCA, is highly contingent on how the market moves. But for most people with a long term view and who do not have the time or expertise to actively manage their investments, I would go for a yes. If you have already set aside the money to buy into the markets, and a significant price drop comes along, of course you buy.

However, a more pertinent question is not whether we should buy the dip, but rather whether we should put our money on hold and wait for the dip? As evident from history, market don't correct as frequent as you take your toilet breaks. From 1987 – 2018, the BTD strategy used bought into only 19 dips on S&P 500, 35 on Hang Seng 50 and 11 on Nikkei 225. In the long run, BTD trails behind a lump sum approach for the markets that trended up. No one knows when the next correction or bear market is going to come. Not even legendary traders like George Soros. He has a bearish view on the stock markets since 2014 and here we are in 2019. Where's the bear? The market has went on a super long euphoric bull since 2009. And S&P 500 rose from a low of 676 to 2506 at the end of 2018 or 370%. The price of waiting may be higher than you think.

What if we encounter a "Japan"? Well, we don't know if its a "Japan" until 30 years later. Meanwhile, your best protection – diversify.

Busting A Common Defense for Buy and Hold

Written By

Patrick Ling

Proponents of buy and hold have a common rationale against trading in and out of markets. The returns from equities would be a lot worse if we removed only a few significant up days. Let's use the S&P 500 to illustrate this.
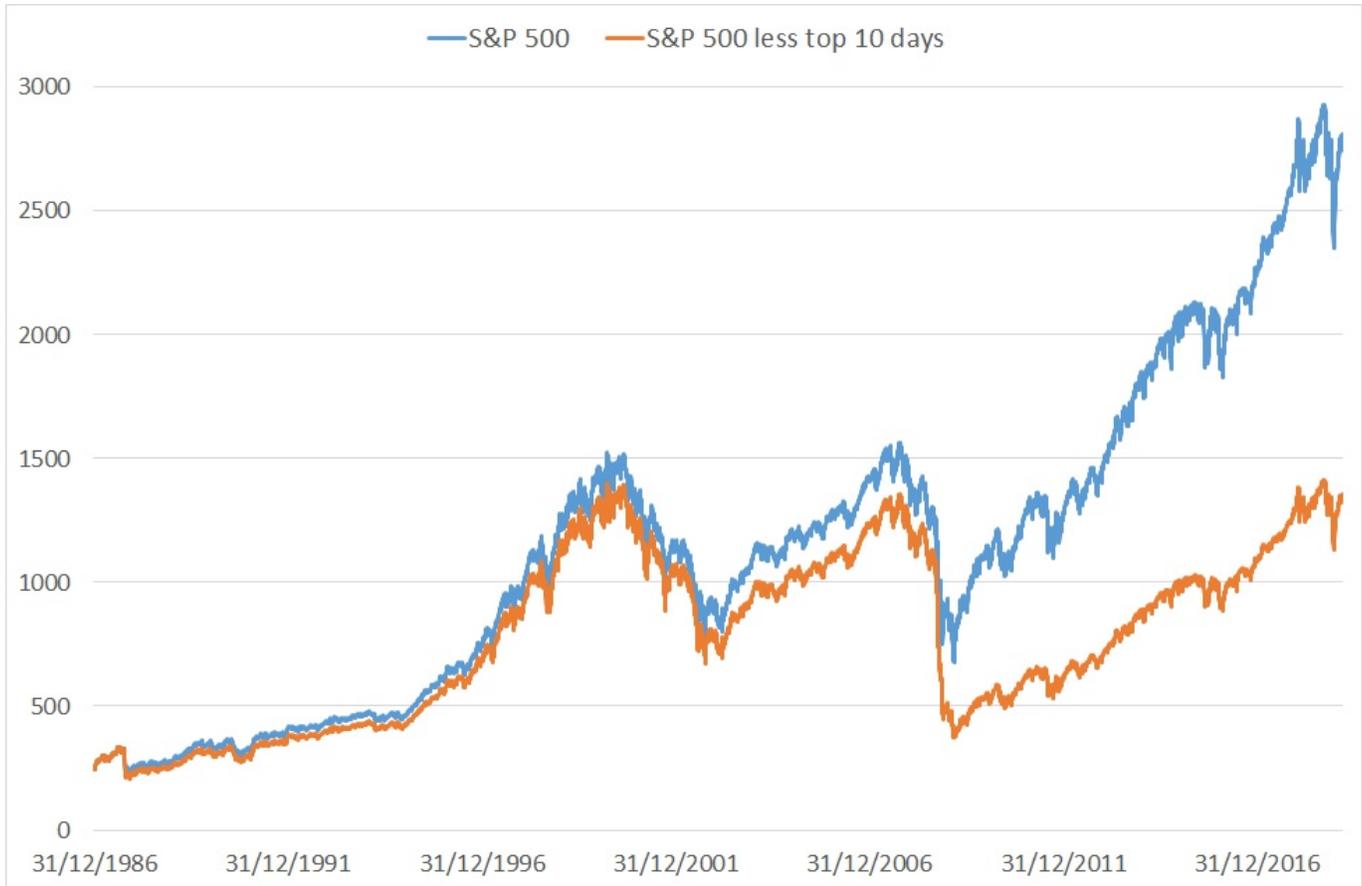
The Case for Buy and Hold

