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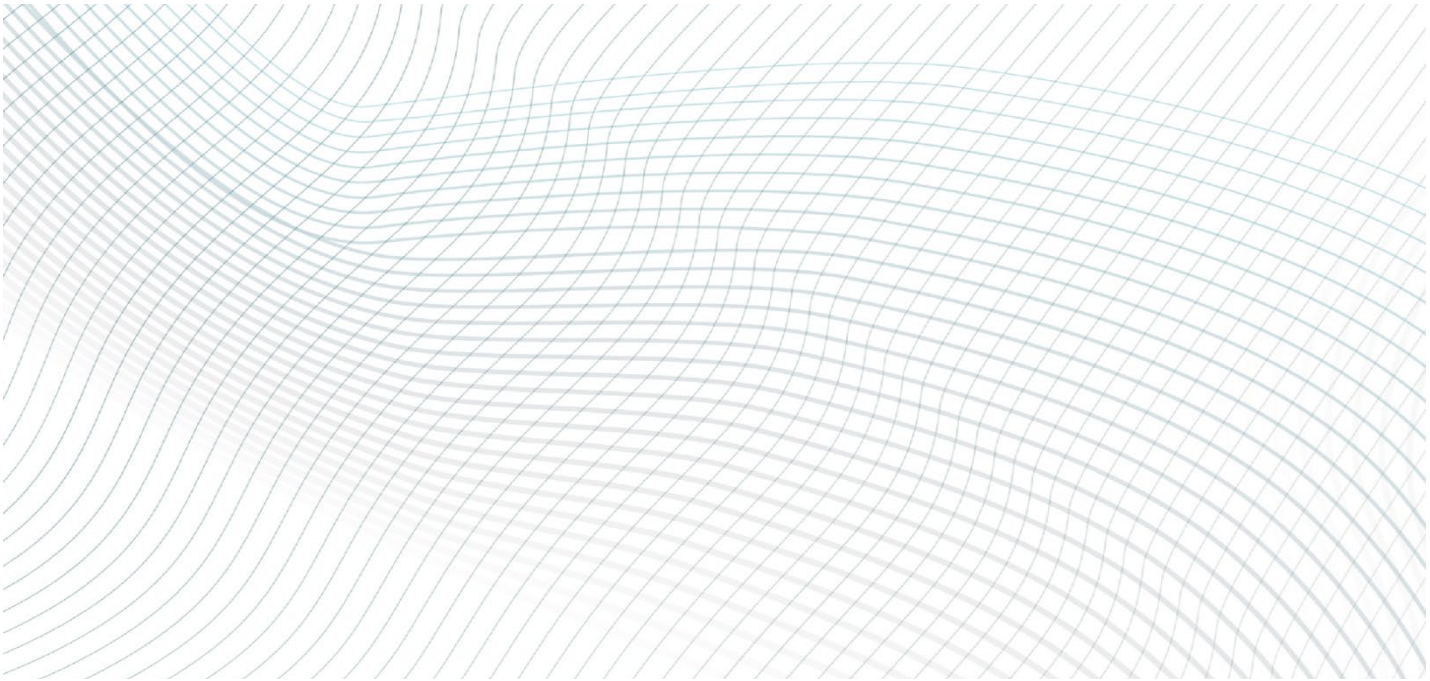


The Pareto Portfolio Model

Nick Lumpp

Abstract

The investment markets have evolved greatly over the decades and investors today have access to more options than ever before. There are countless ways to invest your money these days, but I do believe that many are somewhat outdated, sub-optimal and can be improved upon greatly, resulting in much better outcomes for the investor. The problem with standard portfolio models (e.g. the common 60/40 allocation) is that they do not work well in all potential economic environments, which could prove highly problematic if a large dislocation were to occur right at the beginning of one's retirement. The point is not to predict the future but to be able to adapt as the world changes, no matter what happens. A portfolio should be robust and resilient enough to handle all potential risks that might lie ahead.

This paper outlines the thinking behind the development of the Pareto Portfolio Model - a simple, yet extremely robust and flexible portfolio. In building the Pareto Portfolio Model, I started by identifying the areas of weakness in standard portfolio models and figured out how to improve upon these, resulting in a simpler portfolio with significantly improved results – both financially and emotionally as the volatility and downside risk are reduced.

The model is a compilation of strategies that were built over time to meet the needs of actual clients. It is purely systematic and tactical in nature, meaning it is rules-based and designed to adapt to a changing world and the potential risks that may arise, as compared to traditional portfolio models which are static allocation models that hold through downturns (with the occasional rebalancing). The Pareto Portfolio Model is designed with a core focus on managing downside risk - the utmost priority for many investors as they retire. The model can also be adjusted to meet an investor's specific withdrawal, tax, and investment needs.

In short, the Pareto Portfolio Model is a valuable tool for advisors and investors seeking a long-term portfolio solution designed to continually compound savings in a risk-controlled manner.

Introduction

It's important to understand me and how my brain works in order to understand why and how I arrived at the Pareto Portfolio Model.

First, my brain is hardwired to find the optimal, most efficient outcome – it's just how I think about everything. This is very beneficial when it comes to problem solving and anything involving strategy but can be a little annoying for those around me given I'm a little particular with how I feel things should be done. Anything inferior or sub-optimal just irks me so I'm always looking to iterate and improve things.

"Everything should be made as simple as possible, but not simpler."

-Albert Einstein

I'm also a big believer in keeping things simple and in the concept that "less is more." The book which has probably had the greatest influence on my life is *Essentialism: The Disciplined Pursuit of Less*, by Greg McKeown. At its core, it's about identifying and focusing on the vital few things which are most essential, as compared to the trivial many, and ignoring everything else.

It's applying what is known as the Pareto Principle, or more commonly: the 80/20 rule, to your endeavors. The Pareto Principle is a concept identified by Italian sociologist and economist Alfredo Pareto in the early 1900's when he noticed a repetitive pattern that 80% of results tend to stem from 20% of the inputs. This 80/20 phenomenon can be found in almost anything which you can apply numbers to: population distributions, incomes, wealth, etc.

