

Your Investment And Retirement Plans

Making Sure You Win Anyway

by: Guy R. Fleury

I want to cover two different investment plans. The first should be the most important to you, while the second is your backup plan – your retirement insurance policy.

You will have the advantage of knowing beforehand that executing your long-term retirement plan will succeed. It should give you more confidence to undertake your more risky investment plan. Knowing that whatever the outcome, whether it succeeds or not, you will win the game anyway. Due to your assured backup, your long-term retirement plan.

At the current pace, within 10 to 15 years, government pension plans might run out of money unless they can increase the return on their funds, increase contributions, increase the retirement age, or reduce benefits. They have not been able to remedy the situation over the last 20 years, so what would make you think they will be able to do so in the future? I have no confidence they will.

Your alternative is to take charge. Build your own retirement fund and keep it under your control, meaning no government or outside intervention. This way, in 10 to 15 years, even if "they" cut benefits and say: "it is for your own good", it will not affect you. You will have taken some insurance on that eventuality by building your own.

You cannot expect or bet on the belief that your government will respect its obligations just because it says so. That has worked poorly in the past, so again, you better take charge of your well-being and build a substantial retirement fund to care for yourself and your loved ones.

Within a few years, we will see the introduction of Central Bank Digital Currencies (CBDC) controlled by governments. It is already underway. It would be the same as giving your government access to your bank account to do whatever it wants.

You will have programmable money, not only having a digital footprint but also having restraints on its use following government mandates. The government could freeze or even seize your money under any pretext it wants. They could ban you from buying certain items, limit your purchases, and your ability to travel without a digital passport. The majority will have voted for those "lawmakers", so you will have to endure the consequences.

You certainly will not be in control of that. Prepare to have your assets in other forms, where new laws will be required to take them away without your consent. The world will change a lot over the next 30 to 50 years. Your reaction to this change will matter

a lot, not only for yourself but also for your kids and grandkids. What you can do now could impact your legacy for generations.

The future could be bright and have people survive in peace and thrive. There is so much more to do to continue improving the human condition. Despite all the progress, too many people still suffer and have no opportunities.

Some might look at darker scenarios and say we are on the verge of WWII, and this one might go nuclear. Should that happen?

Regardless, you should go ahead as if that dark scenario will not happen. Otherwise, your future will be gloom and doom, full of worries, always wondering when those bombs will hit.¹

Let's look at the brighter side of things and take charge of our future. I have to believe we will be in that picture.

You need, over the long term, to do what you think is best for you, as if you would survive to be at least 100 years old.

Medicine will extend your lifespan and that of your children.² Do plan for a long life.

My recent papers dealt mainly with building a retirement fund of substance. They covered an accumulation phase starting with an initial capital, with added monthly contributions, up to retirement age. Different scenarios were presented with their long-term expectations.

After retiring, it was suggested that your fund continue growing at a higher pace than inflation and your income withdrawal rate. This view of your retirement phase provided an increasing income stream instead of a fixed one, which we often see in annuity contracts. It was proposed that you remain active in the markets.

In those papers, the goal was to have you self-manage your fund and make it exceed \$50 million before retirement age. At a 5% withdrawal rate, your fund could provide you with \$2.5 million in your first year of retirement. Of course, that is if you had enough time and money to do the job. A 25 years old can have some 40 years before retiring, more than enough to build a substantial retirement fund and live from it for the rest of his or her life.

Your Investment And Retirement Plans will designate the investment plan as Plan A, while the retirement plan will be called Plan B. Since both plans overlap, identifying them as separate should help better understand each and their different purpose.

¹ Those bombs would be 25 times more powerful than the one used on Hiroshima in 1945.

² Half of kids aged 5 and under have a 50% chance of reaching 100 years old.

The above short description is of Plan B.³ It is executed in the background and will require little of your time, if not none. Anyone with the means, patience, and determination can execute it. It is not a maybe it could or might work. It will simply work due to your convictions and perseverance in following your long-term plan executed over decades.

We could also make this retirement fund part of your overall investment portfolio. If your investment portfolio is large enough, it could behave like a retirement fund once you retire. As an investment portfolio, it gets no restrictions other than the ones you will impose. No one will tell you what you can do or force you to do anything that might not be in your best interest.

Nonetheless, we will stick with Plan A for the investment fund since it should be separate and have Plan B be the minimum you can do, leaving Plan A optional. Plan B is the must-execute plan, with Plan A the extra you could do if you have the means or inclination.

The Retirement Fund - Plan B

A retirement fund is simply a delayed gratification bet. You are ready to save and invest some of your current money to get more later. In the case of a retirement fund, this delayed gratification should be on an exponential curve.