Since the beginning of 1987, the top 10 gaining days for the S&P 500 are as listed below.

Date	Top Gainers
13/10/2008	11.6%
28/10/2008	10.8%
21/10/1987	9.1%
23/3/2009	7.1%
13/11/2008	6.9%
24/11/2008	6.5%
10/3/2009	6.4%
21/11/2008	6.3%
24/7/2002	5.7%
30/9/2008	5.4%

If we exclude these top 10 days from the S&P 500, the index level today would be about half of the actual value.

This looks like a very convincing case for buy and hold isn't it? Let's put on our critical thinking hat and ask how likely is it for an investor to miss only these top 10 winning days? Find me such an individual and I'll hire him since I can simply load up on those days he decides to stay out. If you believe the scenario above is plausible, why not also believe that an investor can miss out only the top 10 losing days as listed below?

Date	Top losers
19/10/1987	-20.5%
15/10/2008	-9.0%
1/12/2008	-8.9%
29/9/2008	-8.8%
26/10/1987	-8.3%
9/10/2008	-7.6%
27/10/1997	-6.9%
31/8/1998	-6.8%
8/1/1988	-6.8%
20/11/2008	-6.7%

Adding the result of missing only the top 10 losing days into the previous chart would immediately show how ridiculous it is.
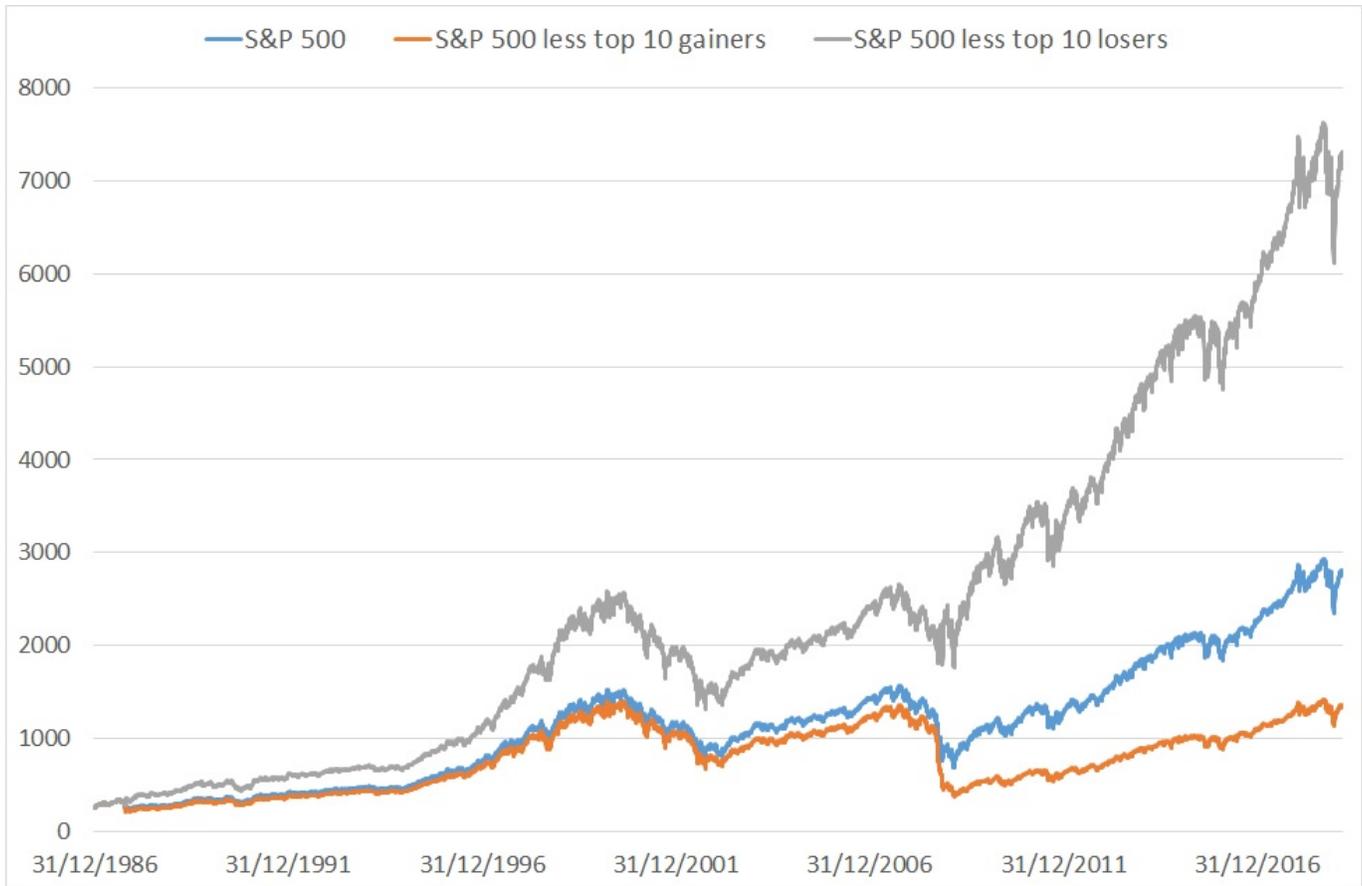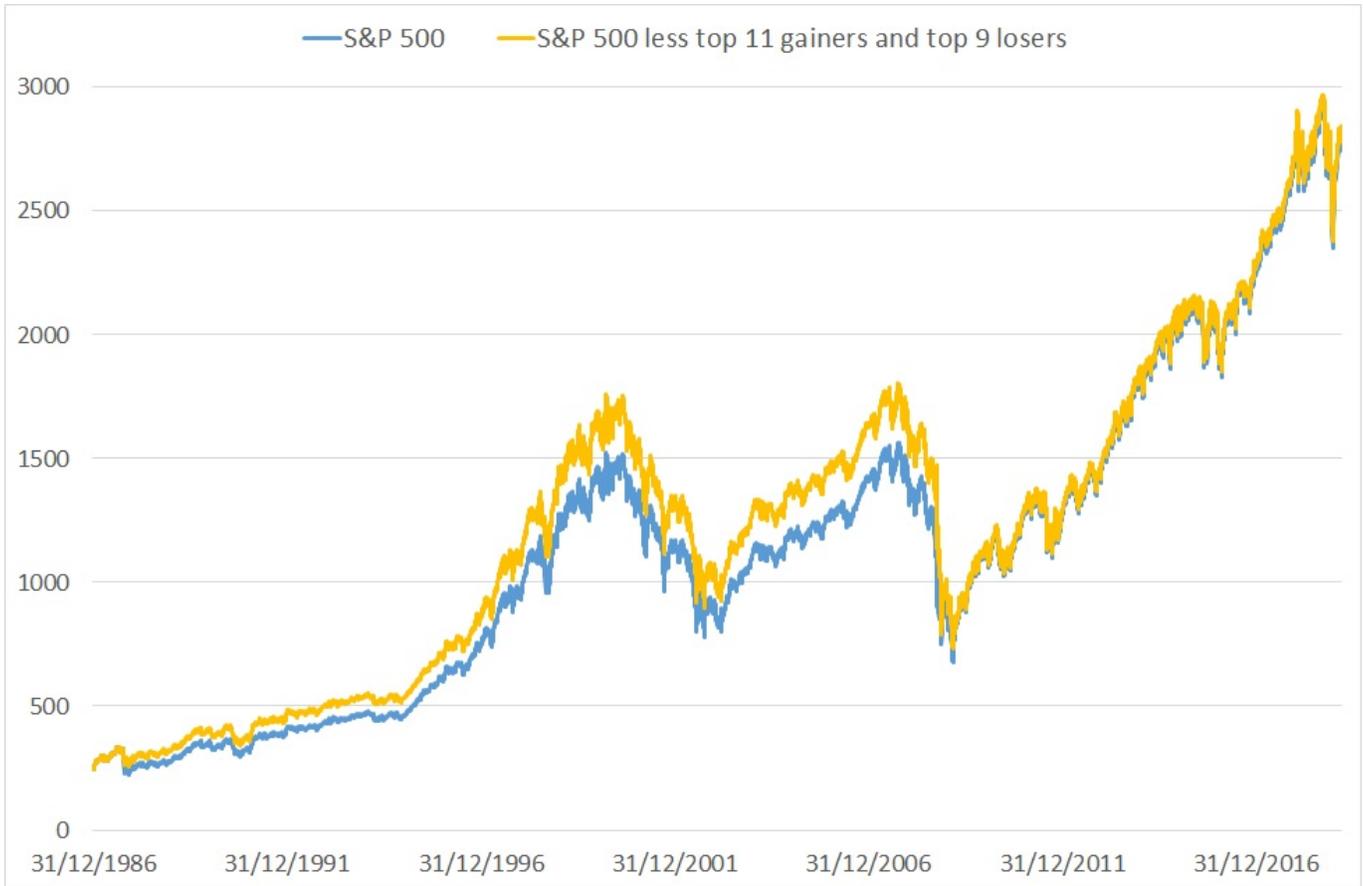

