Self-Managed Retirement Funds

Most people think that upon their retirement, they will have enough money to live by and set to enjoy their retirement for the rest of their lives.

They believe that $50k to $60k per year can and will cover all their living expenses.[1] And often, it is the extent of their retirement planning. They rely on the contributions made to their company's pension plan and pay into Social Security. They have everything covered, confident that reaching retirement age will be a welcomed life transition.

But then, you see numbers like 60% of adults reaching retirement age have less than $10,000 in liquid assets. Or something like 60% of workers live paycheck to paycheck, having a hard time making ends meet such that they do not have enough money left to contribute to a self-managed retirement plan. But few will question the above numbers. Where are they coming from? How have they been validated? Who is putting out these numbers, and for what purpose?

We should always be critical of statements like that. The recent pandemic should have taught us not to trust everything said or printed. Whether by the government or mainstream media. And if you cannot trust them, you will have to figure it out by yourself to determine what is true, what is false, and what is in between.

Even so, people who save a little for their old age often get low long-term returns on their savings which are further dragged down by administrative and portfolio management fees making it hard to exceed long-term market averages.

We often read that some 75% of professional money managers do not exceed long-term market averages, and based on the numerous studies, I tend to agree with that statement. Some put the above percentage even higher. Some do beat averages; otherwise, we would not have a market average to speak of.

Nonetheless, you pay professionals to care for your retirement fund; most cannot even beat market averages. They will congratulate you for choosing them as money managers when you could have done better with a lot less in fees simply by buying low-cost indexed funds.

What are you to do? The answer is simple: you should take charge of your financial well-being. You should manage your retirement fund. And as I will show, it is neither complicated nor time-consuming. There are easy solutions to self-management.

Devise a long-term investment plan of what to do and how to do it with preset goals

[1] As suggested in the following YouTube video: **Stochastic Control Approach to Defined Contribution Plan Decumulation**

and objectives. That is easy to do. We will tackle some of it here. Over recent months, I have written a few articles on this very topic and suggest you read some of them for general information and trading methods you could use.

The Shrinking Dollar

From the start, we know what money is, or more explicitly, its time value. You know its present value. You have some of it in your pocket, wallet, purse, investments, assets, or the bank. There is no need to explain what money is. However, we are interested in its future value. What will it buy 30 or 50^+ years from now?

One dollar buys you one dollar of stuff or services. That is very simple. You do not see that much difference in that dollar from day to day. So much so that when you plan for retirement, you still consider future money almost at face value. And sometimes, it is what financial institutions try to sell you on.

A million dollars today is not worth a million 20 or 30 years from now. It will still be one million at face value, but it will not buy the same million dollars worth of goods and services as it could today.

Inflation will enter the picture. You can use the future value equation for this:

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

where we can set the return rate at $r = -0.04$, applied to some present amount PV over a number of years t. Putting some numbers to the above equation could give:

$$FV = \$1,000,000 \cdot (1 - 0.04)^{30} = \$293,858$$

You had a million dollars, and it has eroded over those 30 years to now be worth only $293,858 in purchasing power.

It says that your current million dollars will have depreciated by some 70% over 30 years. If you had your million dollars at age 35 and planned your retirement at age 65, your future money could only buy 30% of what it could today. There is no way to consider that a suitable or desirable scenario.

You save for your old age, and through government money printing policies, your nest egg melts away.

Saying that you would at least have $293,858 left is not a good argument.

The inflation rate could be higher, and that could result in

$$FV = \$1,000,000 \cdot (1 - 0.08)^{30} = \$81,966$$

Inflation was just 4% higher, and you would be left with less than 10% of your original million dollars.

No matter how you look at it, inflation is generally bad, and for your retirement fund, it is terrible. If you start your fund with $100,000, then your expected purchasing power might be down to $8,196. Tell me you could live on that. If you answer you could, then good luck. You will need a lot of it and can throw this paper in the garbage. It will be of no use to you. On the other hand, if you want to do something to enhance your retirement income, read on. You might find something interesting, like a reasonable plan to get there.