You can do the same thing using an investment portfolio holding appreciating assets. Your investment fund, Plan A, should compound over time like any retirement fund.

The more capital you put in and the more you wait for that gratification, the higher your fund might be. And from it, the higher your future income stream while in retirement. At least, that is what the future value equation is saying:

$$FV = PV \cdot (1 + r)^t \quad (1)$$

where r is the rate of return applied over a period t on the present value of your investment PV . This equation has been around for ages and should not be a mystery to anyone.

Equation (1) offers few choices since the answer will depend on only three variables. And in the case of your pension plan, the timespan (t) might be predetermined, leaving you in a quest for the highest return r you can get. Anything below 10% should be considered a loss since buying SPY could have generated that return.

I used QQQ as the core portfolio in my articles over the last year. The QQQ ETF has 100 stocks, the same 100 stocks as in the NDX Index. It is enough to make this

³ See related and more descriptive articles provided at the end of this paper.

portfolio diversified while also low maintenance. It is an important side effect; you have almost nothing to do over all those years. Leaving you free to do whatever you want, including executing Plan A.

I am making the same suggestion Mr. Warren Buffett has made for many years: "Most people should simply buy an index fund such as SPY and hold for the long term." Over the long term (50+ years), the market's overall average return has been in the vicinity of 10% per year. It is also what you should expect for holding SPY.

Some of my recent articles proposed going a notch higher using QQQ instead of SPY. The reason is simple: both SPY and QQQ are value-weighted. And by construction, QQQ is also a subset of SPY and will outperform SPY over the long term.⁴



Figure 1: SPY vs QQQ

The above chart exemplifies the argument that QQQ has a higher return rate over the long term than SPY. It is not an aberration or some luck factor. It is simply by construction.

The top 100 wealthiest stocks have a higher moving average than the top 500. That is what the above chart shows, making QQQ a better choice.

In effect, with a single decision, you are choosing your expected long-term average rate of return ($r_m + \sum \alpha_i$). You supercharge your index fund proxy by using QQQ.

You might not know what this expected growth rate will be over the following decades, but you know now that QQQ will outperform SPY. The difference might not be that much, about five percentage points or in its vicinity, but it will make a big difference over the years. For example:

⁴ Chart from my paper: [Sitting On Your Bunnies Might Be Your Best Investment Yet](#).

$$\$1,000,000 \cdot (1 + 0.10)^{40} = \$45,259,256 \quad \text{using SPY}$$

$$\$1,000,000 \cdot (1 + 0.15)^{40} = \$267,863,546 \quad \text{using QQQ}$$

That is a difference of \$222,604,291 for the single decision of choosing QQQ over SPY. It is an administrative decision, a choice you have to make. It should not even be a coin flip. Just an exercise in common sense and a simple observation of what you are dealing with.

Those are the kinds of bets one should take when considering the long-term implications of their investment decisions. It resembles Mr. Buffett's bet on the long-term prosperity of America. You should also answer that question: *Where is it all going?*

You should know from the start what your endeavor implies, what is and will be required, and how long it will take. One thing you cannot afford in Plan B is missing out and not getting there.

Plan B is your security: knowing you will win this one, no matter what.

But the game is still ongoing once you reach retirement age at 65. You might have another 35+ years to go. And that investment fund should provide you with the revenue you might need to enjoy all the amenities to entertain your retirement.

Say you opt for a withdrawal of 5% of your portfolio per year as your retirement income starting at age 65. It would transform the above two equations, starting from where they left off, and leave the following legacy funds once you reach 100.

$$\$45,259,256 \cdot (1 + 0.10 - 0.05)^{35} = \$249,650,753 \quad \text{using SPY}$$

$$\$267,863,546 \cdot (1 + 0.15 - 0.05)^{35} = \$7,527,618,385 \quad \text{using QQQ}$$

The legacy difference is \$7,277,967,633. You could have enjoyed an income stream valued at 5% of your yearly holdings during retirement. And since your holdings were increasing yearly, your income stream would also.

This is the result of a single decision made way back before you even started this adventure, but it was nonetheless required, and again, from the start. You should not wait 20 or 30 years, hoping you will catch up later. That might not happen, catching up, that is. The lost years are hard to recuperate or compensate for.

Your first year in retirement, based on the last two equations, would be \$2,262,963 for the SPY case and \$13,393,177 for having chosen QQQ instead. You should be able to survive with either of these scenarios. Note that those withdrawals would increase respectively at an average 5% and 10% rate while in retirement, thereby

providing you with an increasing income stream over all those years while building a colossal legacy fund for your children.