Every year, I "80/20" just about everything – my personal life, how I run my business, how I construct portfolios, etc. It's a process to regain focus on what is most essential and to weed out the trivial things that are simply a waste of time and energy. This is the process which I followed in constructing what I detail in this paper, which is why I refer to it as the Pareto Portfolio Model. I identified the necessary pieces that matter and cut out the rest.

My goal from the outset was to make a portfolio model as simple as possible, yet extremely robust and flexible. It's simple in terms of the minimal number of asset classes included and in terms of the implementation via low-cost ETF's. It's extremely robust because it is designed in a manner to handle all potential economic outcomes. And it's highly flexible because you can adjust the allocation within a portfolio to meet an investor's specific withdrawal, tax and investment needs. The result is a portfolio that is extremely resilient by being able to adapt to all environments.

The investment markets have evolved greatly over the decades and investors today have access to more options than ever before. This includes things like better data, more investment options (there are ETF's for just about everything) and super low trading costs. There are countless ways to invest your money these days, but I do believe that most are sub-optimal and a bit outdated.

Additionally, as many Baby Boomers are retiring, they are hitting the most crucial point where risk management within a portfolio becomes the utmost priority. As you will see throughout this paper, the Pareto Portfolio Model was created out of necessity to meet the actual needs of my clients. It's a compilation of strategies constructed over many years that can work well for anyone, but especially so for retirees or investors that are withdrawing from their portfolios each year.

Ultimately, my goal with this paper is to make you rethink investment portfolios. If you are looking for a portfolio solution designed to continually compound your or your client's savings in a risk-controlled manner, the Pareto Portfolio Model may be right for you.

Lastly, it's important to note that this paper highlights the gross, backtested returns of the portfolio model and its underlying strategies compared to other asset classes and portfolio models. They are not actual results of real money. The point of this white paper is to provide an overview of the thinking behind the approach and construction of the portfolio model for conceptual purposes.

Definitions

Let's start with a few definitions and concepts to help you follow along throughout this paper.

The most common portfolio used today is often referred to as the 60/40 portfolio. It's a 60% allocation to stocks, 40% allocation to bonds. There are variations of this based on someone's risk tolerance and investment goals, so you might see 80% stocks/20% bonds, or 40% stocks/60% bonds. I generally refer to these as standard portfolio models since it's the base approach which most of the investment industry follows – most advisors and brokers, target-date retirement funds, etc.

These models are generally static allocation models, meaning they look to always maintain this allocation balance, and will rebalance the portfolio back to the target allocations as markets move.

This approach differs from an approach that utilizes a tactical asset allocation framework of adapting your portfolio allocation as market conditions change.

Additionally, there are many variables one can use to approach an investment process. Asset classes are generally broken into different styles like small companies (i.e. small caps) vs large companies (i.e. large caps), growth stocks vs. value stocks, or US stocks vs. international stocks. Some people will utilize a discretionary approach to making investment decisions where they are performing research and applying a valuation framework to decide if an investment looks cheap and it is a good time to buy or looks expensive and is possibly a good time to sell. Conversely, there has been a rise in systematic strategies in recent decades which follow a rigid, rules-based approach to determine when to buy, sell and change an investment position. One style factor which research has proven to always be present in stock markets globally is momentum. Since the economy and markets are cyclical, momentum looks to identify which asset class is currently trending upwards, exhibiting strong, positive momentum. This style is often referred to as Systematic Trend Following.

The Pareto Portfolio Model is a composition of purely systematic trend following strategies, combined in a manner to create a tactical approach to asset allocation. In simple terms, it will maneuver into and out of asset classes based on market conditions, trying to ride uptrends and avoid downtrends, as opposed to statically maintaining a constant allocation to an asset class no matter what is happening in markets.

The benefit of doing this is significantly better risk management since the portfolio is not holding through large drawdowns in an asset class.

A Focus on Risk Management

Why should we focus on managing the downside risk? Because the name of the game is: don't lose money!

First, seeing your portfolio value drop is never fun; no one wants to experience it. It leads to all sorts of bad emotions, panicky decisions and usually mistakes. We are often our own worst enemy so if we can remove the potential of making an emotional decision, we can greatly improve our probability of success. After all, a plan that you cannot stick to doesn't offer much value.

Second, big down years kill your compounding of returns. So, there are actually some mathematical reasons beyond just the emotional side of it not being fun. Big losses can often take years to climb back from.

"The first rule of an investment is don't lose [money]. And the second rule of an investment is don't forget the first rule. And that's all the rules there are."

-Warren Buffett

And third, for anyone withdrawing from their portfolio, there is an effect on performance which I call *drag*. If you are withdrawing money every year and you ever experience a down year (you will… it's part of the game), your actual realized return will be less than the portfolio model's return because a withdrawal has the effect of digging an even deeper hole that year… which means less invested for the eventual recovery and thus slightly lower returns. Portfolio drag is affected by two variables: your annual withdrawal rate and the size of the down years. The higher your rate of withdrawal and the larger the down years that you experience, the greater the drag created on returns over time.

To illustrate, below is a table highlighting the returns of the S&P 500 Index and the Vanguard LifeStrategy Moderate Growth Fund (their 60/40 portfolio model) with the drag created (i.e. reduction in realized return) based on withdrawal rates of 3% and 5%. For example, if you had been invested in Vanguard's 60/40 portfolio fund and withdrawing at an annual rate of 3% each year, your realized return would have actually been 7.18% (0.23% less than the fund's return of 7.41%).

Figure 1: Annualized Drag on Performance, 1995-2023

	Return With No Withdrawals	3% Withdrawal Rate*	5% Withdrawal Rate*	Worst Year
S&P 500 Index	10.35%	-0.31%	-0.51%	-37.02%
Vanguard LifeStrategy Moderate Growth Fund (VSMGX)	7.41%	-0.23%	-0.37%	-26.5%

**Source: Portfoliovisualizer.com, with historical inflation adjusted withdrawals*

It's inevitable that we will, at some point, experience another banking crisis, or severe global recession, or disruptive military conflict – something that will send a shock through global investment markets.

I'm certainly not hoping for any of these scenarios to occur, but hope is not a plan. What is your plan for your portfolio if we do experience one of them?

Thinking of risk and potential outcomes like this is what I lose sleep over; it's what my clients pay me to worry about, so they don't have to. This is why, for me and my clients, it's so vitally important to build portfolios that are resilient by utilizing strategies that, when combined, are robust enough to handle any potential outcome.

