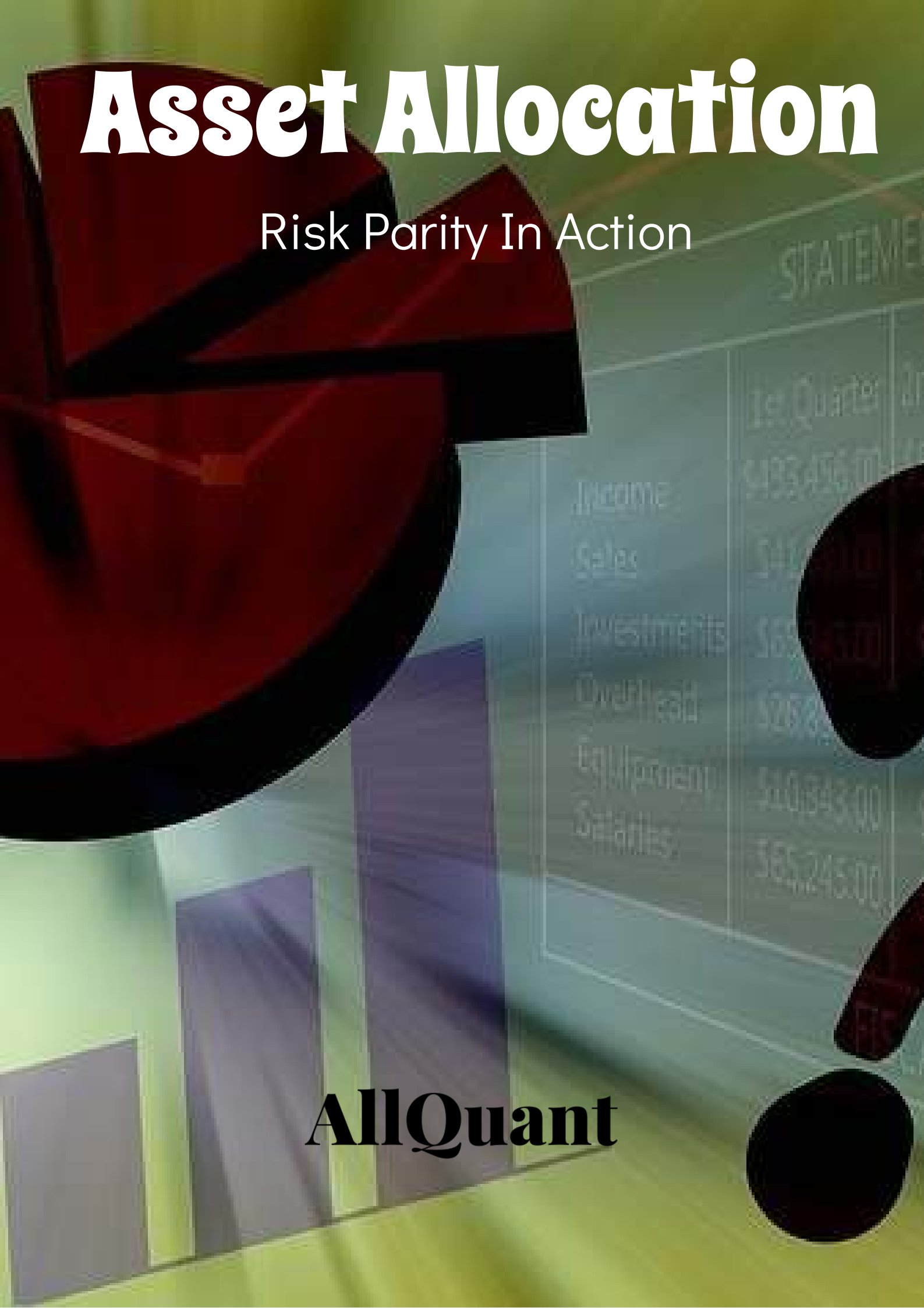
Asset Allocation
Risk Parity In Action
AllQuant

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Risk Parity Common Sense in Diversification

Written By
Eng Guan Lim (E.G.)

When it comes to diversification, investors' opinions are just as … diversified. Ardent supporters believe it is the only sustainable way to make money. And extremists in the rival camp argue that this is proof that you do not know what you are doing.

The truth is somewhere in between. If you diversify without a proper strategy, you run the risk of diluting the returns. Similarly, if you take concentrated bets, you become an easy pick for market black swans.

Diversification works. But the catch is you got to do it right. And it is not that difficult. The mystery to the puzzle lies in answering 2 simple questions:

1. What assets should I put inside my portfolio?
2. How do I allocate my capital among these assets?

Selecting The Right Assets For Diversification

It is not hard to answer this. Let me use an example. Say you are the Head Trader of an investment company, and you are looking to build a team of traders that can work together to make money no matter rain or shine. So will you hire those that trade exactly the same way as you do? **Common sense tells you NO**. Unless you are perfect, hiring others to do the same thing you do makes no sense. Why? Because when you are knee deep in shit, so is everyone else. And if you are already impeccable when it comes to trading, why even bother hiring others?

What you need is others to back you up when you are down. And when others are down, you are in the position to support them. So the ideal mix are profitable traders who trade fundamentally in different ways. Each has their own strengths and weaknesses. They may not be the best in their own class. But together as a team, they become a force to reckon with.

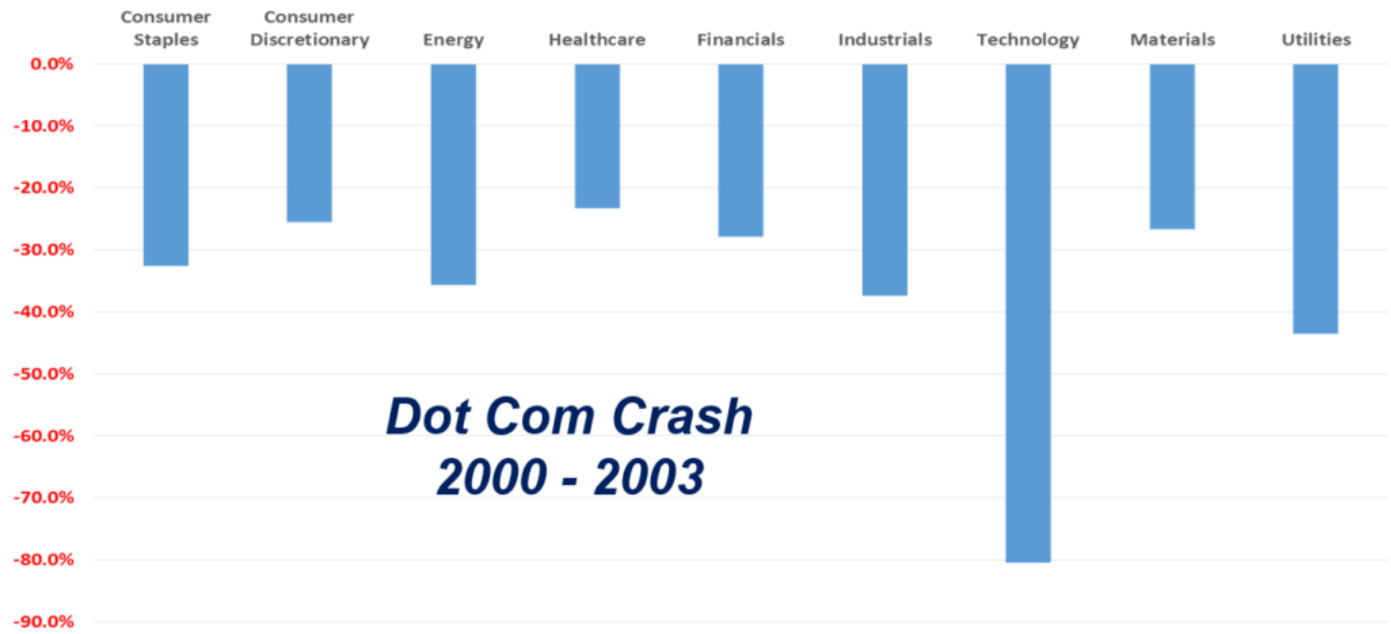
Most people have a portfolio concentrated with stocks

The same concept applies when it comes to selecting assets for diversification. Most people invests predominantly in stocks. Why? Because it holds the most appeal. Familiar, easily accessible, good history, attractive returns ...

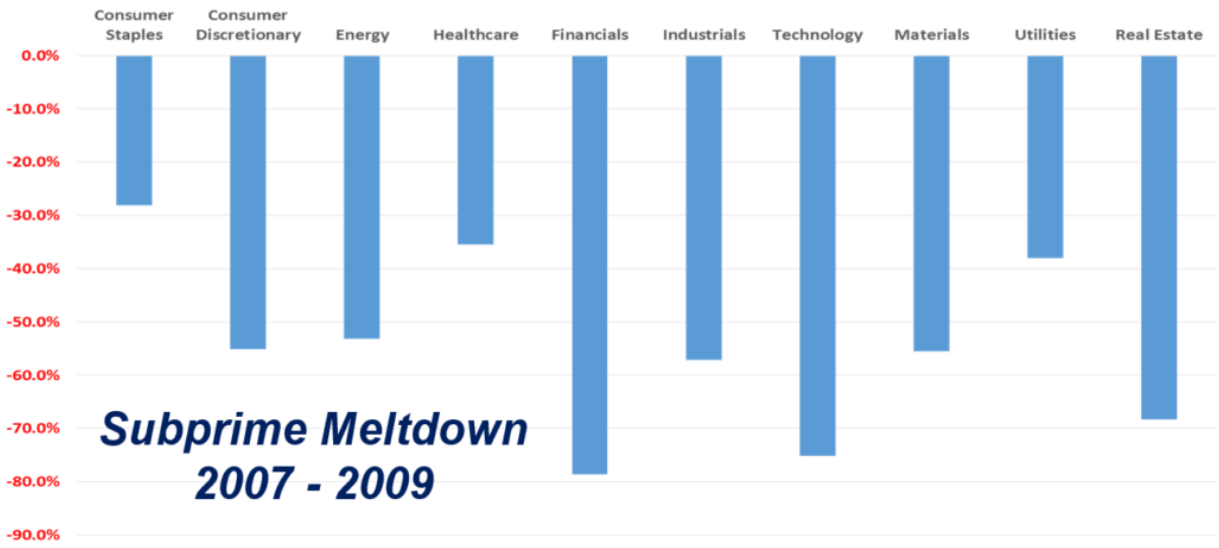
But when the bear pays them a visit, it causes sleepless nights, loss of appetites and emotional upheaval. This is especially so if they have painstakingly build up the portfolio through pumping in their savings over many years. We all know how fast and how deep stocks can fall in a major crisis. And this fear of losing money makes people do irrational things such as timing the market which is worse than doing nothing.