Plan B can easily survive you, so you will not run out of money even if you live up to 100+ years. You can assume that QQQ will be there for quite some time. Its constituent stocks may change, but the nature of the QQQ ETF won't. It will continue to list the top 100 wealthiest stocks on the NASDAQ exchange. Even if the NASDAQ exchange collapsed, some other service would provide a continuously updated list of the top 100 most valued companies.

When you look at the big picture, you consider that that is what you need to do: look at the big picture. And that will be to execute Plan B. It is your retirement insurance policy. You realize you want those outcomes as your bare minimum. Your only problem is: how are you going to do this?

My recent articles and papers have already answered that. What is missing is the commitment to yourself to do it.

The above recipe will hold. You are the one to provide the determination and confidence to carry out Plan B. It is a big commitment but does not have to be strict. It does not have to be an investment plan, only doable using stocks. It can also work using a lot of other assets and methods.

It is where your Plan A, your investment plan, comes to light. Having Plan B to secure your future no matter what, you should feel more confident building Plan A with whatever enterprise you find fruitful. If you want to be an entrepreneur, go for it. If you want to start a new business, go for it. You have a backup plan to secure your future for yourself and your loved ones. Plan B should give you more freedom and determination to do Plan A.

Plan A can be anything you like to do, occupying most of your working hours. Overall, it could complement Plan B, meaning that whatever you do, it could also aid your long-term investment portfolio since Plan A is also an investment plan, an investment plan in yourself and your skills.

Plan A might be the most rewarding and produce much more than Plan B. However, Plan A is also more risky by its very nature. Research papers often state that most business ventures fail. Some estimates make it at 70%+. Therefore, this is not an assured outcome. Suppose you succeed with Plan A, beautiful. It would make you even more prosperous and give you that much more for your retirement income. Regardless, Plan B needs to be your ultimate protection, more than just in case something goes wrong with Plan A.

Equation (1) only states you need a positive rate of return and that the length of time the equation will be applied will matter. My recent articles and papers also

demonstrate that.

There are no hyperbolas or hype presented in Plan B. You are simply buying an indexed fund that will outperform a market benchmark like SPY, another indexed tracking fund.

Investing in QQQ might be the easiest way to achieve higher returns without putting in all the time, meaning not working at it daily. Minimal supervision is not even required. You intend to hold for the long term, so you will let QQQ wiggle on its way up as it will tend to its long-term average. It might not rise every year, but over the long term, it should prove profitable overall.

Not even a little work is involved in choosing QQQ over SPY. In both cases, you only need to buy more shares regularly.⁵ Resulting in the same thing as making monthly contributions to your retirement fund. However, you are now looking at it as your investment plan, where you control the whole process. At the same time, you are responsible for committing to follow your Plan B.

It is your fund, and you can do with it whatever you want whenever you want. No one will dictate or force you to do whatever with your fund. No one to say you cannot put in more than x this year, or due to your age, be forced to withdraw such amount or percentage. Your fund could be in multiple banks and diverse countries. You could move your funds at will without being taxed. It's yours, and you can do with it whatever you want.

You know your ultimate goal is to have that portfolio provide you with all the income you might need while in retirement. You want peace of mind, be financially independent, and worry-free. Your fund should be large enough to supply you with all the money you might need to fully enjoy your retirement for as long as it may last.

QQQ is in the low-bankruptcy risk category, meaning its default probability is extremely low. The reason is simple. You are looking at NASDAQ's 100 wealthiest publicly traded companies. They are not going out of business tomorrow, certainly not while on the top 100 list, either as a group or individually.

You are making the same bet on America as Mr. Buffett has often mentioned as his primary motivation. On the other hand, should you think the US economy is going down the drain, you should adopt a shorting strategy that could at least make you profit from the US's demise. But I would not bet on that. All countries can prosper for the benefit of its citizens.

Any of the stocks in QQQ losing its top 100 status is liquidated and replaced by a newcomer with even better long-term prospects. A way of saying you will not see

⁵ Refer again to: [Sitting On Your Bunnies Might Be Your Best Investment Yet.](#)

any of those stocks go bankrupt while in your portfolio. A stock could still drop like a rock after liquidation, but that would not harm your portfolio.

It makes your portfolio a relatively safe long-term bet able to outperform a long-term market average proxy such as SPY, often used as a market benchmark. My recent papers and articles have, at least, demonstrated that.⁶

You need to acquire the conviction that the above holds true and that you can apply it on your own. Or, otherwise, find someone else who could do it for you. But, even there, you will need the conviction that it will all work out as planned. Plan B requires, more than anything else, patience, confidence, and perseverance. It is not a plan you undertake for a few years; you should be in it for the long term. And this could mean for the rest of your life.