I can't tell you how many clients have said to me over the years something along the lines of: "I never want to experience something like 2008 again." This is where I think standard portfolio models fail investors. If we do experience any sort of scenario that produces average annual returns below the historical rates for an extended period of time (say 10 years), then standard portfolio models will struggle immensely. And if you retired at the beginning of this period, you probably won't be happy with the outcome.

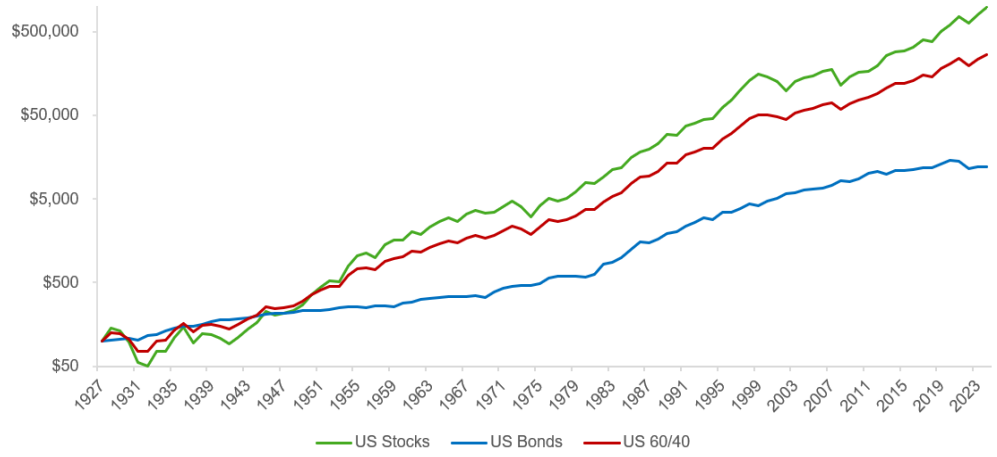
This is ultimately why I built the strategies which make up the Pareto Portfolio Model – out of necessity to solve real problems faced by my clients and to reduce potential risks as much as possible.

Standard Portfolio Models

Since 1928, US Stocks have returned 9.94% per year and US Bonds have returned 5.07% per year. So, if stocks have historically performed much better than bonds, then why would anyone ever own bonds? Why wouldn't you just invest 100% of your portfolio in stocks to earn better returns over time?

The answer of course is because stocks are riskier than bonds – both in terms of higher risk of permanent loss in the event of bankruptcy as well as higher volatility and greater downside risk for a portfolio. And remember, the higher the downside risk, the greater the drag on performance if withdrawing money each year. So, a standard portfolio model's solution to reduce the risk associated with stocks is to incorporate bonds in a manner that attempts to maximize our expected returns per unit of volatility. The sweet spot tends to be the extremely common 60/40 portfolio – 60% stocks/40% bonds. Everyone has their own version of this model with slightly different tweaks in the recommended allocation amounts but they're all virtually the same and produce very similar returns over a long enough period of time.

Figure 2 – US Stocks, US Bonds & US 60/40 Portfolio, Growth of $100 1928-2024



Source: Nick Lumpp, NYU Stern data

Figure 3 – US Stocks, US Bonds & US 60/40 data, 1928-2024

	US Stocks	US Bonds	60% US Stocks 40% US Bonds
Return	9.94%	5.07%	8.47%
Volatility	19.39%	7.32%	12.34%
Sharpe (3.5%)	0.33	0.21	0.40
$100 Invested Becomes	$982,842	$12,111	$265,751
# Negative Years	26	19	21
# Positive Years	71	77	76
Worse Negative Year	-43.84%	-17.16%	-28.64%
Best Positive Year	52.56%	31.87%	33.14%

Source: Nick Lumpp, NYU Stern data

The nice aspect of a 60/40 portfolio is that volatility and downside risk are reduced a good bit for a rather small reduction in returns, historically. This has resulted in a higher Sharpe ratio, which measures volatility adjusted excess returns. In essence, how much volatility did you have to experience to generate returns above the risk-free rate of interest (the higher the number, the better). The construction of this portfolio model stems from research performed in the 1950's and 1960's with the conclusion being Modern Portfolio Theory and the use of the Efficient Frontier. However, back then, the only asset classes investors had access to were US stocks, US government bonds and US corporate bonds. There was:

- No International stocks and bonds (unless you were very wealthy and even then, they were very expensive to access on foreign markets)
- No Emerging Markets (most EM nations didn't even have stock markets yet)
- No portfolio exposure to Real Estate (REITs weren't even created yet)
- No high yield bonds or mortgage-backed securities

- No commodities (other than through leveraged futures contracts)
- And commissions and investment expenses were very high.

Over time, as these asset classes became available, everyone just worked them into their standard portfolio models to add diversification. But did anyone stop to think whether a portfolio allocation should still be based solely on historical return and volatility data, or be held with static allocations as a standard portfolio model does? Is a 60/40 model even the best approach now that we have low-expense ETF's, with low-cost trading and daily liquidity, for nearly every asset class, theme and style you can imagine?

I think standard portfolio models make 3 big mistakes:

1. **They don't manage downside risk.** In fact, they don't do anything to manage downside risk since they always hold a static allocation to each class through bear markets. Their solution is to invest with a more conservative allocation by putting less in stocks and more in bonds, like a sliding scale. Can you tolerate 100% in stocks? Too aggressive, how about 80% stocks/20% bonds? Too aggressive, how about 60/40 or 40/60?
2. **They allocate too much to bonds!** Again, the allocation to bonds is their solution to reducing the downside risk presented by stocks. The problem with this, however, is that the more you invest in bonds, the lower your expected returns will be.
3. **They don't have enough gold.** Maybe it's for ideological reasons, or because gold will perform poorly for long periods, or maybe it's because the research underpinning the construction of standard portfolio models was done before gold freely floated (the US dollar peg to gold didn't end until 1971). Regardless, most models have no exposure to gold while others will have a small allocation.

Let's rethink portfolio construction.