Inflation is a sufficient reason to invest your money. It is not giving you much of a choice. Regardless, you should have another purpose: to build a worthwhile retirement fund.

All that is needed to beat inflation is a forward average return equal to the inflation rate. It could produce something like:

$$FV = \$1,000,000 \cdot (1 + 0.05 - 0.05)^{30} = \$1,000,000$$

where your savings increase at an average 5% rate while inflation is eating it up at the same rate. All this can do is preserve your capital, nothing more. There would be no added value to your initial stake even if you earned, on average, a 5% return.

Oddly, some financial institutions do offer 5% returns on your savings deposits, some even less. Yes, they do say that their primary goal in their investment methods is preserving your capital. You should believe them when they say that and move on; you need more than that.

It should be clear that just preserving your capital is not enough. If you had ten times less as initial capital, you should end with ten times less. Again, that would not make an exciting income stream.

You most certainly have little choice in building a retirement fund or not. But it does not mean you do not have any choice in the methods to be used. First, decide to do it yourself, and then find the best ways to do it. In a way saying: invest in yourself and your future. You are the best qualified to answer such questions.

If you do not plan or do not have the means to set up a retirement fund, you could be left out in the cold. You will end up in a forced simplicity retirement scenario where you will be severely limited in what you can buy in goods and services. For some, it might be enough. They do not need much. But most will desire and want more for themselves, their children, and their loved ones. They will want the freedom and peace of mind money can buy. The freedom to be worry-free and enjoy the good things money can bring them. Do not worry, even with the money, you will not go for 20 meals a day.

After reaching 65 years of age, you may live another 35 years and even longer.[2]

[2] Estimates show that 50% of children under five years old will reach 100 in the coming century.

The human lifespan is expanding. So, it matters how big your retirement fund will be since it might have to be your source of income over those potential 35^{+} years.

Your fund has to be big enough not to run out of money before your passing. And this might be the greatest fear a retiree might face: running out of money before they die. We should also make the point that you will not be taking any of it with you, and therefore, you should enjoy your retirement to the fullest up to the end and the best of your abilities.

As was done in previous articles,[3] I will use the example based on a 30-year-old planning his or her retirement at age 65. We have 35 years to get there and another 35 after that. The first 35 years are there to build your retirement fund any way you can. The mission is to have it grow enough to be of sufficient size to sustain you in comfort for the next 35^{+} years in retirement.

You cannot count on the government to be there for you. In 35 years, their retirement fund, including the part intended for you, might be depleted, primarily due to mismanagement and poor planning. But you will still have paid into it all those years. They will try to tell you that it was for your good, that you do not need it or not so much, or that, after all, it was your fault. You will have contributed to that pension plan for years and might not reap its full benefits.

Should they not solve that problem and they are not on their way to solving it, you better learn how to do the job yourself. It does not require much, as I will demonstrate.

Take Charge

Take charge of your future financial freedom and prepare your retirement fund in such a way as to maintain control over what will happen to it at all times. Not only that but make it big enough to be financially worry-free, knowing that you have much more than enough to enjoy the lifestyle you want.

We might not know the distant future much, but we can count, estimate, and set goals. Planning a retirement fund is based on expectations of what you can do and how you can do it. Once you have a reasonable plan, you execute it.

If you invest in something, the question is: how much will it return? How much profit can it make over the years? How many years will it take to be profitable? Will that investment still be viable in 20 or 50 years? Anything that can appreciate with time can be considered an investment. Stating an appreciation rate can be sufficient to qualify as an investment. You are looking for the future value to be greater than its present: $(FV > PV)$. Your emphasis should be on the growth rate; you want it high

[3] See some of my recent articles on my **website.**

enough to achieve your goals.