You can verify all the presented arguments on your own. You can redo figure (1) anytime. You would get the updated version of the same thing. You can also redo all the calculations presented in my papers and get the same answers. Use those equations, make them part of your mindset, make them the basis of your thinking, and always look at the long-term picture. An equal sign is a brutal statement with no ifs, buts, or maybes. You might not know the future, but you are going there anyway, so prepare yourself and do your best.

If what you do will not hold over the long term, you should look for something else. It is your investment/retirement fund; you should ensure you will succeed, and the first step is to agree with yourself and have your own convictions. Practically, no one can help you with that but you. So, do your homework.

If you do not believe in yourself, there is not much I can do about that.

This investment method (holding QQQ) has an implicit stop-loss. It is not a percentage like some trailing stop-loss or a strict value. It is on the relative ranking to other high-performing stocks. If the stock value is lower than the group's 100th stock, it is liquidated and replaced. That value is constantly fluctuating.

A stock remains part of the 100 best and continues to grow, or it is out. You should expect the top 100 list to change over time. As a matter of fact, over the past 20 years, the top 100 list has changed a lot. And over the next 20 years, it should do the same, that is change.

It is one of the underlying benefits of using QQQ. No matter its composition, it will harbor the top 100 wealthiest companies on NASDAQ. The list is kept up to date by Invesco,⁷ the managers of this ETF. Anytime a stock drops out of the list, it is

⁶ Just look again at figure (1) as a reminder.

⁷ You can find a complete list with weights on Barchart: [100 QQQ stocks](#).

liquidated and replaced. Therefore, your QQQ portfolio is always up to date.

Evidently, QQQ will fluctuate in price as other securities do. However, due to its size and since it is a weighted average of 100 stocks, it tends to fluctuate less than the sum of the volatility of its constituent stocks. Volatility in stocks is not additive. The same principle goes for any other stock portfolio.

The main advantage of using QQQ is its survivorship potential and expected higher performance over a market average proxy such as SPY. The above might sound unusual when most portfolio managers say you should account for survivorship biases when testing your trading strategies.

For the future of your portfolio, survivorship is what you are looking for. You want the stocks in your portfolio to survive and thrive. What better way than only holding survivors? And that is what QQQ is providing. It is biased towards the ultimate survivors, the top 100 best-performing stocks on NASDAQ.

Another aspect of holding QQQ is that it will require only a little of your time. You know from the start that your plan will work. It is not; let's hope we will get there. It is, most certainly, you will get there. That is why Plan B qualifies as your minimum retirement plan.

All you have to do is stay the course and regularly contribute to your fund. You could redo, on your own, any of the charts and tables presented in my related papers and articles. Look them up for more details.⁸

Alternative Solutions

Using stocks is not the only way to build up an investment fund. Equation (1) does not specify which assets are part of the initial capital PV , nor does it provide how many assets you could use or their nature.

You could make it any asset that can appreciate with time. That is not very limiting. As long as the chosen assets can appreciate over the long term, or for the period you will hold them, they can respond to equation (1) in their own way, each with their own time intervals and appreciation rates.

It raises the point of managing multiple assets with varying investment periods over an extended time interval. You still want the compounding effect to apply to your entire portfolio, whatever its composition. Even if some of your chosen assets might not appreciate over their investment period, you still want, on average, your total portfolio to rise in value.

⁸ A list is provided at the end of this paper.

When looking at equation (1), we can observe that it is not timing that is everything. It is simply time. The length of time your portfolio can appreciate matters. The longer, the better.

The longer your assets can appreciate, the more you will get. And some of it might be a matter of choice. You bought QQQ or SPY, and you held for 50 years, you should expect either of the following or get close to it:

$$\$1,000,000 \cdot (1 + 0.10)^{50} = \$117,390,853 \quad \text{using SPY}$$

$$\$1,000,000 \cdot (1 + 0.15)^{50} = \$1,083,657,442 \quad \text{using QQQ}$$

The choice is yours to make. Will you use QQQ or SPY? Short-term, there is not much difference, a mere 5%. But that 5% will compound for 50 years. And it does make a considerable outcome difference. Nonetheless, you could also go for a higher CAGR, a higher initial capital PV , and blast the above numbers to oblivion. Examples:

$$\$1,000,000 \cdot (1 + 0.20)^{50} = \$9,100,438,150$$

$$\$10,000,000 \cdot (1 + 0.20)^{50} = \$91,004,381,500 \quad \text{A Warren Buffet scenario.}$$

$$\$1,000,000 \cdot (1 + 0.25)^{50} = \$70,064,923,216 \quad \text{Maybe your own scenario.}$$

The above numbers suggest that one should look for better strategies than using QQQ as the core long-term portfolio. QQQ has a future upside limit, which is not surprisingly relative to SPY. All QQQ can do is rise above SPY's total return and stay there. Therefore, its upside CAGR limit might tend to something like 15%. Not bad, but you could do better with a bit of work.