A More Balanced Analysis

Instead of missing only winning days or losing days, why not include the possibility of missing both? To do that, the statistics for daily S&P 500 moves since 1987 would come in handy.

Number of Positive Days	Number of Negative Days	% Positive Days	% Negative Days
4360	3748	54%	46%

There are more positive days than negative days. Out of 20 missing days, there is a slightly higher chance of missing a positive day than a negative one. To be exact, roughly 11 days would be positive and 9 days would be negative. Assuming an investor in the S&P 500 were to miss the top 11 winning days and the top 9 losing days, the result would be as follows.

Busting A Common Defense for Buy and Hold

Chart legend: — S&P 500 — S&P 500 less top 11 gainers and top 9 losers. X-axis dates: 31/12/1986, 31/12/1991, 31/12/1996, 31/12/2001, 31/12/2006, 31/12/2011, 31/12/2016. Y-axis values: 0, 500, 1000, 1500, 2000, 2500, 3000.

The scenario of missing only the most extreme daily moves is still a highly unlikely one but at least this is more plausible than missing the top winning days only.

Extreme Moves Tend to Cluster Together

There is another supporting reason why it is likely to miss both extreme daily up and down moves together. It should become clear when the top 10 winning days and top 10 losing days are rearranged in chronological order.

Date	Top losers		Date	Top Gainers
19/10/1987	-20.5%		21/10/1987	9.1%
26/10/1987	-8.3%		24/7/2002	5.7%
8/1/1988	-6.8%		30/9/2008	5.4%
27/10/1997	-6.9%		13/10/2008	11.6%
31/8/1998	-6.8%		28/10/2008	10.8%
29/9/2008	-8.8%		13/11/2008	6.9%
9/10/2008	-7.6%		21/11/2008	6.3%
15/10/2008	-9.0%		24/11/2008	6.5%
20/11/2008	-6.7%		10/3/2009	6.4%
1/12/2008	-8.9%		23/3/2009	7.1%

I have color-coded those extreme up and down moves that occurred within days of each other. You can see the clustering effect of those days.