By the age of 30, you should already have started to build your retirement fund. It should have started at least 10 years earlier. We could compromise and say you should have started at 25, at the latest. Nonetheless, you will find those delayed years have been quite valuable. Consider the following calculation: $\$1,000,000 \cdot [(1+0.15)^{40} - (1+0.15)^{35}] = \$134,688,023$ giving how much those added 5 years represent. We should see it as the value of those delayed five years. So, it is not that trivial. And if you had done the same calculation with $10M, you would be throwing away over $1B for having delayed starting your fund by five years.

The retirement process highly depends on your survival. If you stop breathing, it will dramatically diminish your need for money. Nonetheless, the more time you have to achieve your goals, the better it should be. Time might compensate for some of the errors you will make along the way and allow you to recuperate and do even better. Time is your greatest ally, just as it can be your enemy.

We already set that anything we consider an investment will obey the following equation:

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

That's it. The present value is what you have to start with. The growth rate (g) is the average long-term return on your investment, and t is the time invested in years. All, extremely simple. The time spent between PV and FV could be viewed as portfolio noise since what you are interested in is the future value FV on your investment. Not necessarily all the gyrations your portfolio will endure. Your interest is in the end result. You do not want your portfolio to blow up in your face on its 20^{th} anniversary or any other time. You want that future value (FV) not only to be there but also to be substantial.

You could look at the equation in different ways. First, as some appreciation factor, such as: $FV/PV = (1+g)^t$. Or determine the growth rate by rearranging the terms: $(FV/PV)^{1/t} - 1 = g$. And also, to determine the present value of some future outcome: $PV = FV/(1+g)^t$ by discounting a known future value. Either way, you are still looking at the same equation. If you have two of the terms, you can determine the unknown.

Whichever way we look at it, it will not change the equation. Depending on your information, you can use the equation to estimate the future value of your investments, individually or as a group.

So, what should we expect going forward?

Well, that is easy to answer: more of the same as what has been. Change is gradual, a civilization does not turn on a dime, but we, as individuals, can.