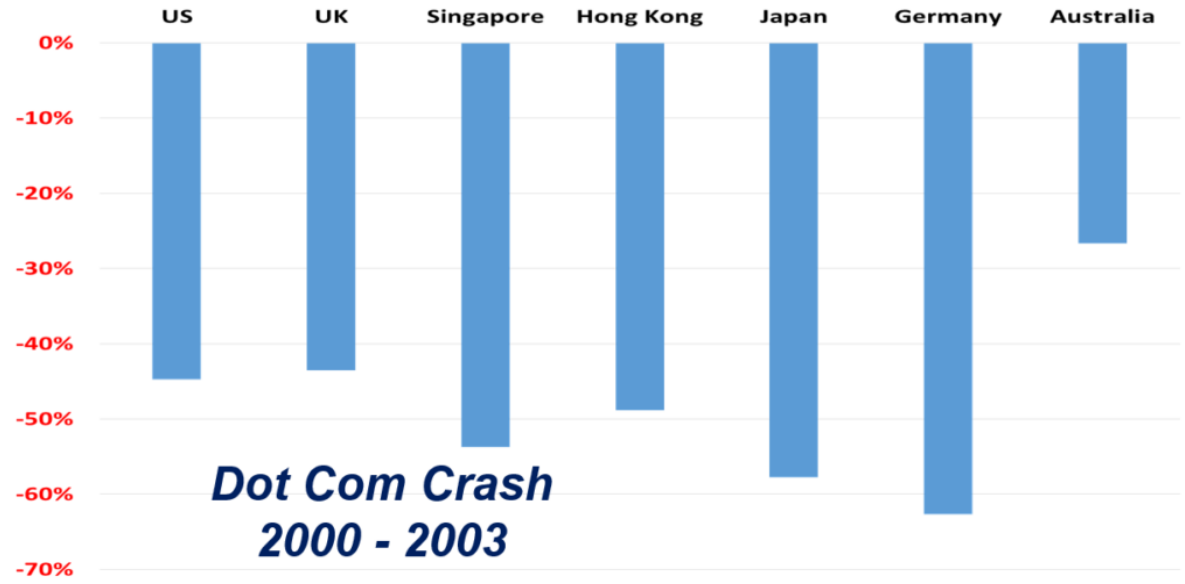
More Stocks Is Not The Solution

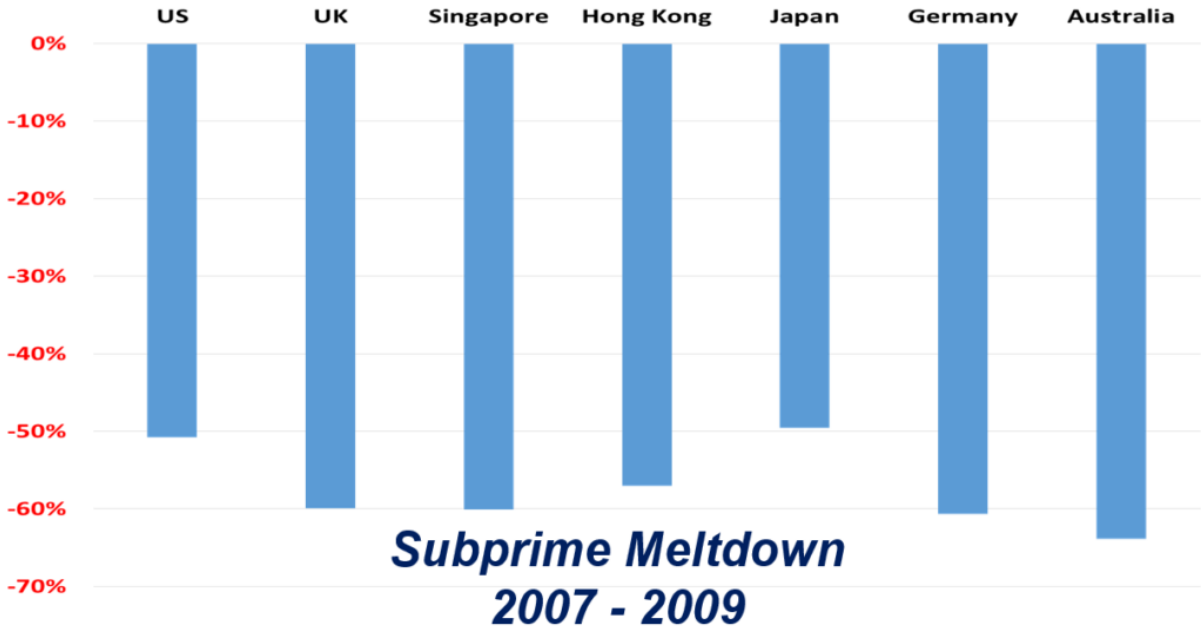
And diversifying across more and more stocks is also not the answer. More of the same will not help you here. Below is a snapshot of how stocks in different sectors and countries performed during the Dot Com Crash (2000-2002) and The Great Financial Crisis (2007-2009).



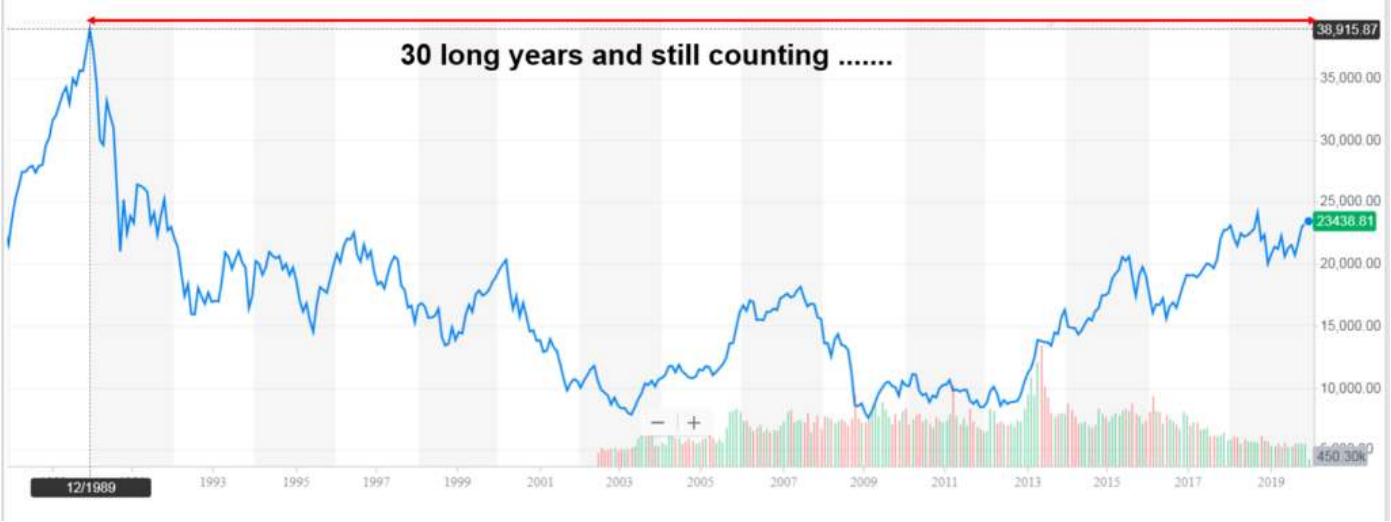
Risk Parity - Common Sense In Diversification







Neither is riding out the crisis an option for everyone. You don't know how long this is going to take and what it means for your future plans. While US stocks has done fabulously well after the last bear market, it doesn't represent the world. After more than 10 years, Asia has yet to fully recover from the Great Financial Crisis (GFC) in 2007-2009. And if you think 10+ years is long, then take a look at Japan.



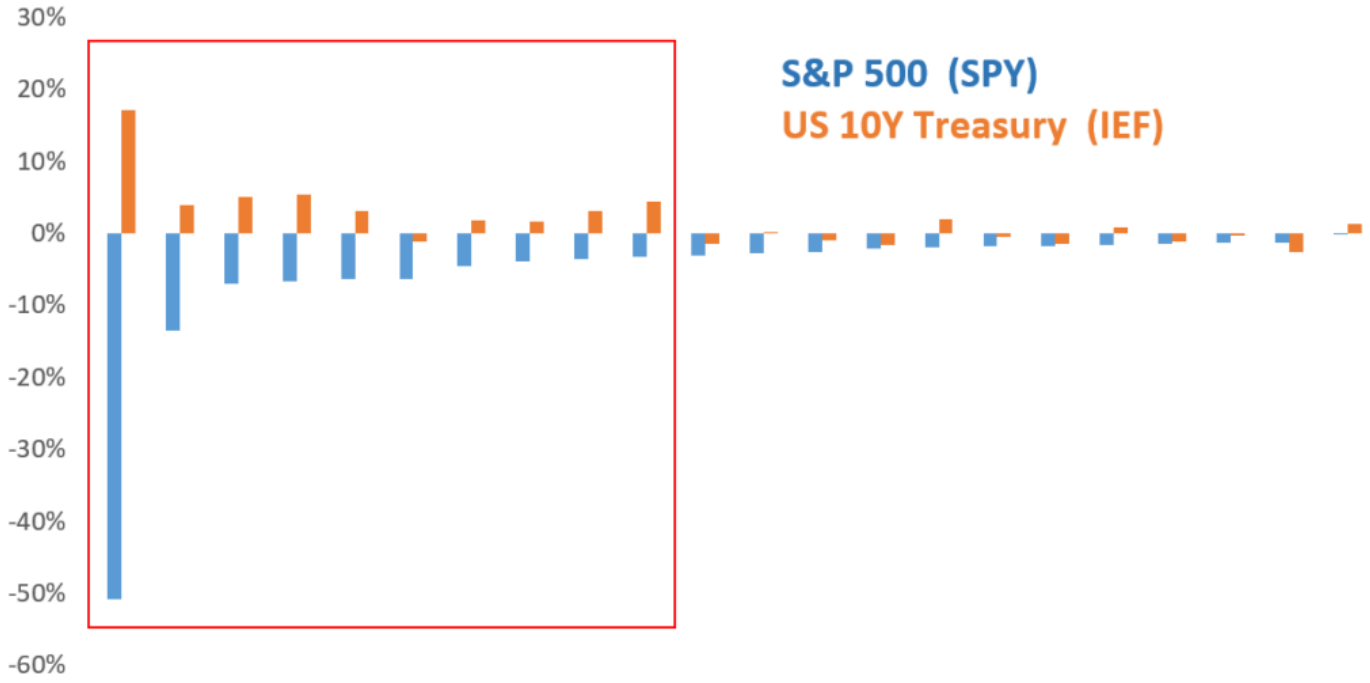
Japan underwent a prolonged downturn marked by deflation and slow economic growth in 1989. And people termed the period between 1989 – 1999 the lost decade. That was before they knew it would went on for another decade. Even today, the Nikkei 225 index was nowhere near its peak in 1989. So 30 long years passed and we are still counting. While this may not happen to you, it is an example of what can.

Looking Beyond Stocks

If stocks is not the answer, then we have to look into other asset classes. Bonds, Commodities, Real Estate.

To illustrate my point, I will just use one example.

Let's look at how good quality sovereign bonds like US Treasuries (IEF ETF) behave with respect to US Stocks (SPY ETF).



This waterfall chart shows the performance S&P 500 when it goes through a crisis or pullback since 2004 and the corresponding performance of the US Treasury. The red box captures all the major crisis or pullback periods. And if you are invested in US stocks, these would be the critical times you needed help. And how did US Treasuries fared during those periods? It delivered outstanding performance! So if you add Treasuries into your portfolio of stocks, they can work magic and can cushion you during times of stress.

Mathematically, we can filter out assets that have such behaviors with one another using a measure called Correlation. Correlation is a statistical metric from -1 to 1 telling us how one asset move in relation to another. So if 2 assets tend to move in opposite directions, then they are negatively correlated. And if they tend to move in tandem with one another, then they are positively correlated. US Treasuries is negatively correlated with US Stocks.

And this relation does not happen by chance. When stocks undergoes a crisis, funds are pulled from stocks and parked into safe haven assets such as Treasury bonds causing their prices to move up. And when US Fed cut rates in an economic downturn, that also elevates the bond prices.

So now that you have an idea of what kind of assets we should be picking, the remaining question to address is how to allocate the capital among them?

Allocating Capital Among Assets

Most people adopt a simple approach to asset allocation. A favorite method is equal allocation. This means that if I have $10,000, and have to decide how much to put between S&P 500 and US Treasuries, I will put $5,000 in each.