What About Other Markets?

Hong Kong Market – Hang Seng 50

Date	Top losers		Date	Top Gainers
19/10/1987	-11.1%		23/5/1989	9.3%
26/10/1987	-33.3%		29/10/1997	18.8%
22/5/1989	-10.8%		2/2/1998	14.3%
5/6/1989	-21.7%		16/10/1998	9.0%
23/10/1997	-10.4%		23/1/2008	10.7%
28/10/1997	-13.7%		19/9/2008	9.6%
12/1/1998	-8.7%		13/10/2008	10.2%
12/9/2001	-8.9%		28/10/2008	14.3%
22/1/2008	-8.7%		30/10/2008	12.8%
27/10/2008	-12.7%		8/12/2008	8.7%

Number of Positive Days	Number of Negative Days	% Positive Days	% Negative Days
4142	3797	52%	48%

There is a slightly more even split between positive and negative days for the Hang Seng Index since 1987. However, let's keep the odds the same as for the S&P 500.

Japan Market – Nikkei 225

Date	Top losers		Date	Top Gainers
20/10/1987	-14.9%		21/10/1987	9.3%
17/4/2000	-7.0%		2/10/1990	13.2%
8/10/2008	-9.4%		10/4/1992	7.5%
10/10/2008	-9.6%		31/1/1994	7.8%
16/10/2008	-11.4%		17/11/1997	8.0%
24/10/2008	-9.6%		21/3/2001	7.5%
20/11/2008	-6.9%		14/10/2008	14.2%
15/3/2011	-10.6%		29/10/2008	7.7%
23/5/2013	-7.3%		30/10/2008	10.0%
24/6/2016	-7.9%		9/9/2015	7.7%

Number of Positive Days	Number of Negative Days	% Positive Days	% Negative Days
4054	3862	51%	49%

The Nikkei 225 has a close to even split between positive and negative days. Out of 20 missing days, there is an equal chance of missing a positive day or a negative one. Roughly 10 days would be positive and 10 days would be negative.