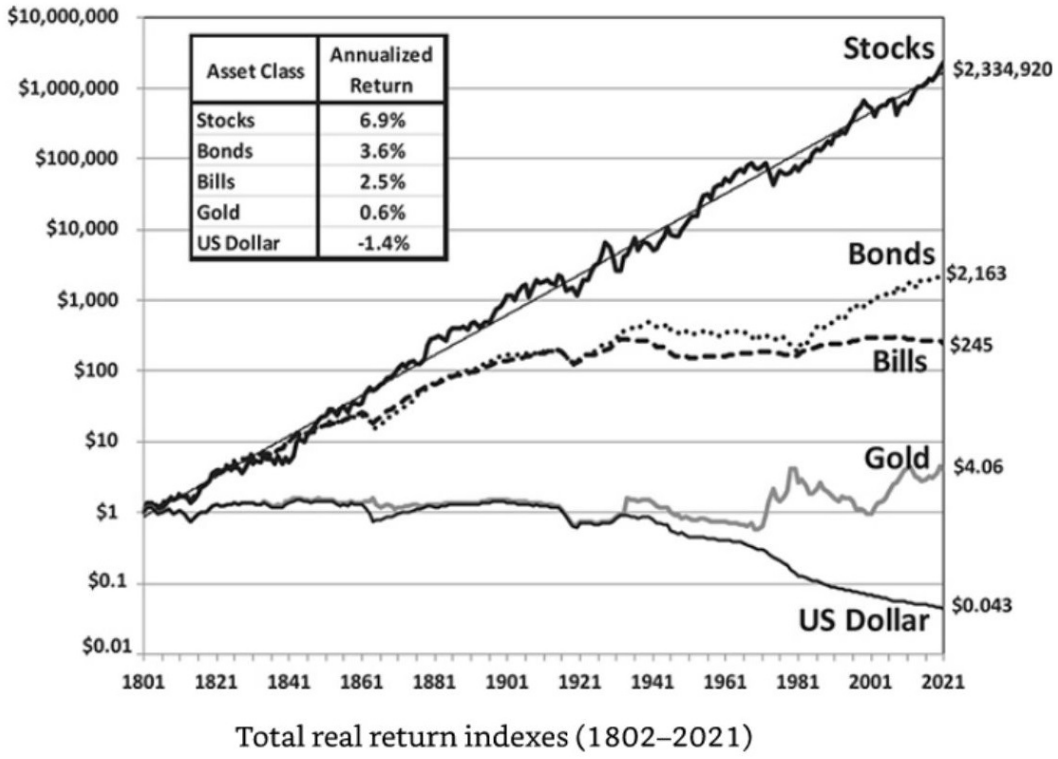

Figure 1: Historical Return Rates Over 220 Years

In the above log chart, figure (1), note the regression line for stocks. It is the average growth rate for stocks, and it has shown to be a good fit over those 220 years.

The question should have been: what remained ”the same”? What was it like? We need general terms and guidelines.

We can look at some assets' historical records and take their average returns generated over the years. See figure (1).

Over the past 220 years covered in that chart, we have stocks appreciating, on average, at 6.9% per year. We have bonds at 3.6%, Treasury Bills at 2.5%, Gold at 0.6%, and the US Dollar having a negative rate of -1.4%.

With a single chart, we can say what to expect going forward, which will be more of the same. It will change, but not by that much.

Some might consider that 6.9% on their stock investments over the next 30 to 50 years a reasonable expectation. It might, but it is not enough. Extrapolating those secular trends should be sufficient to make that point.

Figure 2 refers to the same rates as in figure (1) applied over the next 100 years. Take your initial capital (whatever it is) and locate the interest factor. The 6.9% average return for stocks over the next 30 years gives $FV = PV \cdot (1 + 0.069)^{30} = 7.402 \cdot PV$. Some might think this is a lot, but it is not that much when you realize you could have done much better with little effort. Building a retirement fund is a long-term endeavor.

Future Value Formula: $F(t) = F_0 (1 + g)^t$ with $F_0 = 1.00$

Year	-1.40%	0.60%	2.50%	3.60%	6.90%	10.00%	12.00%	14.00%	16.00%	18.00%	20.00%	22.00%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
5	0.932	1.030	1.131	1.193	1.396	1.611	1.762	1.925	2.100	2.288	2.488	2.703
10	0.868	1.062	1.280	1.424	1.949	2.594	3.106	3.707	4.411	5.234	6.192	7.305
15	0.809	1.094	1.448	1.700	2.721	4.177	5.474	7.138	9.266	11.974	15.407	19.742
20	0.754	1.127	1.639	2.029	3.798	6.727	9.646	13.743	19.461	27.393	38.338	53.358
25	0.703	1.161	1.854	2.421	5.302	10.835	17.000	26.462	40.874	62.669	95.396	144.210
30	0.655	1.197	2.098	2.889	7.402	17.449	29.960	50.950	85.850	143.371	237.376	389.758
35	0.611	1.233	2.373	3.448	10.333	28.102	52.800	98.100	180.314	327.997	590.668	1,053.402
40	0.569	1.270	2.685	4.115	14.425	45.259	93.051	188.884	378.721	750.378	1,469.772	2,847.038
45	0.530	1.309	3.038	4.911	20.137	72.890	163.988	363.679	795.444	1,716.684	3,657.262	7,694.712
50	0.494	1.349	3.437	5.861	28.112	117.391	289.002	700.233	1,670.704	3,927.357	9,100.438	20,796.561
55	0.461	1.390	3.889	6.995	39.244	189.059	509.321	1,348.239	3,509.049	8,984.841	22,644.802	56,207.036
60	0.429	1.432	4.400	8.348	54.785	304.482	897.597	2,595.919	7,370.201	20,555.140	56,347.514	151,911.216
65	0.400	1.475	4.978	9.963	76.481	490.371	1,581.872	4,998.220	15,479.941	47,025.181	140,210.647	410,571.684
70	0.373	1.520	5.632	11.890	106.768	789.747	2,787.800	9,623.645	32,513.165	107,582.222	348,888.957	1,109,655.442
75	0.347	1.566	6.372	14.190	149.049	1,271.895	4,913.056	18,529.506	68,288.755	246,122.064	868,147.369	2,999,074.820
80	0.324	1.614	7.210	16.935	208.073	2,048.400	8,658.483	35,676.982	143,429.716	563,067.660	2,160,228.462	8,105,623.999
85	0.302	1.663	8.157	20.211	290.472	3,298.969	15,259.206	68,692.981	301,251.407	1,288,162.408	5,375,339.687	21,907,136.151
90	0.281	1.713	9.229	24.120	405.502	5,313.023	26,891.934	132,262.467	632,730.880	2,947,003.540	13,375,565.249	59,208,595.707
95	0.262	1.765	10.442	28.786	566.085	8,556.676	47,392.777	254,660.083	1,328,951.025	6,742,030.208	33,282,686.520	160,023,554.949
100	0.244	1.819	11.814	34.354	790.261	13,780.612	83,522.266	490,326.238	2,791,251.199	15,424,131.905	82,817,974.522	432,496,968.264