Rethinking Portfolio Construction

Our overarching goal is to maximize our returns over time while minimizing our downside risk. Notice I didn't say minimize volatility. In my opinion, volatility is a terrible metric for risk, yet it's fundamental to the construction of standard portfolio allocation models! Who doesn't like upside volatility (i.e. big up years)? It's only downside volatility that people hate to experience, so that's where we should focus our optimization efforts.

First, let's simplify the investment process. There are only two things one can invest for: growth or income. Growth investments make money if they appreciate in value and income investments generally earn a return on investment via the cash flow they pay. Many assets are actually a hybrid of two, like a stock that pays a dividend or a rental property that pays rental income. You earn cash flow each year and the potential for price appreciation over time. Stocks are generally viewed as growth assets within a portfolio

and bonds are generally utilized as a stable source of income, but obviously there are gray areas depending on the cash flow generative properties of an asset as well as the timing of when you buy and sell something.

The first step in this exercise is to isolate where we will generate growth within our portfolio.

Let's start with US stocks. Below is a table with the average return for US Large Cap and US Small Cap stocks during all years of positive performance (up years) and the average return during all years of negative performance (down years.)

Figure 4 – Average performance during all up years and down years, S&P 500 and Russell 2000

	US Large Caps (S&P 500 TR)	US Small Caps (Russell 2000 TR)
Average Return During All Negative Years	-13.5%	-11.0%
Average Return During All Positive Years	21.1%	20.9%
% Negative Years	26.8%	31.6%

Source: Nick Lumpp, NYU Stern data; S&P 500: 1928-2024, Russell 2000: 1987-2024

As you can see, the up years tend to be really good, on average, and provide plenty of growth potential. But the down years, on average, tend to be in the double-digits and occur roughly one out of every three or four years. The thing about stock market returns though is that the distribution does not follow a normal distribution curve. Most years are positive, but the total distribution is skewed by a handful of really big down years (e.g. 2008, etc.). This is referred to as *left-tail risk.*

Now, obviously, there is no way to know ahead of time whether a year will be an up year or down year for stocks so what we'll need to do is find a way to cut out the big down years (the left-tail risk) in order to reduce the average loss during any down years as much as possible. An investor can recover from a single digit down year relatively quickly; it's the years where stocks returns are worse than -20% that become problematic and can take years to recover.

As it turns out, if we want strong growth potential, US stocks provide all the opportunity we need without the added currency risk, concerns about rule of law or asset seizures, or any other risks that come with International and Emerging Market stocks. So, this will be our starting point for developing a systematic trend following strategy (tactically allocating based on trend) to determine when to be in US stocks, in hopes of capturing as much of the upside potential as possible, and when to be out, in hopes of eliminating the big down years as much as possible.

Figure 5 below details the performance and risk statistics for our systematic trend following strategies on US Large Cap stocks (compared to the S&P 500 Total Return Index) and US Small Cap stocks (compared to the Russell 2000 Total Return Index). To highlight the improvement in downside risk management, please draw your attention to the bottom three rows. By reducing the number of down years as well as the worst calendar year return, we're able to lower the average return during all down years by a large margin. Fewer down years and smaller losses on average, without giving up return potential equals "mission accomplished."

Figure 5– Historical Return & Risk Metrics of Combined Systematic Trend Following vs Benchmarks

	S&P 500 TR	Russell 2000 TR	Combined Tactical Growth
Return	10.9%	9.2%	12.1%
Volatility	17.0%	18.3%	12.5%
Sharpe	0.38	0.34	0.73
Worst Year	-36.6%	-33.8%	-10.1%
% Down Years	17%	32%	20%
Average Return During Down Years	-13.5%	-11%	-4.7%

Source: Nick Lumpp, S&P 500 TR: 1972-2024; Russell 2000 TR: 1987-2024

What we've accomplished by managing the downside risk usually presented by holding a static allocation to stocks is eliminating the need for a large allocation to bonds because there is no longer a large downside risk potential to hopefully diversify away! And again, it turns out that the risk-adjusted performance metrics of our US stock systematic trend following strategies is so good on its own historically, that adding in other asset classes like international stocks or real estate actually provides **no additional value**. Historically, it has increased the downside risk and volatility because these assets are highly correlated to US stocks and often drop *more* than US stocks during bear markets. So, what we need for true diversification purposes is to find asset classes that are *inversely correlated* to US stocks to provide that "flight to safety" effect during times of crisis (i.e. something that goes up when US stocks go down).

Diversification During Times of Crises

When I ask people what the "flight to safety" asset class used to diversify a portfolio is, meaning what tends to go up when stocks go down, the most common answer is bonds. And specifically, it's US Treasury bonds that often provide the best hedge. However, this is only true about half the time, historically speaking, as the correlation between stocks and bonds continually alternates between positive and negative. The issue that most investors face is that the correlation has been negative for most of their investment experience as we lived through a period of disinflation and falling interest rates for roughly 40 years from 1981-2021, so it's almost engrained in their mind as if that's how things should always work. One needs to zoom out and look back over a longer period to see the historical oscillations. Additionally, gold has also acted as a "flight to safety" asset that benefits during times of turmoil so why do Standard Portfolio Models incorporate little to no gold?

Below are the historical correlations between gold, treasury bonds and US stocks since gold began freely floating.

Figure 6– Correlations between Gold, Treasury Bonds and US Stocks

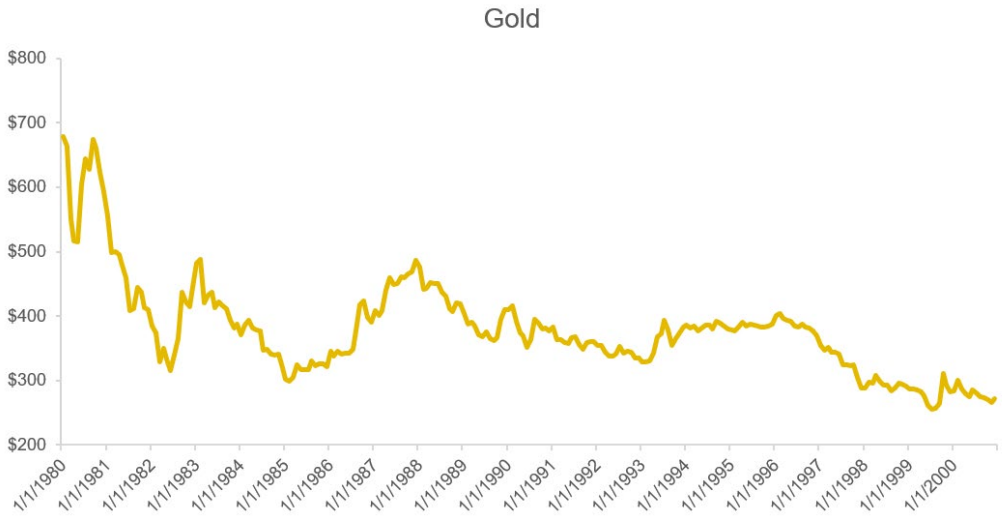
	Gold	Long-Term Treasuries
S&P 500	-0.19	0.06
Russell 2000	-0.06	0.01