Chart: N225 and N225 less top 10 gainers and top 10 losers, plotted from 5/1/1987 to after 5/1/2017.
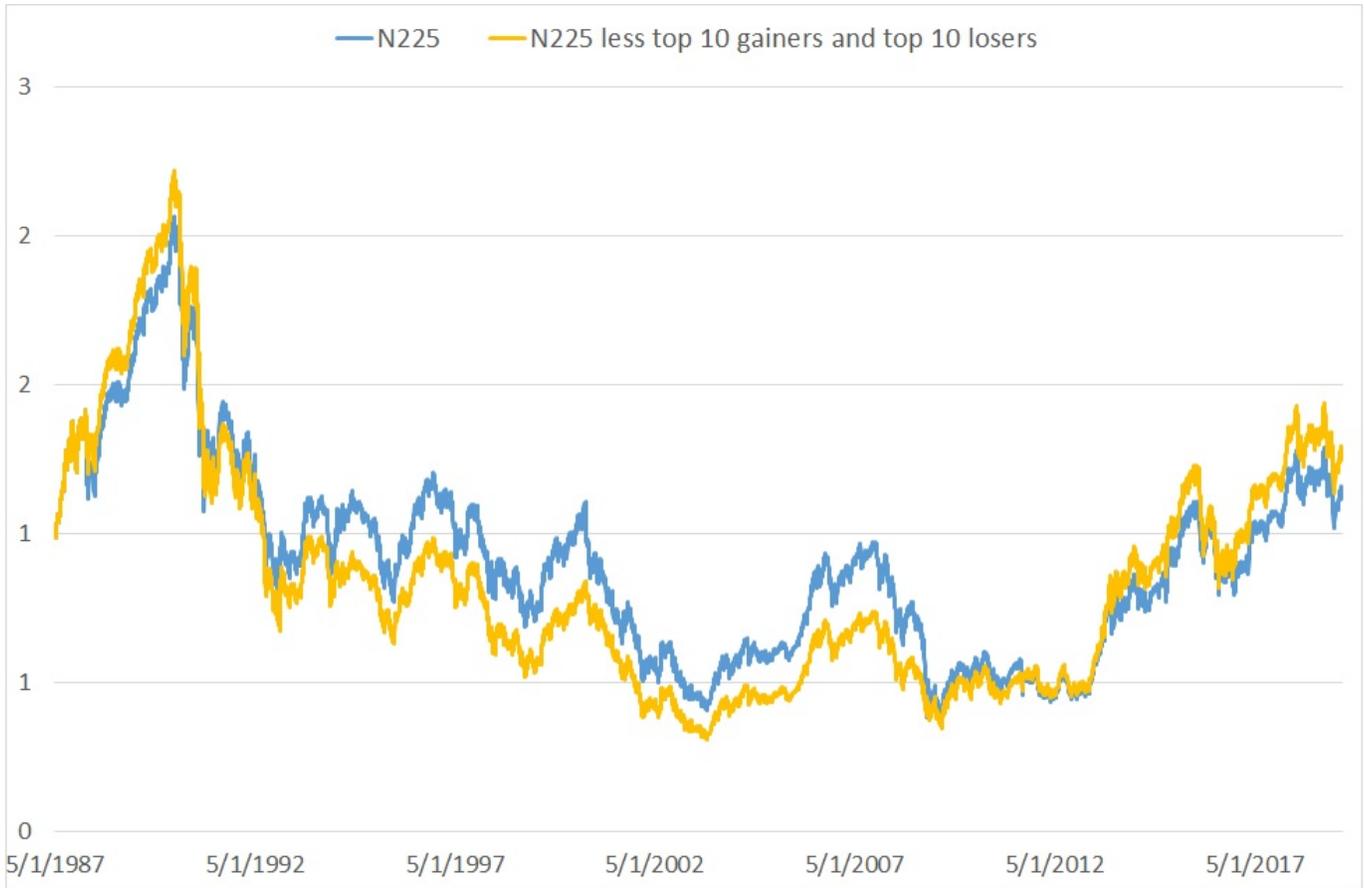
The Debate Continues

This post is not meant to discredit buy and hold. Indeed, no simple study is able to conclusively say which method is better. However, any simple sounding defense used by either camp should be looked at critically to see whether it holds any water.