As the above equations illustrate, you can raise the overall CAGR, the initial capital put to work, or both. That does not happen by itself. You will have to make it happen. That means you will have to design trading/investing strategies to at least outperform the QQQs since it has become your minimum benchmark, whether you like it or not, especially since it is so easy to implement. It will inevitably lead to managing multiple assets.

People think that in investing, you take what investment firms offer. That can be pension or other savings plans, which usually have low-interest rates. In recent years, you even had negative return bonds. It might be a way to preserve part of your capital, but it is certainly not one giving portfolio appreciation.

It is why you have Plan B, to make sure you make it over the long term. But, as said, Plan B has its upside limit, which is QQQ's expected long-term CAGR. And that is why you have a Plan A to raise the overall combined portfolio CAGR.

Plan A will require more time to execute. I see no restrictions except your own constraints. Plan A is an investment in yourself, your skills, and what you like to do. In essence, what you consider your day-to-day job, whatever it is. Nonetheless, look for creative ways to make further investments, things like buying real estate properties, collectibles, and other appreciating assets. Start a business, be an entrepreneur. Those are choices you have to make. Always look for ways to improve your holdings.

This will transform equation (1) into:

$$FV = PV \cdot (1 + \bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3 + \dots)^t \quad (2)$$

where \bar{r}_m is the market's average rate of return as can be obtained using SPY. While α_1 is the excess return obtained by using QQQ, for instance. Leaving α_2 and α_3 and others for your Plan A to fill. Each positive alpha source improving on your overall return: $\bar{g} = \bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3 + \dots + \alpha_n$.

Your Plan B is the primary driver here. You know, even before you start, that you will succeed. One of Plan B's requirements is to last long enough to let your portfolio appreciate. Plan B will take a little of your time by design. Therefore, you can concentrate on what will be part of Plan A, knowing you have a worthwhile backup in Plan B. Furthermore, you could use part of Plan B as collateral for your Plan A since Plan B is composed entirely of very liquid assets.

Plan A is your risky asset. It is where you can take added risks on whatever endeavor you think will succeed. Be an artist, an athlete, an architect, a brain surgeon, or whatever, but transform some of your success into investments to complement your Plan B.

It is all up to you. You have a secured path with your Plan B, requiring little time. And you have Plan A that can boost Plan B by providing more alpha. Furthermore, because it is an investment fund, it could grow and compound for as long as you live. Both of your plans do not have an explicit retirement age. And above all, it will all belong to you to do as you please.

Managing Multiple Assets

For multiple assets, I prefer using the payoff matrix notation. It is all-inclusive and still holds an equal sign.

$$FV(t) = PV_0 + \sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P}) = PV_0 \cdot (1 + \bar{g})^T \quad (3)$$

N is the number of rows (days), while T is the termination time. \mathbf{H} is the holding matrix, the number of shares held in each stock. \mathbf{P} the price matrix, and $\Delta \mathbf{P}$ the price

difference matrix. Whatever the composition of the payoff matrix, we can reduce it to its equivalent average growth rate \bar{g} . You can also easily determine the average profit per trade:

$$\frac{\sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P})}{N} = \frac{FV(T) - PV_0}{N} = \bar{x}$$

As N gets larger and larger, it minimizes the impact of any one trade could have on the average. The thousandth trade, on average, represents about one-thousandth of the total. It implies that the overall average becomes harder and harder to impact as N increases.

From experience, you should know that often, the top 20% of something can do 80% of the work.⁹ It holds in trading also since all trades are not equal; some will be bigger than others, and some will be negative.

By opting for trading in your investment portfolio, N , the number of trades you will make gains importance. As N increases, you will get more interested in averages like \bar{x} and how you could impact it.

If you do 100,000 trades over your 40 years managing your stock portfolio, you know that each dollar you add to your average long-term profit represents \$100,000. The objective becomes to do things that will improve your overall average over improving any single trade. You will need to play averages.

We could also say that holding QQQ for the duration has about the same outcome as if rebalancing every week the constituent stocks in the NDX Index:

$$\sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P}) \rightarrow \sum_1^1 (h_{0_{QQQ}} \cdot \Delta \mathbf{p}_{QQQ})$$

where $h_{0_{QQQ}}$ is a single QQQ position.¹⁰

The QQQ payoff matrix overall return will converge to the NDX Index return by construction. There is nothing unusual here; it should be expected, almost as a premise. QQQ is very closely mimicking the NDX Index and its stock weights. And therefore, QQQ's return will tend towards NDX's return.