But if you ask them why they do it this way? You are likely to end up with reasons such as:

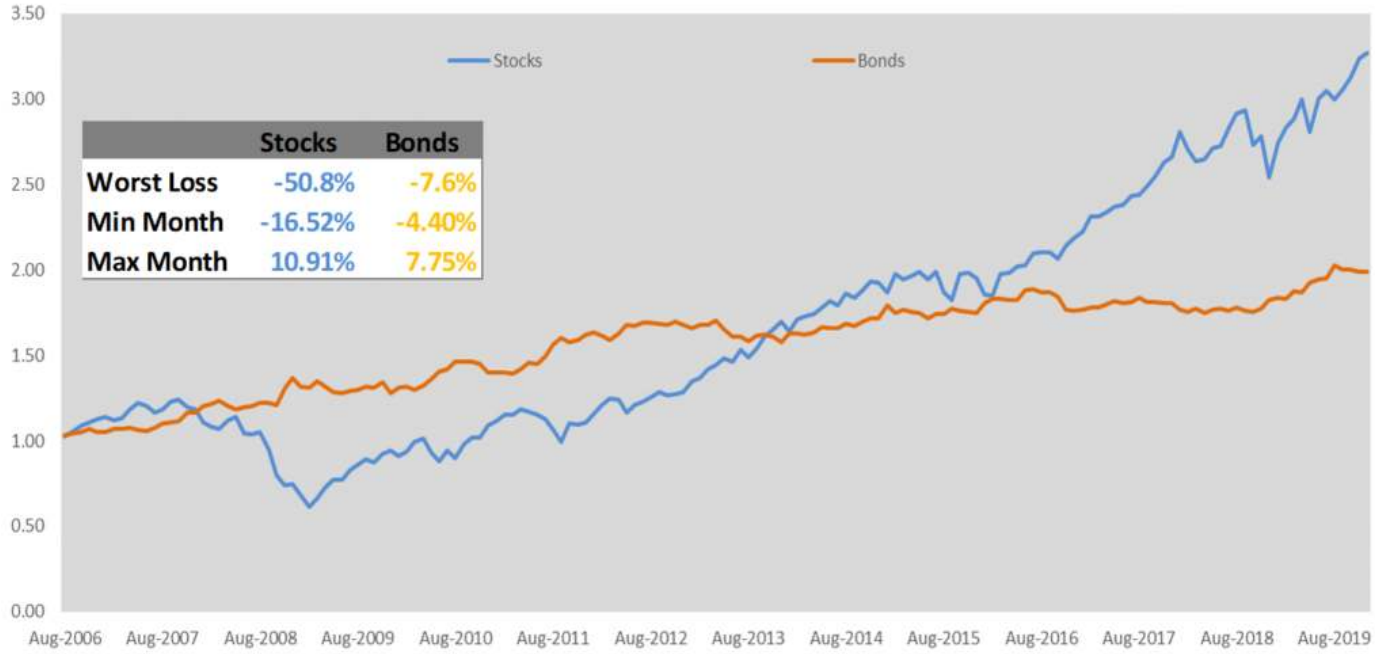
- I don't want to think so much about it.
- It is easy to implement.
- I have no better way to do it.
- Balanced approach? Fair and square?

With the exception of the last point, the rest are kind of valid. The last reason, however, stems from misconception. While the objective of constructing a balanced portfolio is sound, the traditional approach to allocating equal amount of capital to each asset is, however, actually far from balanced.

Perspective Shift - From Dollars To Risk

To see what I mean, you have to see things from the perspective of risk. There are many ways to calculate risk and there are various types of it as well. But what we are concern about here is a measure called volatility. Not going to delve into the math here. Just want to give you an intuition behind it.

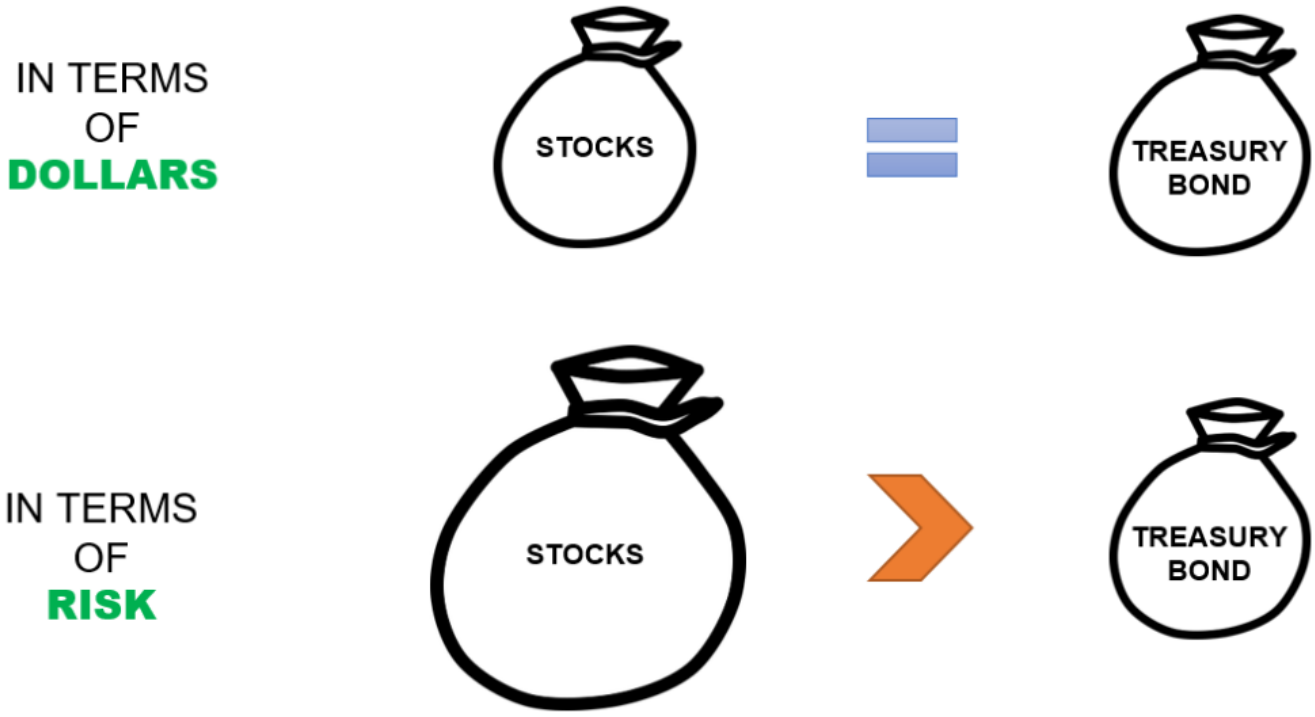
Look at how Stocks and Bonds move.



Even if you do not understand the mathematical concept behind risk, you can visually appreciate what it is. From the chart, we can see that Stocks moves more aggressively than bonds. They have a tendency to swing up and down in larger magnitudes. And volatility is somewhat like a measure on this tendency.

Why is that even considered risk? Because the larger those swings are, the more uncertain we are about achieving our target return. And in the interim, such assets experience bigger drawdowns and shortfalls. During this period, Stocks lost more than 50% of its value at the worst point. Bonds, on the other hand, only loses about 8%.

So now, if you have a portfolio comprising half Stocks and half Bonds, which do you think will drive the performance of the portfolio? The answer is clear. Stocks. And **RISK IS THE DRIVER OF RETURNS**. So does the portfolio still look balanced to you now? NO, while it is balanced in terms of dollars, it is grossly **LOPSIDED IN TERMS OF RISK**.

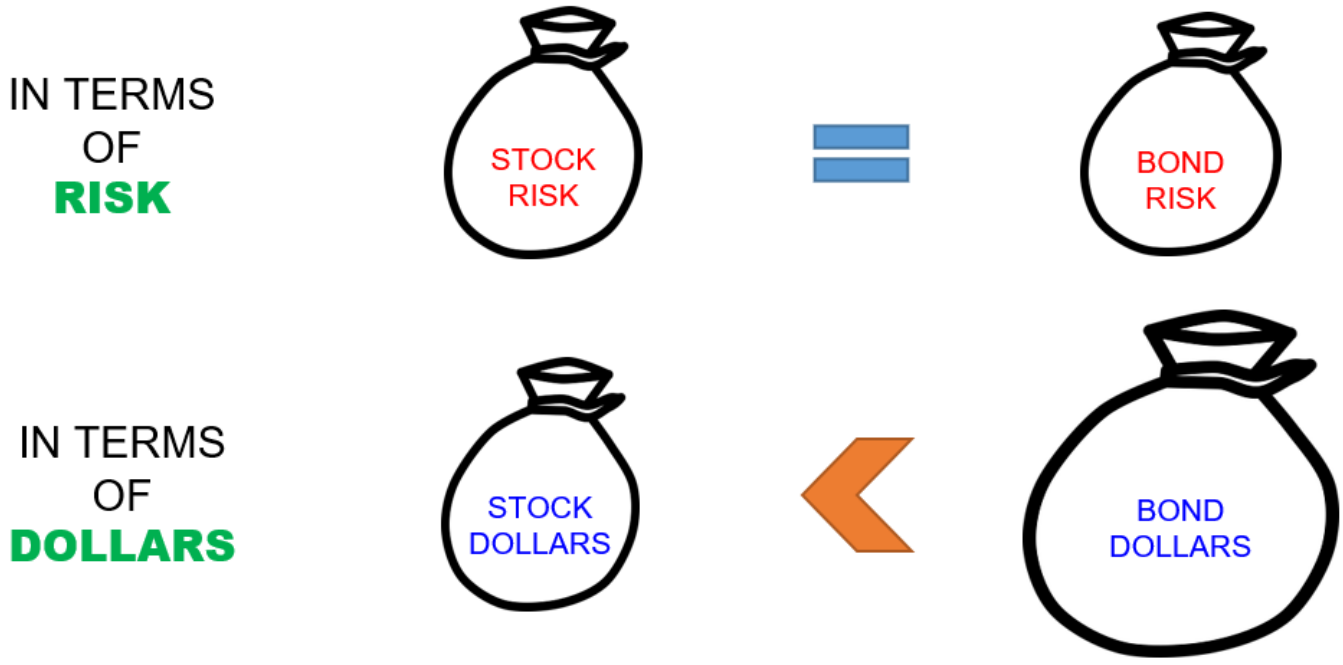


Risk Parity Asset Allocation - Allocating Using Common Sense

So what we actually desire for a balanced portfolio is an **equal contribution in risk** and not the dollar capital. Why?

1. Can we control the market? **NO**
2. Can we predict the market or which asset will perform? **NO**

But what we do know is that each asset have their own strength and weaknesses and they perform differently under different market states. So if that is the case, then common sense tells us that the best we can do is to size the assets up such that they drive the portfolio equally. Don't touch what is beyond your call. Leave the rest to the markets.



If the portfolio is well represented with assets for every market state, you have no need to predict what the market will do anyway. This dramatically lowers the risk and makes your portfolio much more robust. And if what you want is high returns, then you always have the option of leveraging up to amplify it.

This allocation approach is called **RISK PARITY**. The foundations behind Risk Parity was set as far back in the 1950s when Harry Markowitz came up with the Modern Portfolio Theory (MPT). Ray Dalio, founder of the largest hedge fund BridgeWater Associates, subsequently launched the first hedge fund based on Risk Parity principles in 1976. He named it the "All Weather Fund" and till today, it is still going strong.

Risk Parity Performance - Weathering the Crises

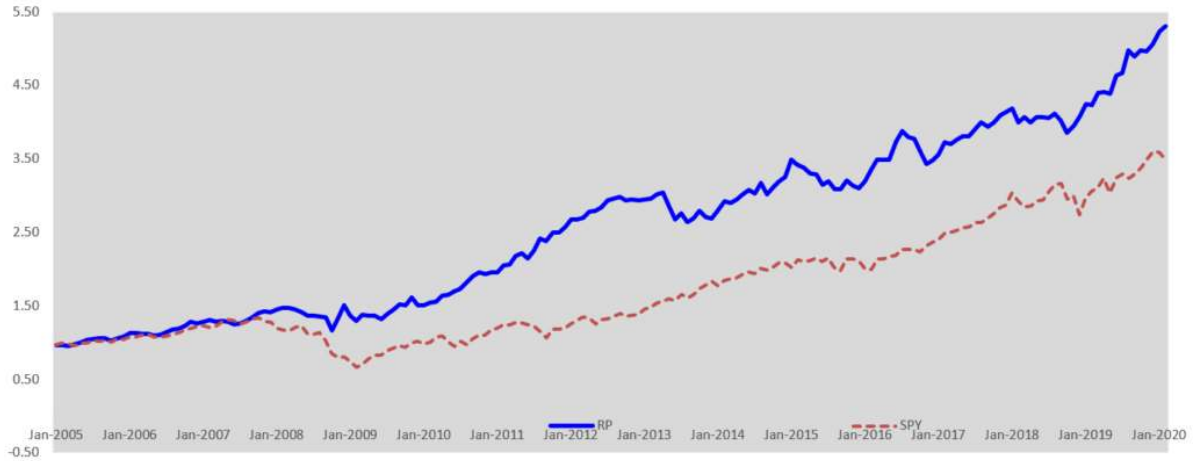
I used to run Risk Parity as a slice in a multi-strategy hedge fund. And after I left, I adapted it into a scaled down version that is more practical for individuals to implement with minimal outlay. The portfolio comprises multiple assets: Stocks, Bonds, Commodities and Real Estate running on 1.7x leverage.