The S&P 500 Momentum Effect

Written By

Patrick Ling

The S&P 500 was up 17.5% for the first 4 months of 2019 after the dismal performance in December last year. This led to some commentators saying that now is a good time to take profits off the table. In fact, this seems to be happening right now, no doubt triggered by the escalating trade war tensions between US and China. This line of reasoning sounds logical and comfortable. But what does history say?
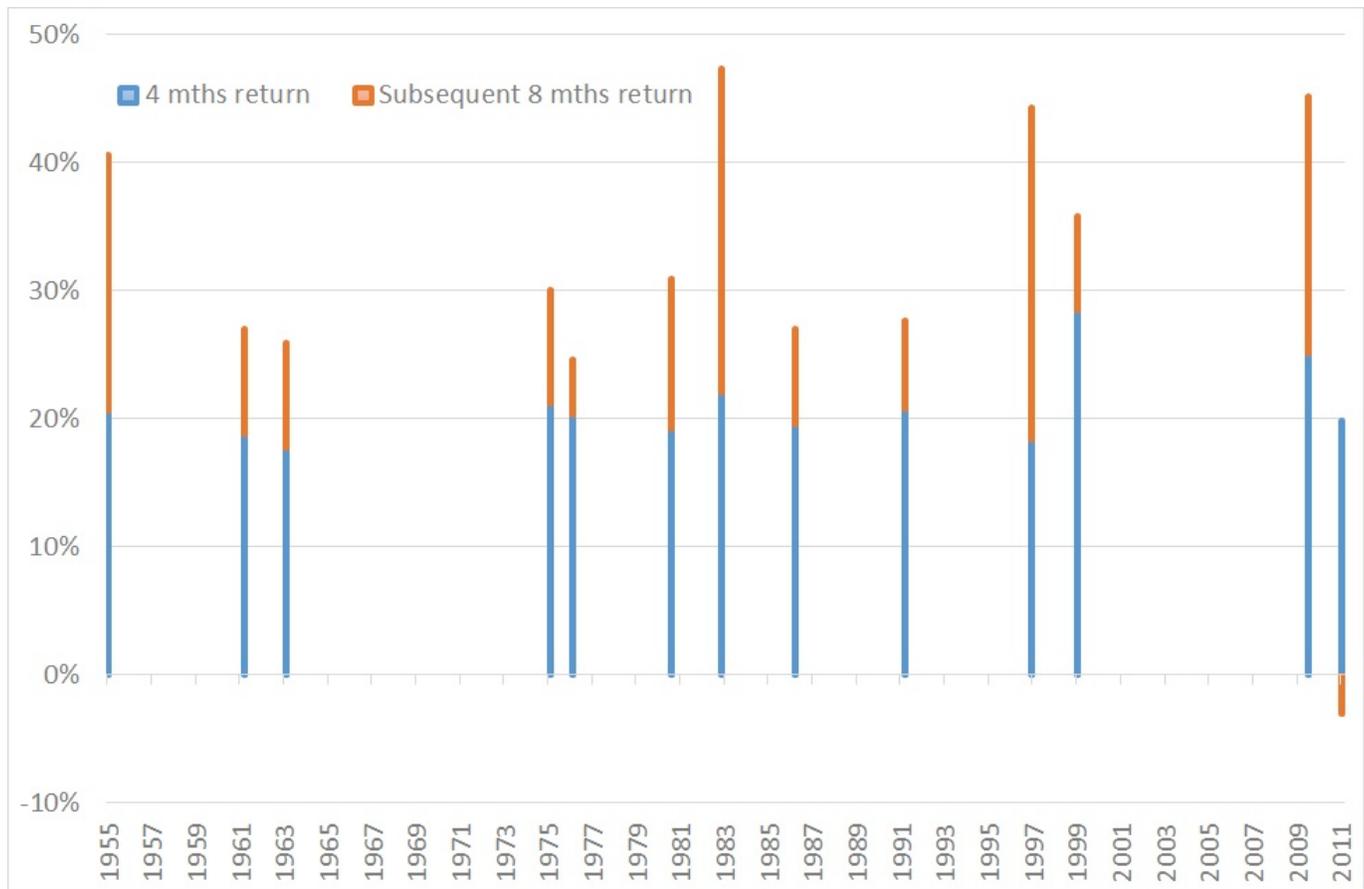
A Trip Back To The 1950s

Since the 1950s, there have been a number of instances where the S&P 500 is up 17.5% or more in a period of 4 months. These periods do not have to start in January and they can even cross over calendar years. How did the subsequent 8 months return look like after each strong 4 months period?

I excluded any 4 months period that overlapped with the 8 months period following the previous strong 4 months period. So for example, if a strong 4 months period is from January 1990 to April 1990, I would exclude any strong 4 months period that occurred within May 1990 to December 1990. This is because any such periods would be within the "momentum effect" of the prior period and as such the subsequent "momentum effect" if any would be less valid.

Below is the stacked chart of 13 such instances since 1950. The blue bar is the 4 months return and the orange bar is the subsequent 8 months return. If the subsequent return is positive, it would be added on to the blue bar. If the subsequent return is negative, it would be shown as a negative orange bar.

For almost all of such strong 4 months period, the subsequent 8 months continued to be positive. Some even doubled the 4 months return. The only exception was in 2011 when the subsequent 8 months gave back some of the gains. However, the full year was still a positive one.

Caveat

There are only 13 samples for the entire period. This is hardly statistically robust in the traditional sense. However, it is hard to get sufficient samples since each sample is a year long and samples cannot overlap. This study is just to give a sense of whether one can say for certain that taking money off the table now is definitely going to generate the least regret 8 months down the road.

The Latest Sample

Below is the normalized equity curves of all past 13 samples as well as the current instance.