*Source: Nick Lumpp, Correlations with S&P 500: 1972-2024, *Russell 2000: 1987-2024*

While both gold and treasury bonds have exhibited low correlations with US stocks, gold is the asset that has maintained a negative correlation to both Large Caps and Small Caps, whereas treasuries have been positively correlated. I would attribute the positive correlation to both asset classes (stocks and bonds) posting positive returns in most years though, so this isn't to say that treasury bonds haven't work well as a diversifier, but by the numbers, gold has been a truer diversifier in terms of maintaining an inverse correlation.

Perhaps the exclusion of gold is because of ideological reasons with industry leaders like Warren Buffett and Jack Bogle proclaiming it an unproductive "pet rock." I think the answer most likely lies in one of two areas. First, the research that underpins Modern Portfolio Theory and the Efficient Frontier, the foundation of standard portfolio models, was conducted during the 1950's and '60's – a period before gold freely floated as the US dollar was still pegged to gold then. Other than a couple of devaluations of the dollar against gold in prior decades, they largely had no data or reason to include gold in a portfolio as it was simply an equivalent of cash that paid no interest. Second, since gold began trading freely in 1971, it tends to move in long, multi-decade trends including a period of over 20 years where it did nothing but fall in value! I think people became fed up with it and decided it just wasn't worth holding in a portfolio.

Figure 7–Gold Price 1980-2001

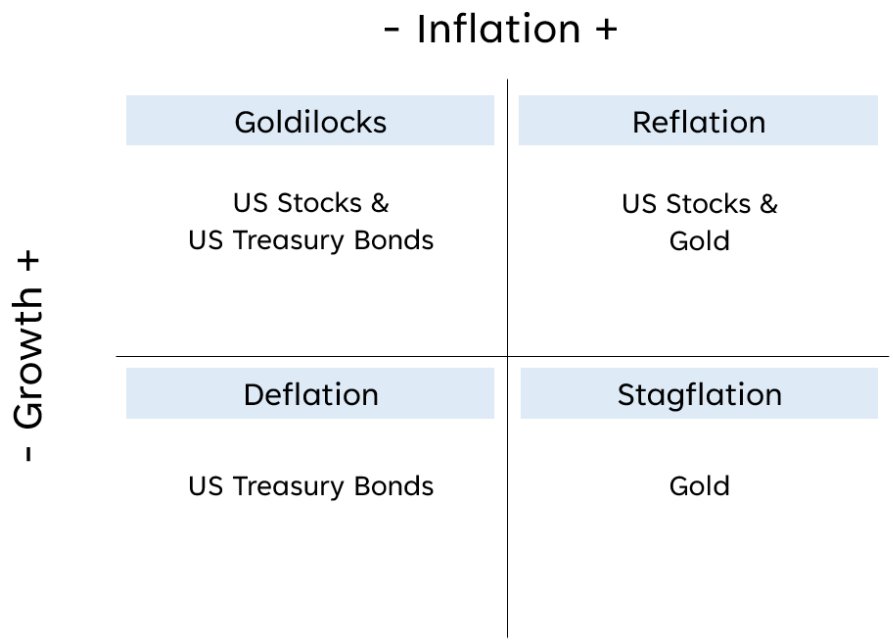


Source: Nick Lumpp, data from MacroTrends

However, again I think people are incorrectly viewing an asset and the best way to approach it within a portfolio. Most asset classes are viewed in terms of maintaining a *static* allocation when a portfolio model is backtested. But this is a fundamental misunderstanding, at a foundational level, of the economic variables that drive asset class performance. No asset class works well in every environment. For example, there are times when stocks perform well (i.e. during economic expansion) and times when they don't (i.e. economic contraction). This is true for every asset class, including bonds and gold. So, our goal in constructing a truly diversified portfolio should be to make sure we're covering all potential outcomes and remaining flexible enough to adapt as conditions change.

From an economic perspective, the two main drivers of asset class performance are the rate of change in economic growth and the rate of change in inflation. For math geeks, I'm referring to the second derivative. Specifically, what we want to know is whether the rate of change in each is accelerating or decelerating. We can take these potential outcomes and make a simple four quadrant grid to illustrate the type of macroeconomic environment we're in (Figure 8, below). For example, the top left quadrant is the environment of growth accelerating ("+") while inflation is decelerating ("-"). We would call this a "goldilocks" economic environment of strong growth with falling rates of inflation. In this scenario, both stocks and bonds tend to perform well. This is the standard 60/40 portfolio sweet spot. The reverse of this is the bottom right quadrant where inflation is accelerating but growth is decelerating. This is known as a period of "stagflation" and typically gold is the best performing asset as both stocks and bonds tend to perform poorly (e.g. the 1970's).

Figure 8– Four Macroeconomic Outcomes



Source: Nick Lumpp

As has played out historically, stocks tend to exhibit their worst performance during times when economic growth is decelerating or outright declining. It's during these periods when a "risk off" diversifier like treasury bonds or gold is crucial to offset potential drops in the stock allocation of one's portfolio. As can be seen in the four quadrant grid above, Treasury bonds and gold tend to alternate as the flight-to-safety asset depending on inflation at that time. Historically, inflation of 4% annually, as measured by the Consumer Price Index (CPI), has acted as a line in the sand where the correlation between stocks and bonds flips. We generally see a negative correlation during periods of low inflation (below 4%) and a positive correlation when inflation is above 4%. **This means that bonds don't always work as the sole portfolio diversifier against drops in stocks!** Case in point was 2022, where the economy was experiencing high inflation and both stocks and bonds dropped in the same year. It also means that gold doesn't always work, as is highlighted in Figure 7 above where interest rates were taken to the high teens in the early 1980's in an attempt to break the inflation of the 1970's, leading to a 20+ year period of decelerating rates of inflation. In short, a static allocation to either is probably not the best approach.