Holding QQQ is the equivalent of a trading strategy continuously rebalancing its 100 constituent stocks. Therefore, all the underlying trading going on, whether due to rebalancing activities or list maintenance, will be reflected in the QQQ ETF.

Holding QQQ can be a total portfolio solution, including its trading. If you are only holding QQQ, you have nothing to do; rebalancing and maintenance are all done in the background for you.

⁹ The top 6 assets in Berkshire Hathaway's 90+ stock portfolio account for over 65% of it, or about.

¹⁰ See [Use QQQ - Make the Money and Keep IT](#) for a demonstration of this.

Whatever the transaction, it can impact the portfolio's growth rate. And this, that you did only one trade or several millions. You still get a portfolio's starting point and endpoint:

$$FV(T) = PV_0 + \sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P}) = PV_0 + N \cdot \bar{x}$$

which will reduce the cumulative sum of all generated profits and losses to two numbers: N , and \bar{x} .

Based on equation (3), your portfolio does have an equivalent growth rate, and it only speaks in terms of the future value of money $FV(T)$. Whatever you do, you will find your portfolio's long-term growth rate to tend to \bar{g} , meaning your portfolio's average growth rate can easily be higher than the market's average growth rate since you will bring along some alpha of your own.

Your first step to increasing your growth rate \bar{g} was to "buy" some alpha, not by working for it, but by buying QQQ instead of SPY. A simple matter of stock selection: taking the top 100 instead of the top 500.

A representation of the payoff matrix is relatively simple. You could build it up in any spreadsheet. Here is an example:

P				ΔP				H				H * ΔP				Σ(H * ΔP)	
Stock 1	Stock 2	Stock 3	Stock j	Stock 1	Stock 2	Stock 3	Stock j	Stock 1	Stock 2	Stock 3	Stock j	Stock 1	Stock 2	Stock 3	Stock j	Total	
43.38	30.40	75.96	57.62	0	0	0	0	100	100	100	100	0	0	0	0	0	
41.81	27.49	75.90	60.35	-1.57	-2.91	-0.06	2.73	100	100	100	100	-157	-291	-6	273	-181	
40.91	26.16	75.23	60.11	-0.91	-1.33	-0.67	-0.23	100	100	100	100	-91	-133	-67	-23	-314	
38.64	29.30	78.07	59.22	-2.27	3.15	2.84	-0.90	100	100	100	100	-227	315	284	-90	283	
40.68	32.13	80.03	61.76	2.04	2.83	1.96	2.54	100	100	100	100	204	283	196	254	937	
37.62	29.04	75.26	63.50	-3.06	-3.09	-4.77	1.74	100	100	0	100	-306	-309	0	174	-441	
39.09	28.13	70.62	64.29	1.47	-0.91	-4.64	0.78	100	100	0	100	147	-91	0	78	134	
42.43	27.52	70.36	64.54	3.34	-0.61	-0.27	0.25	100	300	0	100	334	-183	0	25	176	
43.56	25.73	76.02	62.87	1.13	-1.78	5.66	-1.67	100	300	0	100	113	-535	0	-167	-590	
40.50	28.04	81.49	62.46	-3.06	2.31	5.47	-0.41	100	0	100	100	-306	0	547	-41	200	
44.09	27.30	81.87	62.15	3.60	-0.74	0.39	-0.31	500	0	100	100	1798	0	39	-31	1806	
46.43	26.53	82.31	62.12	2.34	-0.77	0.44	-0.03	500	0	100	100	1169	0	44	-3	1210	
46.76	25.43	79.97	65.06	0.33	-1.09	-2.35	2.94	500	200	100	100	165	-219	-235	294	6	
50.01	25.39	75.72	62.78	3.25	-0.04	-4.24	-2.28	500	200	100	100	1625	-9	-424	-228	964	
47.50	26.01	73.34	64.86	-2.51	0.63	-2.38	2.08	500	200	200	100	-1255	125	-476	208	-1398	
46.91	29.22	79.29	64.32	-0.60	3.21	5.95	-0.54	500	200	200	100	-298	642	1190	-54	1480	
50.10	29.97	80.41	61.36	3.19	0.74	1.12	-2.96	500	200	200	100	1597	149	225	-296	1674	
49.58	28.51	79.45	60.41	-0.52	-1.46	-0.97	-0.95	0	200	200	100	0	-292	-194	-95	-580	
49.07	29.27	73.90	59.70	-0.52	0.76	-5.55	-0.70	100	200	200	0	-52	153	-1110	0	-1009	
50.92	31.41	68.06	59.92	1.86	2.14	-5.83	0.22	100	200	200	0	186	427	-1166	0	-553	
53.45	34.32	66.82	58.81	2.52	2.91	-1.24	-1.12	100	0	200	100	252	0	-248	-112	-107	
52.07	31.39	67.47	60.94	-1.37	-2.93	0.65	2.14	100	0	200	100	-137	0	130	214	206	
51.17	29.59	64.66	58.76	-0.90	-1.80	-2.81	-2.18	0	0	0	100	0	0	0	-218	-218	
49.52	29.12	66.85	61.32	-1.66	-0.47	2.19	2.56	0	0	0	100	0	0	0	256	256	
52.21	29.92	66.61	62.78	2.69	0.80	-0.24	1.46	0	0	0	100	0	0	0	146	146	
ΣΔP =				8,83	-0,47	-9,35	5,16					Σ(H * ΔP) =	4762	31	-1273	565	4085