Historical Performance since 2005

Below is the back-tested performance of the strategy since start of 2005 up till 24 Feb 2020. And let's do a comparison against the SPY ETF which represents the US S&P 500.

HISTORICAL PERFORMANCE

RP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2005	-3.3%	0.4%	-2.1%	3.0%	2.2%	3.1%	1.5%	0.7%	0.3%	-3.3%	3.3%	2.3%	8.1%
2006	4.1%	0.6%	-1.1%	0.3%	-2.2%	0.5%	3.0%	3.1%	1.5%	3.1%	4.4%	-2.0%	16.3%
2007	2.0%	1.7%	-1.6%	1.6%	-1.4%	-2.5%	0.5%	3.5%	3.5%	4.2%	1.8%	-0.9%	12.7%
2008	2.4%	1.5%	0.2%	-1.6%	-2.3%	-3.5%	-0.3%	-0.7%	-1.0%	-12.9%	13.6%	13.1%	6.2%
2009	-9.3%	-4.5%	5.8%	-1.0%	0.4%	-3.4%	5.5%	4.1%	5.0%	-0.9%	7.2%	-6.6%	0.7%
2010	-0.6%	2.4%	1.0%	5.1%	0.8%	2.7%	2.6%	5.3%	4.4%	2.6%	-1.3%	0.9%	29.0%
2011	0.2%	4.9%	0.2%	5.[Plot Area]	1.4%	-2.9%	4.8%	7.7%	-1.9%	5.0%	0.4%	2.7%	31.6%
2012	4.3%	0.1%	0.7%	3.2%	0.1%	2.0%	3.1%	0.9%	0.9%	-1.8%	0.6%	-0.6%	14.1%
2013	0.4%	0.6%	1.9%	0.7%	-6.3%	-5.9%	2.7%	-4.1%	1.8%	3.7%	-2.7%	-1.1%	-8.4%
2014	4.0%	4.7%	-0.9%	1.9%	2.4%	2.0%	-1.6%	4.6%	-4.8%	3.0%	2.9%	1.6%	21.1%
2015	7.4%	-2.2%	-0.8%	-2.4%	-0.5%	-4.3%	1.5%	-3.3%	0.2%	3.8%	-2.4%	-0.9%	-4.5%
2016	2.9%	4.9%	4.2%	0.1%	-0.1%	7.3%	3.8%	-2.2%	-0.5%	-4.7%	-4.7%	1.3%	12.0%
2017	2.6%	4.4%	-0.7%	1.8%	1.2%	0.2%	2.3%	2.5%	-1.6%	1.5%	2.4%	1.1%	19.0%
2018	1.2%	-4.5%	1.7%	-1.8%	1.9%	-0.2%	-0.3%	1.6%	-2.4%	-4.1%	2.5%	3.2%	-1.5%
2019	4.1%	0.0%	3.9%	0.1%	-0.4%	5.6%	0.6%	6.7%	-1.6%	1.7%	-0.3%	1.8%	24.1%
2020	3.6%	1.2%											4.9%



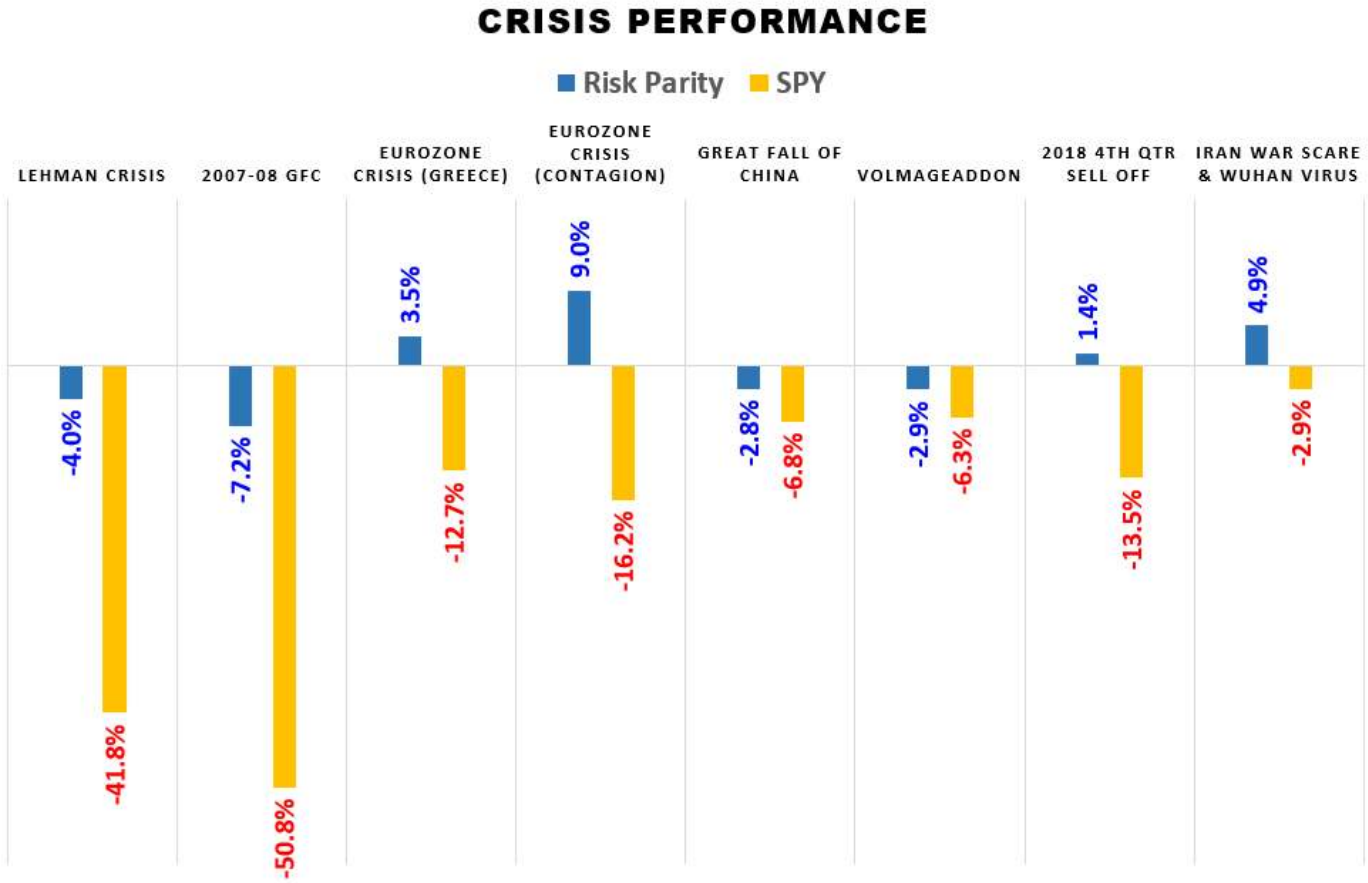
Risk Parity Vs SPY

Risk Parity portfolio outperform the SPY ETF (S&P 500) both in terms of CAGR and risk adjusted metrics. It delivered almost 12% per year against 9% for SPY. And despite running it at 1.7x leverage, its risk in terms of volatility is still lower than that of SPY. It also manage to weather through the period with a much lower drawdown of about 20% vs 50% for SPY. So if you have a larger risk appetite, there is still room for higher leverage.

PERFORMANCE	RISK PARITY	SPY
Total Returns	430.0%	249.4%
CAGR	11.6%	8.6%
Annualized Volatility	11.7%	13.7%
Maximum DrawDown	-20.7%	-50.8%
Sharpe Ratio	1.00	0.63
Max Monthly Return	13.6%	10.9%
Min Monthly Return	-12.9%	-16.5%
% Positive Months	65.9%	66.5%

Risk Parity During Stock Market Crisis (as at 24 Feb 2020)

And here is where you see a clearer picture of diversification at work. During stock market crises, Risk Parity outperformed. In fact, in some of these episodes, Risk Parity managed to deliver a positive return.



Conclusion

So this is it. Diversification is not that difficult conceptually, isn't it? It is, in fact, in my opinion, a lot easier than going around picking stocks, hanging around the computer doing intraday trading or timing the market. Sometimes, simple things are the ones that work and will continue working for a long time.

Risk Parity
Is It Game Over?

Written By
Eng Guan Lim (E.G.)

Risk Parity – Is It Game Over

Unprecedented, unprecedented … Yes, it happened again. Unprecedented. At least in certain ways.

I lost count of how many times I said this word since I started investing. And unsurprisingly, it was usually accompanied by a period of extraordinary pain to my pocket.

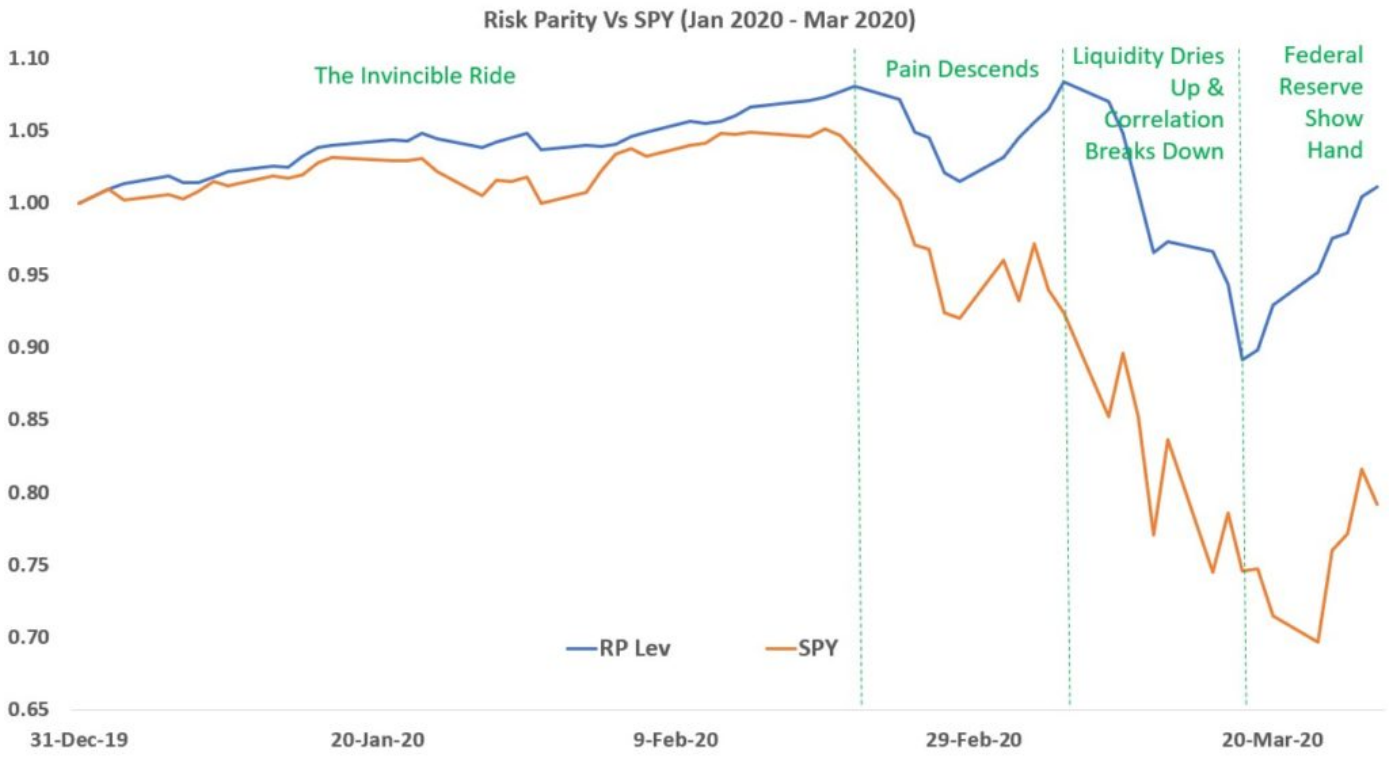
In this first quarter of 2020, we witnessed the power of Mother Nature coinciding with Human Nature. COVID-19 disrupted our daily lives and brought extreme fear and chaos to the financial markets. What is most astounding in this episode is the speed at which the stock market turned and plunged into the bear territory.