With knowing that the flight to safety portfolio diversifier has flipped back and forth between treasury bonds and gold historically, our goal should be to come up with a systematic way to determine which asset a portfolio should be holding for times of economic turmoil. And that is what we did. Figure 10 below details the historical performance and risk statistics of our systematic timing strategy between treasury bonds and gold.

Figure 9– "Flight to Safety" Asset Performance and Risk Statistics, 1972-2024

	Gold	Long-Term Treasuries	Gold/Treasuries Systematic Timing
Return	7.9%	5.9%	12.0%
Volatility	26.3%	11.6%	23.5%
Sharpe (4.5%)	0.13	0.11	0.31
R^2 with S&P 500	-0.19	0.06	-0.11

Source: Nick Lumpp

There are a few points to highlight. First, since gold is a pretty volatile asset by itself, the volatility of the systematic timing strategy was still relatively high. However, a lot of gold's volatility comes from big up years. The negative correlation with stocks was maintained, which is great to see. And lastly, by adapting our portfolio as the inflationary environment changes, we would have been able to increase returns quite a bit over statically holding gold and treasuries through long bear markets in each, resulting in a significant increase in the overall Sharpe Ratio.

True Diversification is Inverse Correlation

Most people think diversification means holding a lot of different assets or simply having exposure to everything. In portfolio terms, true diversification means holding assets that hold no correlation, or ideally, are inversely correlated. The final step is to add additional exposure to the one asset class that isn't positively correlated to US Stocks: Managed Futures.

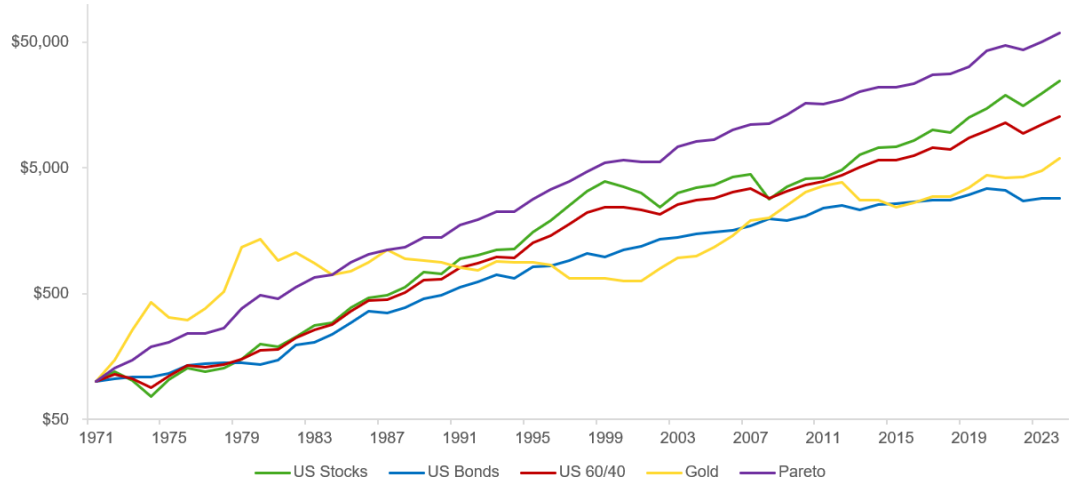
I've found that many people, financial advisors included, don't fully appreciate or understand the point of including an allocation to a managed futures strategy within a portfolio allocation. These strategies are systematic, absolute return focused strategies that generally trade in commodities, interest rates and foreign currencies (FX). They're generally correlated to volatility so they can often have a long string of low annual returns when markets are calm. However, this also means they tend to experience their best years of performance when markets get crazy and volatility spikes, thus creating an inverse correlation to stocks when it matters most: during the down years. This is how these funds can add a lot of value to a traditional stock & bond oriented portfolio.

We don't have as much historical data on strategies like this as we do for asset classes like stocks and bonds. However, they've been around long enough (the Eurekahedge CTA/Managed Futures Index has data since 2000) to show their merit through various market environments and bear markets and adding a small allocation has proven to reduce the volatility and downside risk of the Pareto strategy, historically.

Putting it all Together

When we put it all together, the result is a simple portfolio composed of a few systematic strategies combined in a manner that drastically reduces the downside risk of investing as compared to standard portfolio models and the usual buy-and-hold approach to investing. We have our trend following strategies on US stocks to provide our growth (a 70% allocation) coupled with managed futures and our systematic strategies to flip between treasury bonds and gold as our "risk off" diversifier to buoy the portfolio during times of crises (a 30% allocation). Everything else is non-essential, allowing us to create this portfolio using only 7 low-cost ETF's for the ultimate simplicity.

Figure 10 – US Stocks, US Bonds, US 60/40, Gold & Pareto Portfolio, Growth of $100: 1972-2024



Source: Nick Lumpp, NYU Stern data

Figure 11 – Risk & Return Metrics: 1972-2024

	US Stocks	US Bonds	60% US Stocks 40% US Bonds	Gold	Pareto
Return	10.94%	6.53%	9.58%	8.03%	12.79%
Volatility	17.03%	8.90%	11.43%	26.25%	10.75%
Sharpe (4.5%)	0.38	0.23	0.44	0.13	0.77
$100 Invested Becomes	$24,516	$2,852	$12,737	$5,985	$58,991
# Negative Years	11	10	9	19	7
# Positive Years	42	43	44	34	46
Worst Negative Year	-36.55%	-17.16%	-17.69%	-32.60%	-7.01%
Best Positive Year	37.20%	31.87%	31.49%	126.55%	43.32%