Normalized Equity Curves
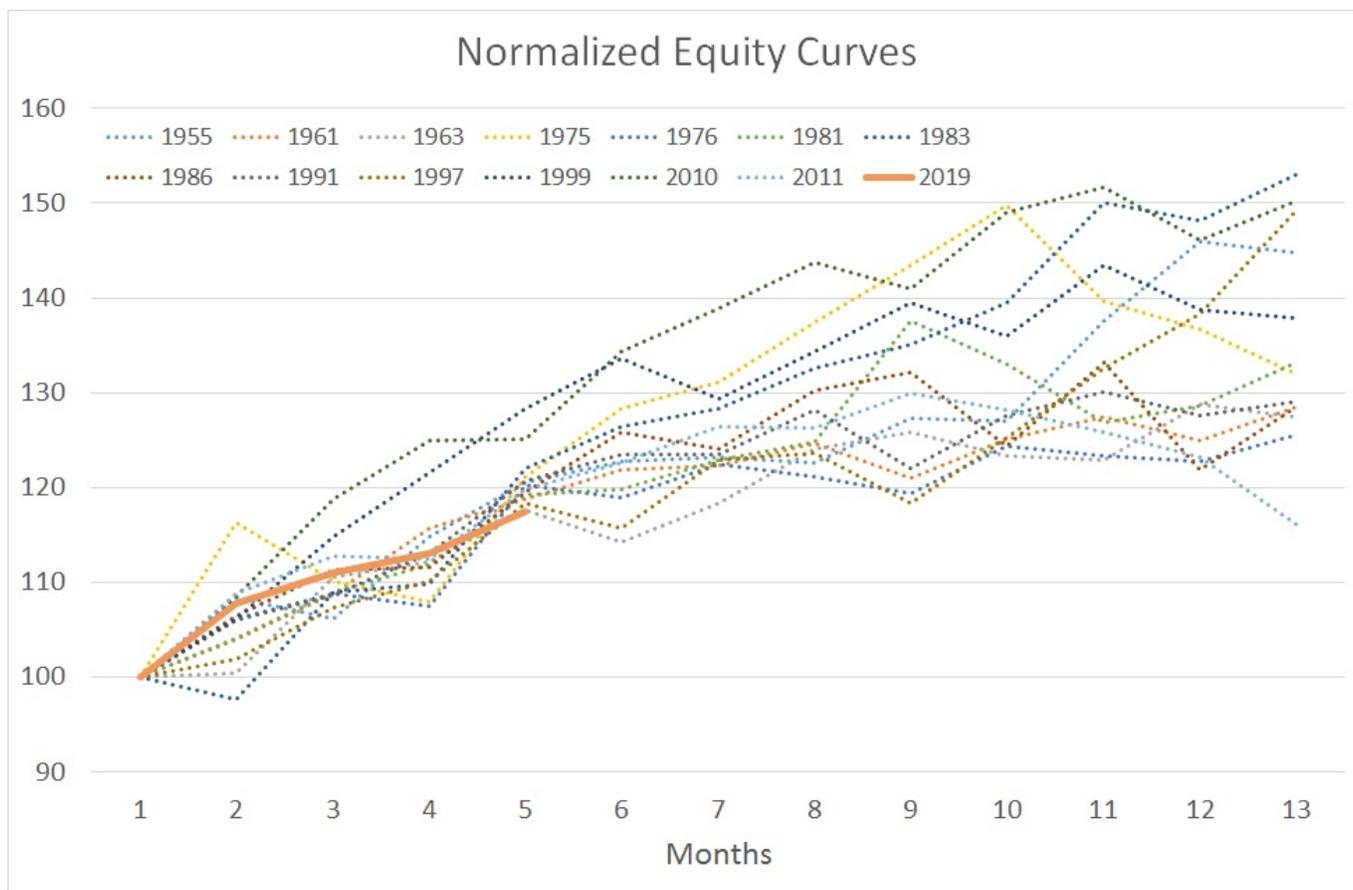
I shall leave it to readers to decide for themselves what is the most likely path of least regret for the following 8 months.

Eng Guan Lim (E.G.)

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