Figure 2: Example of a Payoff Matrix

The first block, the price matrix P, displays the assets' trading prices (entries, exits, and in-between closing prices). The second block, ΔP, is the daily difference to the next close or closing trade price. The H matrix maintains the inventory on hand at any one time (# shares held).

A positive quantity stands for a long position, while a short has a minus sign. A quantity of zero means no position at that time. Those inventory numbers result from your trading program. It will dictate which stock to trade, when, and how many shares to buy, sell, or hold.

Therefore, the holding matrix \mathbf{H} becomes the trading strategy. Whatever moves the inventory on hand is dictated by your buy and sell orders, and they originate from your trading program. One way to improve the outcome of your trading strategy \mathbf{H} is to enhance it somehow. That can be achieved with a \mathbf{D} matrix acting as an enhancer to the underlying strategy \mathbf{H} :

$$\sum_1^N ([\mathbf{a}(t)(\mathbf{H} + \mathbf{D})] \cdot \Delta\mathbf{P}) \gg \sum_1^N (\mathbf{H} \cdot \Delta\mathbf{P})$$

Matrix \mathbf{D} is the enhanced decision process applied to strategy \mathbf{H} , and it can be anything you want. You could execute it independently as long as it could positively impact the overall portfolio. Possibilities are technically limitless, including adding a scaling function designed to increase $(\mathbf{H} + \mathbf{D})$ when prices rise and reduce or exit a position on falling prices.

You have to look at where you can impact your overall portfolio performance, and that is by your inventory control procedures ($[\mathbf{a}(t)(\mathbf{H} + \mathbf{D})]$). Adding a few alpha points to your long-term CAGR will make a difference. The more you add, the more significant the long-term impact.

The fourth block in figure (2) gives each position's daily profit or loss. All the positions with zero shares will translate into no gains or losses in the payoff matrix.

You get the daily sum of profits by adding horizontally the profits generated by each stock in the portfolio. Adding vertically, you obtain the total running profit for each stock.

The matrices in figure (2) are relatively small. You will have to deal with much bigger matrices. For example, a SPY portfolio would be composed of at least 500 columns, and after 40 years of daily data, it would have $500s \times 40y \times 52w \times 5d \geq 5,200,000$ data points. It's not that small a matrix to manipulate. The QQQs, would have $100s \times 40y \times 52w \times 5d \geq 1,400,000$ data entries. Figure (2) is just for illustrative purposes. You will have to deal with the equivalent of much larger matrices.

It is not only the payoff matrix that could be huge. It is also the holding matrix \mathbf{H} , the price matrix \mathbf{P} , and the price difference matrix $\Delta\mathbf{P}$. To these matrices, you would have to add other matrices of the same size to handle trading procedures and information matrices needed to make your trading decisions.

Any correlation you could find in such huge matrices might be irrelevant. What does a data point some 5 or 10 years ago have to do with what is happening today? How

relevant could it be? Nonetheless, a corporate decision five years ago could still impact today's stock price.

When making correlation matrices, you are not looking at past corporate decisions; you are only looking at numbers. And in stock, old data, meaning prices of five years ago, will tend to be lower since, on average, for the survivors, they tend to rise over the long term.

However, should you look closer at the average price movement of all those stocks, you should find a lasting and upward drift. It means that, on average, stock prices have memory and are generally rising. Prior articles also illustrated this point. Stocks have had an upward drift for over 200+ years. It should be more than enough to classify it as a long-term trend, index-wise.