Source: Nick Lumpp, NYU Stern data

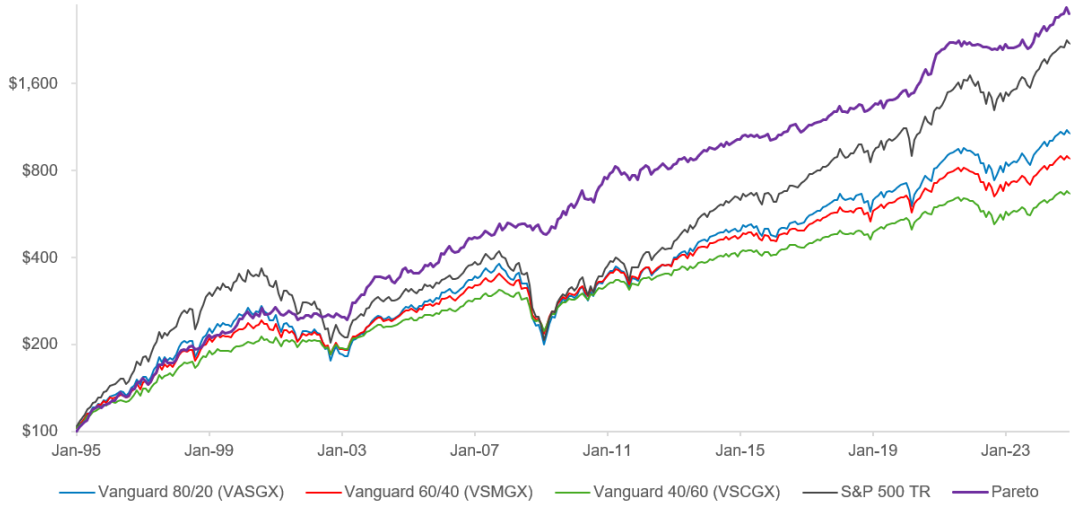
As you can see in the table above, the Pareto Portfolio Model has been able to achieve stock-like returns with less volatility than a 60/40 portfolio, and most importantly, better downside risk management than all other assets in the table, historically, including bonds by

themselves. The path of returns is also much smoother with the Pareto Portfolio Model never experiencing a long period of below average returns or significant drawdowns – something very important as someone retires and begins withdrawing from their portfolio. All of this is accomplished by cutting out the left-tail risk presented by asset classes, thus improving the compounding of returns over time. Lastly, the downside reduction is vital to prevent us from making an emotional decision when markets are going haywire and potentially bailing on a plan at the worst possible moment.

You may be thinking to yourself that your preferred portfolio model is not just US Stocks and US Bonds. Maybe it's global in nature and includes other asset classes like International Stocks, International Bonds and Real Estate. How does the Pareto Portfolio Model stack up against a globally diversified standard portfolio model?

The current makeup of most of the portfolio models used today cannot be backtested to 1972 since many asset classes and benchmark indices weren't created until the 1970's and 1980's. However, some of the longest running global (standard) portfolio models are the Vanguard LifeStrategy Funds which became available in 1994. The Vanguard LifeStrategy funds are extremely popular and common in many retirement plans, totaling assets in the tens of billions of dollars, so these are a great proxy to use for the past 3 decades. Figures 12 & 13 below compare the return and risk data on Vanguard's global 80/20 fund (VASGX), 60/40 fund (VSMGX) and 40/60 fund (VSCGX) compared to the Pareto Portfolio Model and S&P 500 TR Index from 1995-2023.

Figure 12 – Vanguard LifeStrategy Funds, S&P 500 and Pareto Portfolio, Growth of $100: 1995-2024



Source: Nick Lumpp, data from NYU Stern and Yahoo!Finance

Figure 13 – Risk & Return Metrics: 1995-2024

	Vanguard 80/20 (VASGX)	Vanguard 60/40 (VSMGX)	Vanguard 40/60 (VSCGX)	S&P 500 TR	Pareto
Return	8.29%	7.61%	6.62%	10.82%	11.50%
Volatility	14.94%	11.93%	9.23%	18.16%	10.15%
Sharpe (2.1%)	0.42	0.46	0.49	0.48	0.93
$100 Invested Becomes	$1,092	$902	$685	$2,180	$2,619
# Negative Years	8	7	6	6	5
# Positive Years	22	23	24	24	25
Worst Negative Year	-34.39%	-26.5%	-19.52%	-36.55%	-7.01%
Best Positive Year	29.24%	27.94%	24.35%	37.20%	33.83%

Source: Nick Lumpp, data from Yahoo!Finance & PortfolioVisualizer.com

We can see again how the Pareto Portfolio Model exhibits stock-like returns with significantly less risk. The volatility of the portfolio is like a conservative allocation model but by successfully reducing the downside risk through systematic trend following, we no longer need a large allocation to bonds and thus don't experience the large reduction in expected returns, resulting in a substantially higher Sharpe Ratio. Not to mention never experiencing a double-digit down year, historically.

The key takeaway is that one can be very flexible with how they implement the Pareto Portfolio Model. It can be worked into your preferred portfolio model as a risk-managed Tactical allocation in place of other growth assets, or you can adopt the Pareto Portfolio as your core model and supplement it with other assets to either enhance returns, increase the cash flow of a portfolio, or reduce the expected volatility if you're targeting a specific level. For example, by simply putting a certain percentage in T-bills and investing the rest in the Pareto Portfolio Model, you can easily reduce the overall expected volatility to a targeted level.

Application #1: Handling Withdrawal Needs

Let's say a client is taking withdrawals from their portfolio. How do I handle this need?

One of the best ways to destroy your returns over time is to draw money from a portfolio when it's down. To prevent this, what we want to do is set aside withdrawal needs in short-term bonds and bills, outside of the portfolio model, so the money is locked in and not at risk of potential losses.

Historically, the Pareto Portfolio Model has never experienced more than 2 down years in a row (see exhibit A below). It's certainly possible that it could, but it hasn't happened yet. I generally set aside 4 years of a client's annual withdrawal needs and invest the rest in the

portfolio model for better growth potential. The reason I do 4 years is to have a cushion for the potential of experiencing 3 downs years in a row plus one extra year for any unexpected withdrawal needs that also might arise. For someone taking withdrawals at an annual rate of 4%, this would be 16% set aside in short-term bonds and the remaining 84% can be invested for growth in the Pareto Portfolio Model. Notice that this is a significant increase over the standard 60% of a portfolio invested for growth, thus increasing expected returns over time.