It took only 19 trading days for SPY to plunge 29% from its highs. To put things into perspective, compare this with the previous bear markets. The Great Financial Crisis (GFC) in 2008-2009, which we thought was fast, took about 250 trading days. And the Dot Com Crash in 2000-2002 took around 360 days. Previous moves of such magnitudes happened only well into the bear market and not at the start. So what just happened made the past 2 crisis looked like gentle babies. There is hardly any time to react unless you are already positioned for it.

Risk Parity Chronicle 2020

I ran multiple strategies in my own portfolio. Most headed south rapidly during this period because they are running a net long bias. My best performer for the year is a volatility hedge that I put on prior to this event. I had closed the position to lock in the profits. That helped to cushion the losses coming from my other positions. But for your information, I didn't know this is coming. It is just part of my longer term hedging strategy in case such a tail event occurs. Aside from the hedge, only a few other strategies were spared the magnitude of this fallout. And the Risk Parity strategy (it runs on 1.7x leverage) I wrote about in a previous post is one of them.

It was not entirely a joy ride though. Let's take a look at how Risk Parity did during this period.



The Invincible Ride Up : 1 January 2020 – 21 Feb 2020

Risk Parity started the year on a solid footing. While COVID-19 is starting to stir up a storm, the different asset classes are still performing in line with expectations. Even when the first wave of sell off in the equity markets began on the 19 Feb 2020, it was still holding up. Safe haven assets such as bonds and gold were on a roll when the turmoil worsened, more than offsetting losses from the stock markets. As at 21 Feb 2020, the Risk Parity portfolio was still sitting on a YTD gain of about 8%. SPY ETF representing S&P 500 was also in the green as well, being up more than 3%.

Panic Descends : 22 Feb 2020 – 6 Mar 2020

Things took a dive from 22 Feb – 28 Feb as the global COVID-19 situations deteriorate. SPY took a steep fall of more than 12% from its high, dropping every single day continuously for 7 days. Risk Parity followed south this time, albeit to a lesser degree, as safe havens showed a more muted response against the larger drops coming from risky assets.

The start of March then provided some respite. Many asset classes rallied and Risk Parity actually regained its footing and hit a new high on the 6 March. The credit goes to the strong performance from longer duration bonds as risk aversion rose and investors piled in. SPY, on the other hand, resumed its descent 2 days ago and was back near its prior low. At this point in time, Risk Parity was up more than 8% for the year while SPY has rapidly deteriorated and nursing a loss of -8%.

Liquidity Dries Up and Correlation Breaks Down : 22 Feb 2020 – 18 Mar 2020

As most people stayed fixated on the stock markets, a worse threat is growing in the bond markets. The sell off have sparked a level of volatility not seen giving rise to strains in liquidity within the Treasury markets. This leads to numerous issues including widening basis between off-the-run Treasuries and on-the-run Treasuries with similar features. For a long time, funds had put on highly leveraged relative value bets on the narrowing of these basis. In theory, this should work most of the time. But this is not your typical time. Mounting losses leads to further unwind in an already unfavorable and illiquid market.

The traditional bastion of safety, US Treasuries, buckled and gave way. Gold was not spared as well. We witnessed massive outflows from all asset classes as institutions started deleveraging, taking profits or selling whatever they have to meet coming obligations. The only thing in demand is CASH.

US Federal Reserve stepped in on the 15 Mar slashing Fed Funds Rate to 0% and announcing a $700 billion program to restore the proper functioning of the Treasury markets. That didn't seem to impress the market amidst concerns on funding and progress of a much larger fiscal stimulus in the pipeline. Risk Parity continues to plummet to a loss of -11% on 18 Mar 2020. SPY was far worse at -25%.

The Federal Reserve Show Hand : 19 Mar 2020 – 31 Mar 2020

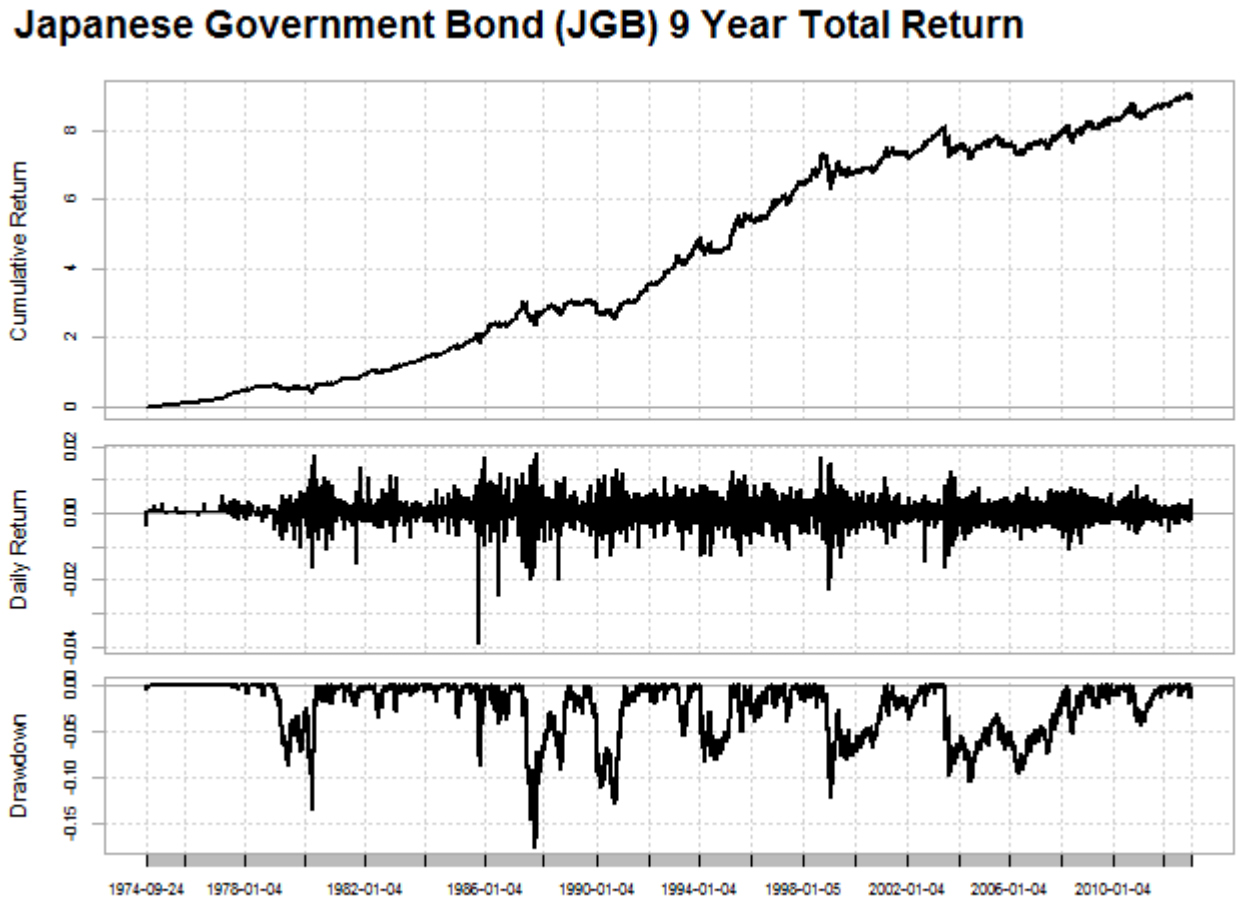
In just a week, US Federal Reserve upped its stakes to the max. It introduced officially UNLIMITED Quantitative Easing. As far as monetary stimulus is concerned, this is practically the end of the road. It can't put money directly into the hands of the people, force people to lend or spend, but it can at the very least stabilize the market volatility somewhat. And in the process, they bailed the big guys out again. Yes, it is not fair. But I guess the policy makers are not in an enviable position either. Let everything crumble, go through a hard reset, walk into a totally unchartered terrain to forge a new order or kick the can down the road and keep the music playing?

Anyway, the monetary bazooka was a welcomed relief while waiting for the fiscal measures. Almost all asset classes staged a rally after that. Stocks, in particular, put on a compelling performance that rivals the ferocity of its drop. And at the end of March, Risk Parity recovered and edged up with a slight gain of less than 1% gain for the year.

Are We Near The End?

Even though Risk Parity weathered through this quarter, it triggered questions regarding its sustainability. With Fed Fund rates at zero and monetary tools drying up, does this mark the demise of Risk Parity type strategies which relies on traditional safe haven assets such as bonds to deliver?

Theoretically speaking, bonds prices will rise as long as the rates goes lower, even if it is below zero. There are real examples around e.g. Japan and Germany. Moreover, while US is close, it is not there yet. Unlike Japan, as at this moment, the yields of longer term Treasuries are still above zero. And as we have seen, Fed Fund rates are not the only tools at the central bank's disposal. And since 2008, central banks worldwide have become more ready to innovate and deploy whatever is necessary to keep things running.



Source: https://www.r-bloggers.com/japanese-government-bonds-jgb-total-return-series/

In fact, what I worry more goes beyond the upside of bonds being capped, but rather where this leads to for the broader market. In a way, the loose monetary policies helped set the stage for what happened today. It was spectacularly successful in fueling a dramatic stock market rise and widening the rich-poor gap and social divide. But it was way less effective in generating wealth and demand among the larger population which is the real engine for growth.

It is difficult to know where this will take us. And I believe no one have the answer. If the top brains with all the resources at their fingertips fails to see what is to come again and again (or rather they knew what is to come, but just did not know when, or thought they could managed whatever came their way), then what could mere mortals like us do? But in a highly undesirable scenario, if we do follow Japan down the bottomless pit of deflationary and economic woes, then the stock market is in for a rough ride. Japan lost more than 3 decades of time and is still in this pit.

Performance Assessment

As a rule of thumb, I lean towards using historical performance to guide my decisions when treading on uncharted waters. Because that is the only reliable thing at my disposal. I have seen enough so called “sensible” discretion that fails. Timing and execution is of paramount importance even if you get your call right. For example, there are people shouting bears as early as 2014. Yes, they finally got that right but only 6 years later in 2020.

So for me, a more objective way is to look at how Risk Parity fared today against what is has been through.

Is this the first time that Risk Parity encounter situations where all assets tumble together?

NO. There are numerous occasions throughout history where correlation between the assets goes up over a period of time. They happened for various reasons. For example, a rate tightening regime which the market is not prepared for can trigger a sell off across both stocks and bonds. The taper tantrum in 2013 is one such incident. And in this current case, Mother Nature triggered a liquidity crisis. But if you looked back further, the same thing happened in Oct 2008 after Lehman Collapse. And the impact was worse. The Risk Parity portfolio lost more than 12% in that month alone.

The table below shows the historical months between 2005 and 2019 where all major assets fall in line with one another.