No matter how much data is in the payoff matrix, it still has a growth rate equivalence as given in equation (3). It is also easy to determine this growth rate. Here is the formula:

$$\left[\frac{FV(t)}{PV_0} \right]^{1/t} - 1 = \left[\frac{PV_0 + \sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P})}{PV_0} \right]^{1/t} - 1 = \bar{g} \quad (4)$$

Another equation that has existed for ages. It makes all the performed transactions in the payoff matrix (winning and losing trades) echo in the portfolio's growth rate \bar{g} .

Equation (4) also says that whatever happened while holding SPY, it would tend to its historical average for anyone holding this ETF over the long term. It would make \bar{r}_m the overall market average, trending to its long-term historical average of about 10% ($\bar{r}_m \rightarrow 0.10$). Nothing is that precise in the investment world except for commissions, fees, and taxes, which you will pay.

It does not mean that SPY will not fluctuate in value; it will. And by some standards, it will fluctuate a lot, a lot more than it should. But then again, that is the trading environment you intend to play in and win.

It puts even more weight on Plan B. Your choice of picking QQQ over SPY was easy to make. QQQ has an expected higher growth rate than SPY by construction ($\bar{g} \rightarrow 0.15$). A single investment decision can significantly impact one's portfolio over time.

Your NEW Benchmark Strategy

You now have a retirement strategy (Plan B) that can bring you, over an extended period, something approaching a 15% CAGR and requiring very little of your time. Not only that, it almost guarantees you will win the game while at the same time

building your retirement fund as if a byproduct of building your long-term investment fund.

So, the BIG question is: **Why would you accept less?**

You can achieve Plan B simply by holding QQQ for 40+ years. This plan is like holding an index fund proxy like SPY but with some alpha built in. Instead of working for this alpha, you bought it.

Until you can demonstrate to yourself (the only place where it will matter) that you can do better than Plan B, it should be your strategy of choice.

Once you find something better, you could gradually switch to your new strategy. Nonetheless, whatever your portfolio becomes, it should remain your Plan B, your backup plan, requiring little of your time. You should make sure your new strategy will have a long-term return expectation exceeding a 15% CAGR. It is what I mean when saying a better strategy; otherwise, why change?

You are in a "race" (mostly with yourself) to reach the highest possible CAGR you can (\bar{g}). That is the objective. That is what equation (1) says, loud and clear. The endpoint matters (at T); it is the end game. Only then will you have a definite answer to equation (4).

You could easily modify the QQQ strategy by trading its component stocks to increase overall CAGR.¹¹ For instance, instead of using the 100 stocks part of QQQ, only use the top 50 or 30. It will also raise the overall CAGR. As said previously and given in a previous paper, since the top 100 stocks of NDX outperform the top 500 in SPY, so will the top 50 of the top 100 stocks. It's an easy way to add a couple of alpha points. It could raise your overall CAGR to 17%+ or about, and again, by choice.

You could use other trading methods and routines to increase your overall return further. You are not limited to only using stocks. You could add other assets that could be part of your Plan A should it help you achieve your goal. And that is have your overall portfolio exceed your 15% benchmark (your plain QQQ strategy).

$$E[FV] = PV \cdot (1 + E[\bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3])^t \quad (5)$$

Equation (5) sets the expected future value of your portfolio to your initial invested capital growing over t years at an expected average rate of $E[\bar{g}] = \bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3 + \dots$ where the expected alphas represents the edge you could bring to the job, and r_m the long-term market average; something that could be had by buying SPY for instance and holding that position for the duration.

¹¹ Refer again to: [Make Yourself A Glorious Retirement Fund](#) for a detailed account.

We have already covered α_1 by using the QQQs, thereby providing us with 5% in alpha points since the expected rate of return for the QQQs exceeds the growth rate of SPY by about 5%. In a simulation presented in a prior paper, the QQQ's growth rate was 15.7% over some 13 years, thereby showing that a 15% CAGR was easily accessible.

Using the QQQ strategy, we did practically nothing and bought ourselves five alpha points ($\bar{g} = 0.10 + 0.05 = 0.15$). We could add two more alpha points by using the top 50 stocks, giving us $E[\bar{g}] = 0.10 + 0.05 + 0.02 = 0.17$.

We are not limited in the number of alpha sources our investing/trading strategy could have. We could add other appreciating assets to our payoff matrix. The objective would be to raise the portfolio's long-term growth rate as high as possible. Even above a 30% long-term CAGR, if we can. We are often the limiting factor with our constraints, not necessarily the environment we are trading in.

The ultimate goal is to survive it all. The easiest 15% CAGR is simply buying the QQQs and planning your monthly contributions to your retirement plan, as recent papers and articles exemplified.

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