One might counter this by saying that they'll just invest in an 80/20 portfolio model. You could, but then you would have 80% exposure to the downside of the stock market which increases your maximum drawdown and performance drag quite a bit. Again, the problem is that the exposure to stocks in a standard portfolio model is not tactically managed in a manner to reduce downside risk. You can't only look at the expected returns of stocks (the upside potential) while ignoring the downside risk and all the problems it can create.

At the end of the year, if the Pareto Portfolio Model was positive, I rebalance the total portfolio to replenish the 4 years' worth of withdrawal needs again and realign the strategies within the portfolio model back to target weights. If the model was down, I wait another year to avoid selling from our growth bucket while it's down. With this approach, we have 3 to 4 years that we can wait for another positive year to occur before replenishing our short-term bonds and thus hopefully never have to remove money after negative performance.

Application #2: Adapting to a Changing World - Incorporating Bitcoin

What if things change in the world in a way that certain asset classes no longer behave as they have historically? What if gold is slowly replaced over time by Bitcoin? Afterall, Bitcoin is often referred to as "digital gold" since it was created to mimic gold and its ability to serve as a neutral reserve asset uncontrollable by any one entity but in a more efficient, digital manner. If you haven't spent any time studying Bitcoin to understand its intricacies and how it works, this may sound somewhat ridiculous. However, I can assure you the possibility of nations incorporating Bitcoin as a reserve asset, and potentially even replacing gold with it, is a real risk to gold over time.

Trying to predict whether or not this actually happens or when it might happen is not the point – the point is to assess potential risks and minimize them as much as possible. If gold were to slowly lose its "risk-off, flight to safety" behavior over time, this would present real challenges to the performance of the Pareto Portfolio. So, the simple solution is to incorporate a small position in Bitcoin, just in case.

"It might make sense to get some in case it catches on."

Bitcoin offers perhaps the most asymmetric return-to-risk profile of any asset you can buy today. Put simply, it means the upside potential is massively higher than the downside risk. Even if it ends up being worthless and goes to $0, the downside risk is no more than 100%.

-Satoshi Nakamoto on Bitcoin in 2009

However, the upside potential could be as much as 10,000% over time for a 100-to-1 reward/risk ratio!

Any asset that provides an attractive asymmetric profile like this can add a lot of value to a portfolio. It allows you to risk a little but potentially make a lot, so it simply becomes a question of proper sizing – how much should you own given the downside potential?

Figure 14 below shows the risk and return data for the Pareto portfolio since inception without Bitcoin vs. incorporating Bitcoin with a very modest 1% position (taken from the gold/treasury bond allocation and rebalanced annually back to 1% of the portfolio value). Keep in mind that Bitcoin was created in 2009 and wasn't accessible to purchase until 2010 so I'm only including returns from 2011-2024. The reason I am including this now and not from the beginning is because I did not want anyone accusing me of cherry-picking a high performing asset to inflate the return data of the Pareto Portfolio. I wanted to show that it stands on its own, but that one could include Bitcoin, or any other asset of their choosing, with a small allocation to enhance returns if desired.

Figure 14 – Risk & Return Metrics: 1972-2024

	Pareto Portfolio	Pareto Portfolio with 1% Bitcoin
Return	12.79%	14.29%
Volatility	10.75%	13.78%
Sharpe (4.5%)	0.77	0.71
$100 Invested Becomes	$58,991	$124,837
# Negative Years	7	6
# Positive Years	46	47
Worse Negative Year	-7.01%	-7.97%
Best Positive Year	43.32%	73.38%

Source: Nick Lumpp, NYU Stern data, own calculations

As you can see, even a modest 1% position would have added more than 1.5% per year of returns resulting in a final portfolio value that would have been more than double (despite Bitcoin only being included for 13 years). The volatility of the total portfolio did increase but keep in mind, volatility is a poor metric of risk. This is a perfect example since most of Bitcoin's price volatility has been to the upside! And who doesn't like upside volatility? It's the downside risk that we care about. On this front, the worst year's return dropped by less than 1 percentage point; a rather modest increase in downside risk for the additional upside of more than 1.5% per year.

It's important to note that I do not expect Bitcoin's performance moving forward to be as high as it has been historically. This is an effect called diminishing marginal returns as something gets larger. But remember, the main reason to incorporate Bitcoin is to ensure we maintain exposure to a "risk-off" asset that is working to diversify our growth allocation to stocks. In the event that Bitcoin continues to grow and eventually starts to replace gold from this perspective, it would be a good idea to include it. And with the newly approved Bitcoin ETF's (as of January 2024), it's now super simple to include in a portfolio.

Bitcoin is still less than 10% of the total market cap of gold, at today's prices, so there remains plenty of upside potential if it were to eventually act as a "digital gold" for reserve and trade settlement purposes by central banks and nations. Given the current size of each asset class and the expected lower returns of Bitcoin moving forward, an allocation of roughly 10% the allocation to gold may be more appropriate. For the Pareto Portfolio, this would be a roughly 3% portfolio allocation today – still a relatively modest position size that would not risk wrecking the portfolio if the downside risks did materialize.

Exhibit A: Historical Returns by Year

Figure 15 – Pareto Portfolio Model Backtest Annual Returns: 1972-2024

	Return		Return		Return
1972	27.20%	1990	-0.32%	2008	1.67%
1973	16.15%	1991	25.23%	2009	17.78%
1974	27.29%	1992	10.97%	2010	23.10%
1975	9.63%	1993	15.64%	2011	-1.41%
1976	16.97%	1994	0.69%	2012	9.48%
1977	0.29%	1995	25.55%	2013	15.39%
1978	9.78%	1996	18.91%	2014	9.25%
1979	43.32%	1997	16.46%	2015	-1.01%
1980	28.16%	1998	19.88%	2016	7.86%
1981	-6.42%	1999	16.56%	2017	16.18%
1982	23.66%	2000	5.63%	2018	1.43%
1983	18.68%	2001	-3.35%	2019	15.05%
1984	5.84%	2002	-0.97%	2020	33.83%
1985	25.35%	2003	31.88%	2021	9.62%
1986	15.51%	2004	11.09%	2022	-7.01%
1987	7.94%	2005	3.53%	2023	15.01%
1988	5.55%	2006	19.19%	2024	18.04%
1989	19.39%	2007	9.71%		

Source: Nick Lumpp