	Stocks	Treasuries	Gold	Reits
Mar-05	-1.83%	-0.44%	-1.63%	-1.71%
Oct-05	-2.37%	-1.99%	-0.64%	-2.88%
May-06	-3.01%	-0.17%	-1.32%	-2.70%
Jun-07	-1.46%	-0.88%	-1.94%	-9.01%
Oct-08	-16.52%	-1.61%	-16.14%	-31.73%
Jun-11	-1.69%	-1.87%	-2.43%	-3.30%
Oct-12	-1.82%	-0.46%	-2.94%	-0.91%
Jun-13	-1.33%	-3.09%	-11.06%	-1.98%
Sep-14	-1.38%	-1.85%	-6.18%	-6.04%
Jun-15	-2.03%	-3.46%	-1.52%	-4.67%
Oct-16	-1.73%	-3.66%	-2.94%	-5.74%
Feb-18	-3.64%	-2.51%	-2.08%	-7.68%

Is this the worst the Risk Parity experienced so far?

NO. For sure, it is bad but not the worst yet. But of course, this episode may not be over yet.

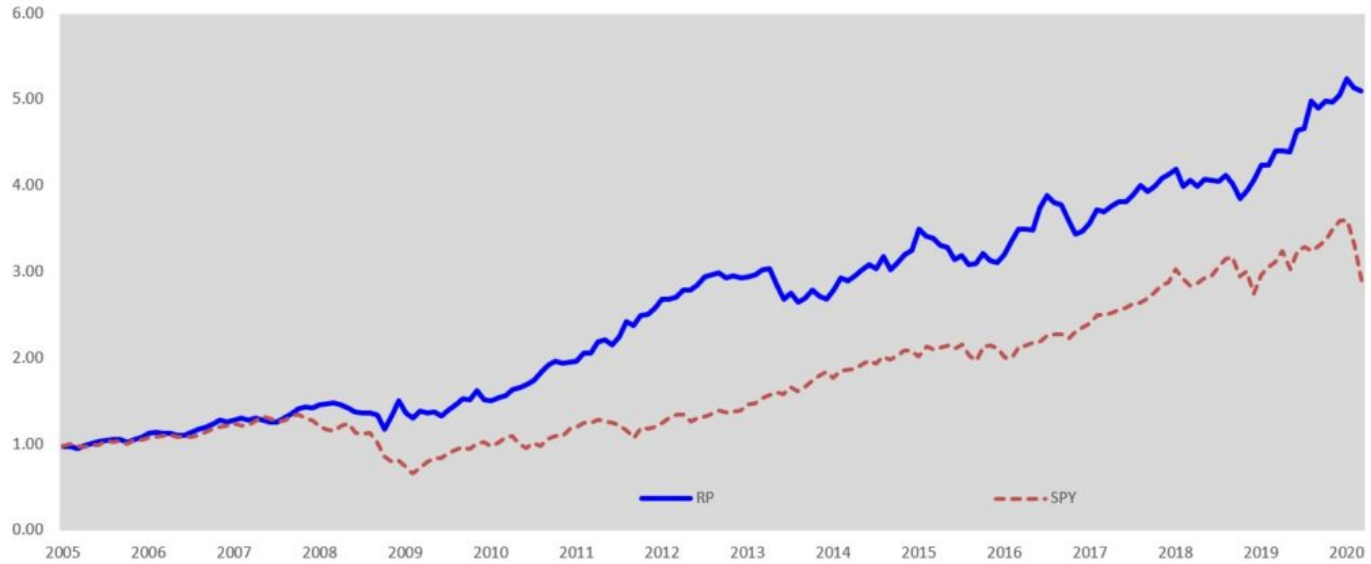
	Max Loss	Duration From Start to Bottom
2008	-23.5%	155
2009	-16.7%	46
2013	-15.5%	102
2020*	-17.7%	15

* 2020 is not over yet.

The worst historical loss (using daily returns) happened during 2008 after Lehman Brother collapsed. During 2008, the Risk Parity strategy took on a cumulative loss of -23.5%. The episode was fairly similar with what happened today. Both are mired in liquidity emergencies. In this current one, Risk Parity lost as 17.7% at the worst point. There were several other episodes since 2005 which sees Risk Parity losing more than 15%. One happened in 2009 where the world is just emerging out from the GFC. Another occurs during 2013 or the year where market throws the QE taper tantrum.

How does the overall performance looked to date (as of 31 March 2020)?

RP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2005	-3.3%	0.4%	-2.1%	3.0%	2.2%	3.1%	1.5%	0.7%	0.3%	-3.3%	3.3%	2.3%	8.1%
2006	4.1%	0.6%	-1.1%	0.3%	-2.2%	0.5%	3.0%	3.1%	1.5%	3.1%	4.4%	-2.0%	16.3%
2007	2.0%	1.7%	-1.6%	1.6%	-1.4%	-2.5%	0.5%	3.5%	3.5%	4.2%	1.8%	-0.9%	12.7%
2008	2.4%	1.5%	0.2%	-1.6%	-2.3%	-3.5%	-0.3%	-0.7%	-1.0%	-12.9%	13.6%	13.1%	6.2%
2009	-9.3%	-4.5%	5.8%	-1.0%	0.4%	-3.4%	5.5%	4.1%	5.0%	-0.9%	7.2%	-6.6%	0.7%
2010	-0.6%	2.4%	1.0%	5.1%	0.8%	2.7%	2.6%	5.3%	4.4%	2.6%	-1.3%	0.9%	29.0%
2011	0.2%	4.9%	0.2%	5.9%	1.4%	-2.9%	4.8%	7.7%	-1.9%	5.0%	0.4%	2.7%	31.6%
2012	4.3%	0.1%	0.7%	3.2%	0.1%	2.0%	3.1%	0.9%	0.9%	-1.8%	0.6%	-0.6%	14.1%
2013	0.4%	0.6%	1.9%	0.7%	-6.3%	-5.9%	2.7%	-4.1%	1.8%	3.7%	-2.7%	-1.1%	-8.4%
2014	4.0%	4.7%	-0.9%	1.9%	2.4%	2.0%	-1.6%	4.6%	-4.8%	3.0%	2.9%	1.6%	21.1%
2015	7.4%	-2.2%	-0.8%	-2.4%	-0.5%	-4.3%	1.5%	-3.3%	0.2%	3.8%	-2.4%	-0.9%	-4.5%
2016	2.9%	4.9%	4.2%	0.1%	-0.1%	7.3%	3.8%	-2.2%	-0.5%	-4.7%	-4.7%	1.3%	12.0%
2017	2.6%	4.4%	-0.7%	1.8%	1.2%	0.2%	2.3%	2.5%	-1.6%	1.5%	2.4%	1.1%	19.0%
2018	1.2%	-4.5%	1.7%	-1.8%	1.9%	-0.2%	-0.3%	1.6%	-2.4%	-4.1%	2.5%	3.2%	-1.5%
2019	4.1%	0.0%	3.9%	0.1%	-0.4%	5.6%	0.6%	6.7%	-1.6%	1.7%	-0.3%	1.8%	24.1%
2020	3.64%	-2.1%	-0.7%										0.8%



The chart and table shows the back-tested performance of the strategy since 2005 till end 31 Mar 2020.

As of 31 Mar 2020, Risk Parity (1.7x leverage) is still up, but only mildly at less than 1% for the year while the global stock markets are still deep in the red. So at this juncture, there is nothing conclusive that suggest the strategy is behaving out of its norms. I wouldn't say we are out of the woods yet. The situation remains fluid. Lasting damage has been done and more may be uncovered as we go. Meanwhile, keep watch.

Risk Parity Your Asset Seleciton Matters

Written By
Eng Guan Lim (E.G.)

When we talk about Risk Parity, the first thing that comes to our mind is literally the words RISK and PARITY. Or in simple English, EQUAL RISK. Risk Parity is just a generic term for a type of risk-based allocation. One where we allocate assets in our portfolio such that each of them holds an equal amount of risk. The premise of pursuing such an allocation approach is simple and elegant. If you can't predict reliably which asset class will perform and which will not, then just make sure they drive the portfolio equally. I talked about this in an earlier post I wrote.

Risk Parity - There Is A Problem With The Name

However, the name by itself, gives no emphasis to another important part of the portfolio construction process. And that is selecting the right mix of assets. Without the right mix, Risk Parity can't work its magic.

If you select only risky assets such as equities, high yields junk bonds in your pursuit for returns, nothing will save you at the time you need it.

If you pick every single asset out there, thinking diversifying as extensively as you can is the answer, you may find yourself owning too little of the assets that can make a difference during those few crucial periods. Markets are much more interconnected. In such instances, a simple equal risk allocation across all these asset classes might not do as well as intended because many of the asset classes which took up a slice of the risk gets correlated.

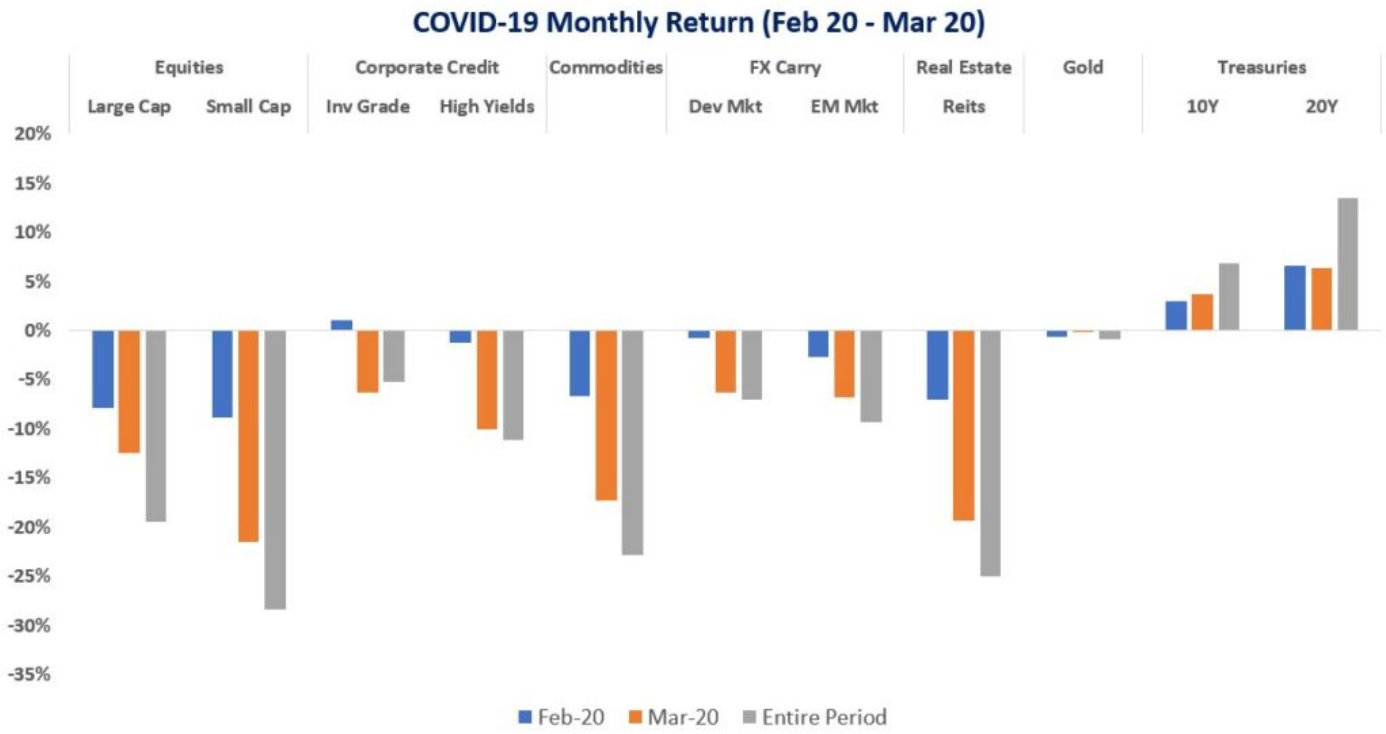
I do not know the exact mechanics of what other funds use. Each is different. But their average performance do suggest leaning towards the latter. It is not surprising. Because of their size, they are pushed to diversify everywhere in order to deploy their funds effectively.

Institutional Risk Parity Fund Performance

2020 COVID-19

Institutional Risk Parity funds went deep into the red in 2020. Their agonies started in February and worsened dramatically into March. At the end of March 2020, most are nursing double digit losses for the year. Many of these funds operate based on a target volatility controlled by adjusting leverage. The higher their target volatility, the more their leverage, the worse they are hit. Based on numbers compiled by HFR Risk Parity indices, these funds are **on average down between -10% to -17% alone for March, and -13% to almost -20% for the year**.

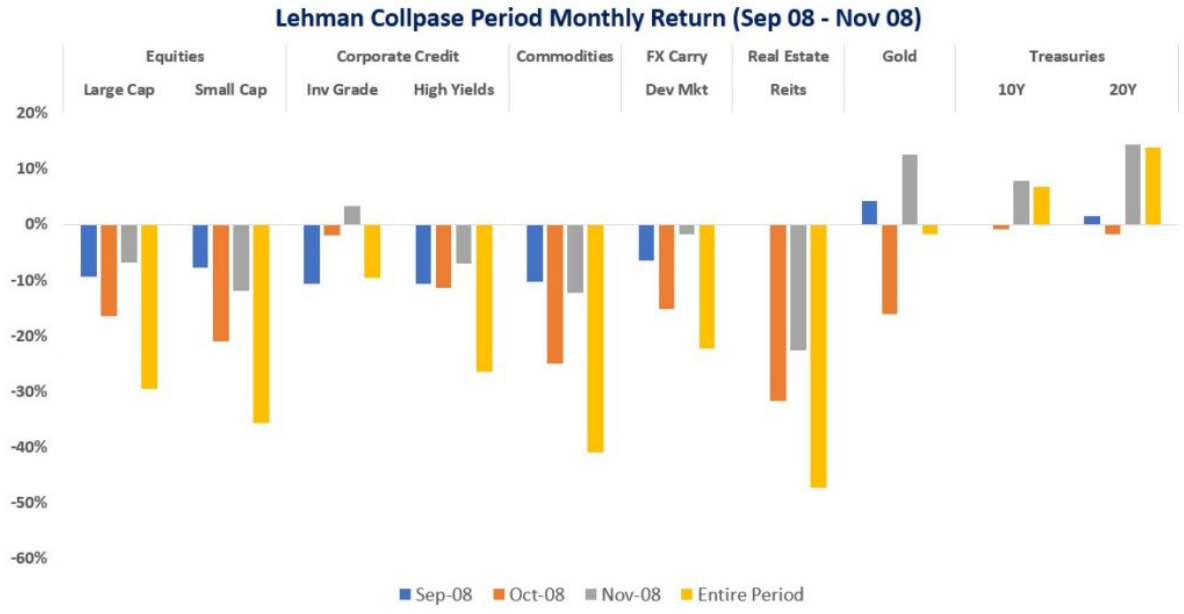
They are typically spread out across all major asset classes ranging from equities, credit, commodities, FX carry, real estate and sovereign bonds. It is not hard to see why they are down if we look at how the different classes performed during February and March 2020.



February looks bad. But the killer was March. With the exception of Gold and Treasuries, everything took a big hit. Stocks nosedived, credit collapsed, commodities crashed, FX carry unwound, REITs tumbled… Cracks appeared across all major markets including Treasuries which faced liquidity issues. It was a perfect storm. Mixed in a big dose of leverage, and you get a potent concoction called bloodbath. As prices fell and volatility surged, these funds delever, aggravating an already painful selloff.

2008 Lehman Collapse

If we want to draw a parallel, we can fall back to Sep 2008 – Nov 2008. Lehman filed for bankruptcy in Sep 2008 and sent markets into an extreme panic mode. How the markets moved in the months that followed looks like what we just went through, except that it was worse. In these 3 months, again every major asset except Gold and Treasuries, plummet.



What Happen To These Asset Classes During The Crisis?

Large cap, small cap, or whatever cap. They are all COMPANIES running businesses. So essentially they have the same "genetic makeup". When the economy breaks apart, they crumble together. Corporate credits are debts of the same COMPANIES. The probability of defaulting on their obligations will rise, and that expectation is reflected with the prices of their issued bonds falling.

Energy elements such as crude oil is a large component in the Commodity basket. So the fallout between Saudi Arabia and Russia in cutting oil production earlier played a big part in the recent sell off. But that said, when economy sinks, business slows, demand plunge, commodity prices generally falls (with some exceptions like Gold which has low correlations across the different markets).

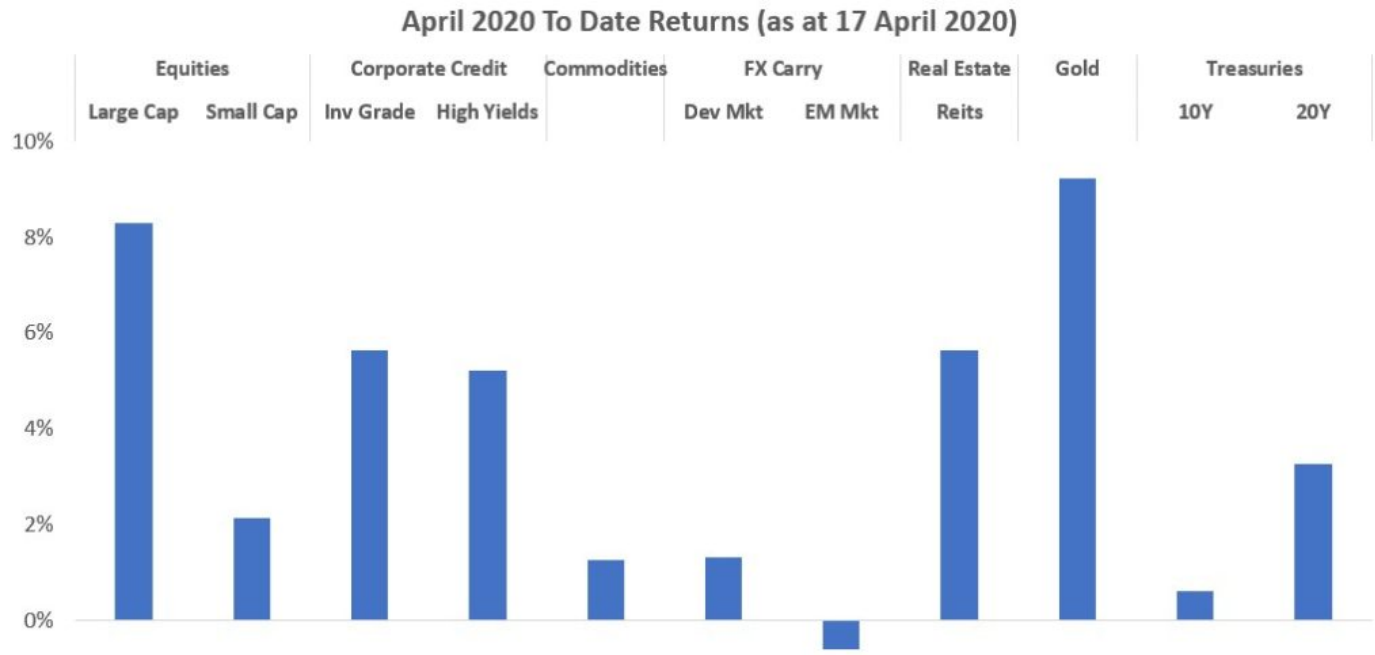
FX carry trade is a popular trade. For a long time, funds borrowed in low cost currencies to invest in higher yielding currencies to profit from the interest rate differential. It works well as long as the currencies remain fairly stable. For example borrowing in Yen or even USD, and then investing in AUD or other high yielding emerging market currencies. But when panic descends, investors pull their funds out and flock to the dollar in droves. The value of these high yielding currencies plunged beyond what the interests could cover. This forced carry trades to unwind, further exacerbating the sell offs.

The real estate market, similarly, suffers. Sales slow as Buyers and Sellers put their decision on hold. Rentals drop. Mortgage defaults rise. Prices head south.

The only assets that has a higher probability of survival in such times are the traditional safe havens such as Gold and Treasuries.

Assets Are Rallying Again

At the point of writing of this post in April 2020, almost all the asset classes are rallying. Investors piled back, funds relevered, shorts covered... If the trend persists, you can expect the Risk Parity funds to do well this month. But given that many would be operating below their typical leverage when the recovery starts, it would be some time before they recoup their losses.



The credit goes to the US Federal Reserve again for bailing everyone out. But they had a big hand in creating the mess today from the loose monetary policies they set during the GFC. And like it or not, you will need them to keep the music playing. The million dollar question is when the music ends? Perhaps when we see a major shift in the world order where US loses its power and influence, but no one really has the answer.

Select Your Assets Carefully

But coming back to asset selection, there is no need to represent every single thing in the market if it does not make sense. Unlike large established funds, for most individuals, we don't have the issue of having too much money to invest (although I am sure we don't mind having such problems). So we do have a choice. Do some due diligence, and select your mix of assets carefully.

Taking Modern Portfolio Theory Into The 21st Century

Written By
Patrick Ling

The Rule of Thumb Asset Allocation

Financial advice often sounds logical and widely adopted by most financial advisors. One of the most common advice is to diversify your capital across different asset classes. according to risk appetite and your age. A popular portfolio asset allocation method is the 60/40 portfolio (60% allocation to stocks and 40% allocation to bonds).

How this fixed allocation came about is unclear. Perhaps it started from a pure 100% allocation to stocks. But the problem with this allocation is that it is too volatile, especially during bear markets. A safer asset is then thrown into the mix to reduce portfolio volatility. This is where bonds come in. However, safer assets also means lower return. Hence, there is a price to pay for lower portfolio volatility in the form of lower return. If we just simply go for a equal split between stocks and bonds, the resultant portfolio return is unattractive. Financial advisors would not have clients and nobody is happy. Skew the allocation more to stocks and voila, the 60/40 portfolio is born.

A variant of the 60/40 portfolio is the life-cycle portfolio. This portfolio would skew even more to stocks if you are young and gradually lessen up as you age. A common rule of thumb is to subtract your age from 110 and allocate that number to stocks. So a 30 year old should allocate 80% to stocks and 20% to bonds whereas a 60 year old should allocate 50% to stocks and 50% to bonds.

The 60/40 portfolio has its advantages. It is easy to explain to clients. It is readily understood by clients. Hence, it is more readily adopted. Some diversification is better than none!

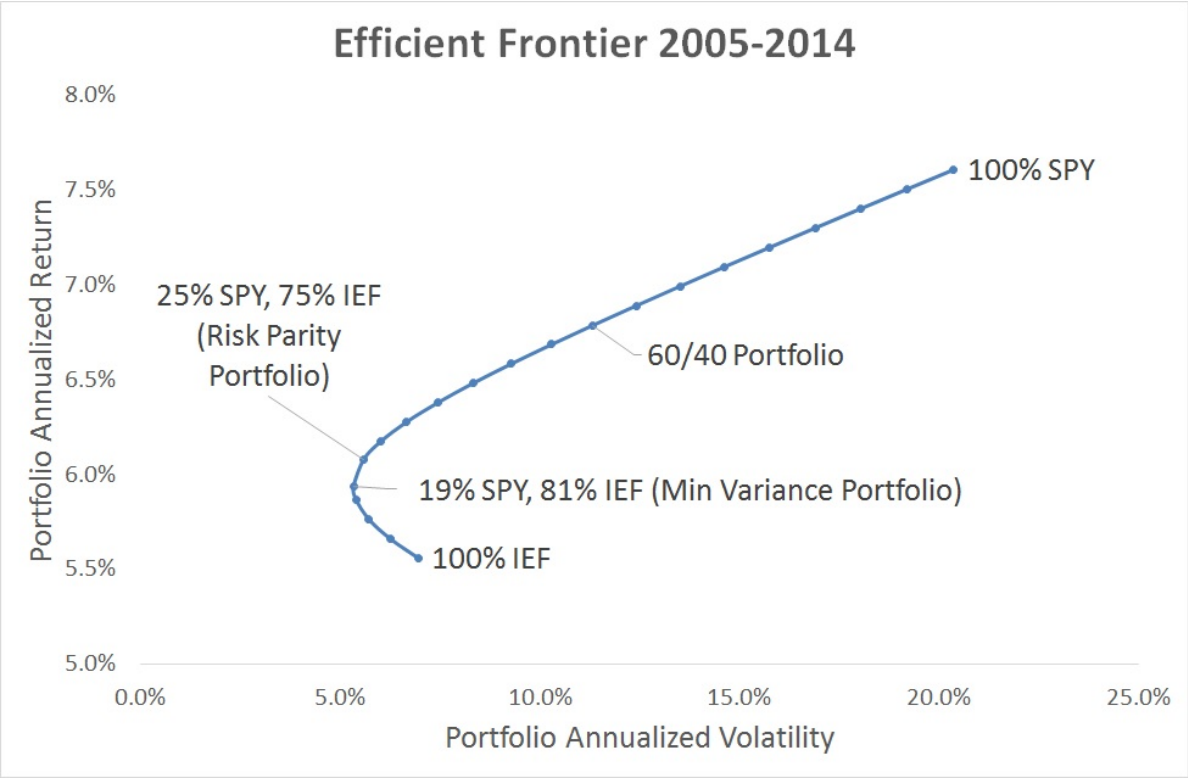
The Mathematical Approach to Portfolio Asset Allocation

However, is such a fixed asset allocation approach truly the most efficient way of constructing a portfolio? To answer this question, we turn to Harry Markowitz's Modern Portfolio Theory (MPT).

Let's assume that we would like to include two ETFs in our portfolio. The first is SPY which represents stocks and the second is IEF which represents bonds. It turns out that we are able to obtain the respective portfolio annualized return and annualized volatility for different allocations to the two ETFs. However, we require the historical return series for both ETFs in order to calculate portfolio annualized return and volatility. The window we choose for the historical return series has an impact on the numbers.

Efficient Frontier using 2005-2014 Daily Return Series

Below is the plot of portfolio annualized return vs annualized volatility for various portfolio allocations using daily historical return for a ten year period from 2005 to 2014.

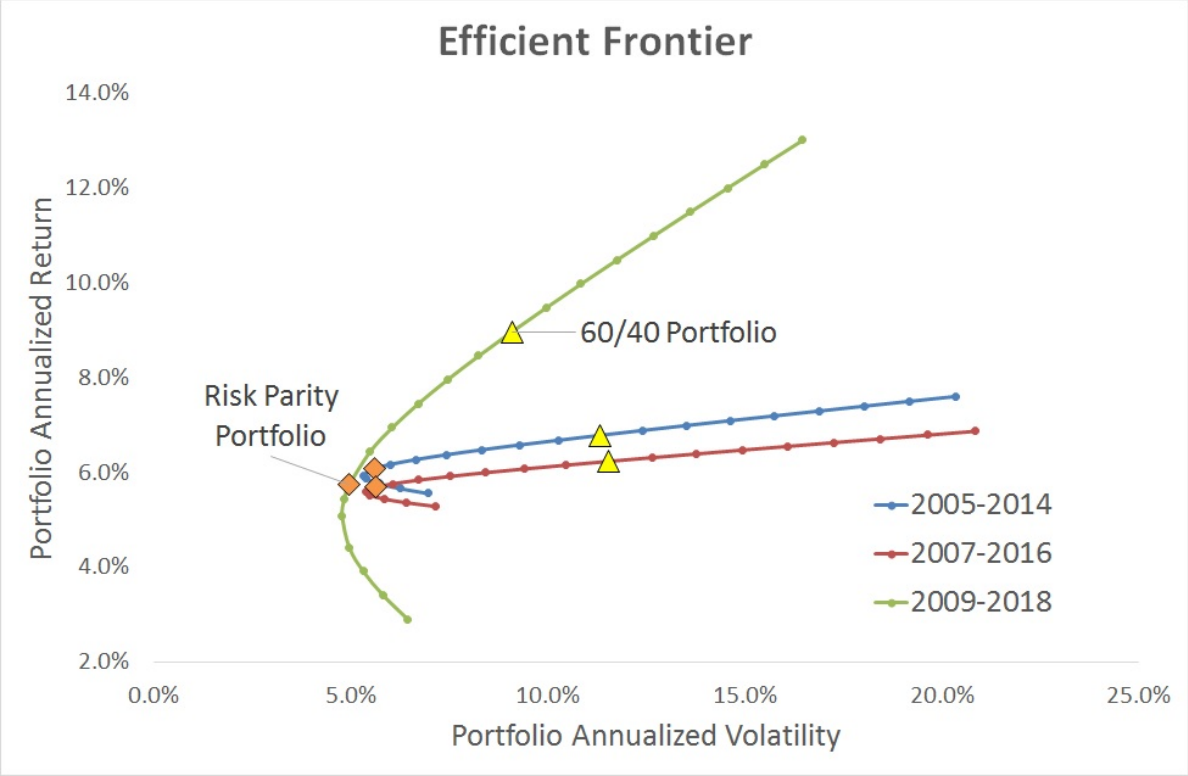


This plot is known as the efficient frontier because for any given portfolio volatility, the highest return can only be achieved by the specific portfolio allocation that falls on the blue line. There are a few observations we can make from this chart.

1. The Minimum Variance Portfolio contains 19% SPY and 81% IEF.
2. The 60/40 Portfolio is an arbitrary point on the efficient frontier.
3. There is only one point on the efficient frontier where the marginal risk contribution from both SPY and IEF are equal. This is the Risk Parity Portfolio. In this instance, the allocation is 25% to SPY and 75% to IEF.
4. The Risk Parity Portfolio is close to BUT NOT the Minimum Variance Portfolio.

Driving with the Rear View Mirror

Although MPT allows us to use a mathematical approach towards asset allocation, it presents its own set of difficulties. The efficient frontier is plotted using past historical return series. It tells us what our portfolio annualized return and volatility would have been if we had invested at the start of the historical series. It doesn't guarantee that our portfolio annualized return and volatility would be the same going forward. In fact, the efficient frontier does change quite a fair bit using different historical window periods. Below is a plot of different efficient frontiers using different ten year windows.



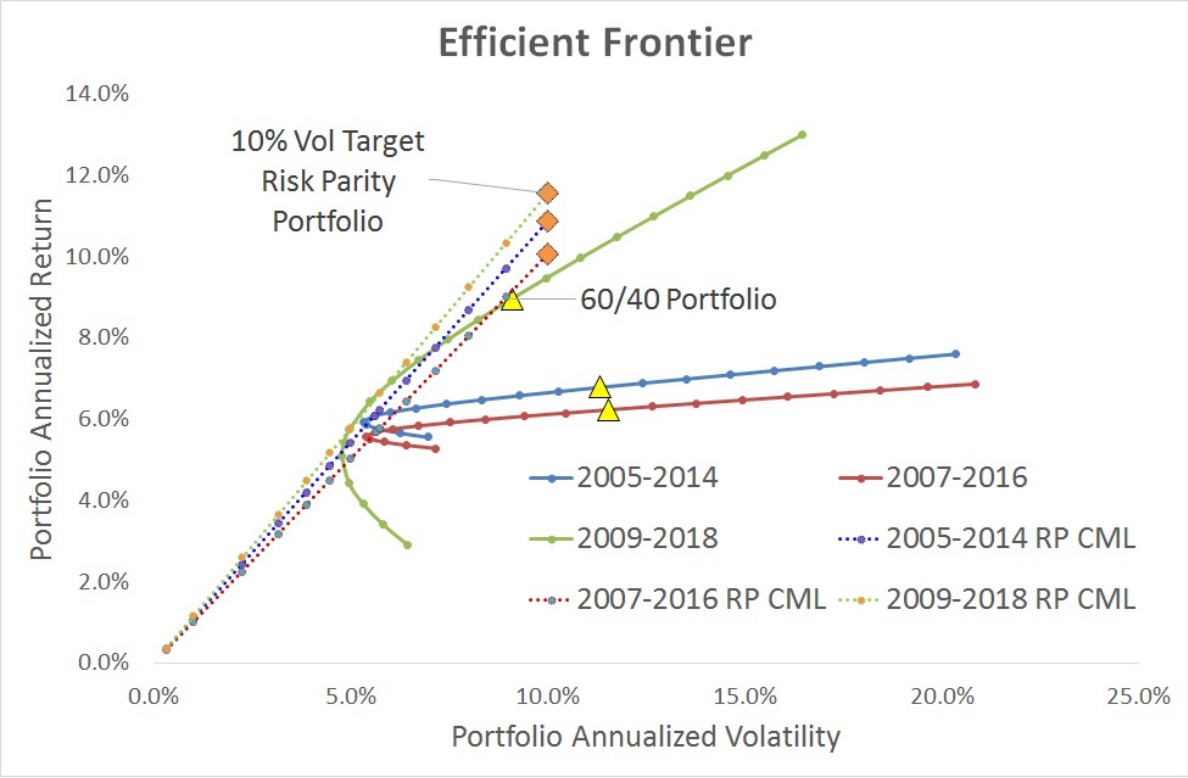
You can see that the ex-post performance of the 60/40 Portfolio varies quite a bit depending on which ten year period you use. On the other hand, the ex-post performance of the risk parity portfolio clusters around the same region. However, bear in mind that the portfolio allocation differs slightly for each ten year period. The exact portfolio allocation is also only known after the fact. If we want to approximate the risk parity portfolio in practice, we need to rebalance on a regular basis such that the marginal risk contribution of SPY and IEF remains equal.

There is a practical reason for wanting to maintain the same marginal risk contribution from all asset classes in the portfolio. There is no way to know which asset class is going to perform in the future but we do not want any single asset class to dominate the performance of the portfolio. The best way is to ensure all asset classes contribute the same amount of risk to the portfolio. In this way, we remain truly agnostic to all asset classes.

Compensating for Low Return with Leverage

You might say that the Risk Parity Portfolio is good and stable but the return is not attractive. This is where the secret of the investment industry lies if ever there is any secret. The most important focus is to create a portfolio that delivers a decent risk-adjusted return. Then you can just employ leverage to get the returns you want. There is a cost to using leverage so we need to take that into account. But for the sake of illustration, let's assume leverage is free for now. Using leverage, we can extend a straight line from the origin to cut through the efficient frontier at the Risk Parity Portfolio. I call this the Risk Parity Capital Market Line (CML).

I borrow the term Capital Market Line (CML) from CAPM theory. The CML is the straight line that cuts the efficient frontier at the market portfolio. This market portfolio is the portfolio that gives the best risk-adjusted return without considering equal risk contribution from all the asset classes making up the market portfolio. Therefore, the Risk Parity CML has an additional constraint where all asset classes must contribute the same amount of risk to the portfolio.



You can see that if we employ leverage to target a 10% portfolio volatility, the Risk Parity Portfolio is able to deliver a higher return than the 60/40 Portfolio for a similar portfolio volatility. The performance is also relatively stable across time as compared to the 60/40 Portfolio.

Conclusion

In conclusion, dynamic asset allocation targeting equal risk contribution is more sensible than a fixed asset allocation approach even though it might be harder to explain to clients. However, it really is not that much harder if we can avoid discussing the math behind it.

We are now in a new world where printing money is the order of the day. It is also time to update Modern Portfolio Theory as well.

Online Course : All-Weather Investing Via Quantitative Modelling in Excel.

For those who are interested, we developed an online foundation risk parity course on Udemy called "All Weather Investing Via Quantitative Modelling In Excel". We structured the course in a systematic way. You will find everything you need to know from concept to implementation of a 2-asset risk parity portfolio comprising stocks and bonds. In particular, you will learn how to build the Risk Parity model through a guided step-by-step approach from scratch using MS Excel. No programming experience is needed.

Over 8 hours long, the course starts with the concept behind Risk Parity, then moves on to cover all the essential MS Excel skills and financial mathematics knowledge required before moving on to build the model. Then, finally, you will see how to operate the Risk Parity model for investment purposes.

Enroll or Find Out More About The Course At Udemy Here

Eng Guan Lim (E.G.)

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Patrick Ling

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