Figure 2: Expected Returns Over Next 100 Years

You could easily reach a 15% CAGR over the next 30 years simply by buying QQQ and holding it for the period.[4] That would give: $FV = PV \cdot (1 + 0.15)^{30} = 66.212 \cdot PV$.

It gets even more interesting if you can reach a 20% CAGR over the same period. It would generate: $FV = PV \cdot (1 + 0.20)^{30} = 237.376 \cdot PV$. Compare that to the other rates in the above table (Figure 2). For example, Mr. Buffett has realized a 20% CAGR over 50^{+} years, which gave him:

$$FV = PV \cdot (1 + 0.20)^{50} = 9,100.438 \cdot PV$$

and my point being that: anybody could do that too. But first, you have to plan for it. It will require setting objectives and devising tools to achieve those goals and provide sufficient capital to do the job.

What we are doing in this process is extending the underlying trend line for equities found in figure (1). The table in figure (2) was made to be used based on a present value (PV) of $1 dollar. It makes it easy to evaluate the outcome of any investment. Multiply the number in the growth rate column that crosses the number of years by your initial stake. You can also use the table to compare rates over different periods.

Figure 1 shows secular trends ordered by overall performance. Any combination of these CAGRs will produce less than for stocks alone. For instance, a 60/40

[4] Look up the following article on my website: **QQQ To The Rescue.**

stocks/bonds portfolio would produce:

$$FV = 0.50 \cdot PV \cdot [(1 + 0.069)^{30} + (1 + 0.036)^{30}] = (3.701 + 1.445) \cdot PV = 5.145 \cdot PV$$

We can determine the average CAGR over the period as: $5.145^{1/30} - 1 = \bar{g} = 0.0561$. Something between stocks and bonds, but still lower than 100% in stocks where you had a 6.9% CAGR. It shows that any combination would produce an overall CAGR less than the stock-only scenario. The overall return would be even lower if we combined only Bonds with T-Bills, or stayed only in Gold and US Dollar.

Your objective should be to achieve a better return than what the secular regression line in figure (1) is depicting.

Portfolio Objectives

Building a retirement fund aims to make it grow as much as possible without undue risk and within our capital constraints. You are not out there, gambling it all on the throw of a dice, thinking it will surely work. Even before you start, you want to know that you will win. Otherwise, you might be gambling 35^{+} years of your life, and for what? Poor me, I was unlucky is not that much of an excuse since you knew better. On the other hand, nothing beats making a big bet on the big thing.

Regardless, it remains all up to you. How are you going to do it? If you have yet to observe. Nobody cares how you will do it. It might sound wild, but you are the one that is responsible for building your retirement fund, and if you do not do it, do not count on others, including your government, to bail you out. For sure, your broker will not. So, take charge.

Say you think that if you had $1 million today, you would have enough to live on. That is today. But what about 50 years from now? How much would you need? Using figure (2) with inflation around 2.5%, on average, over the next 50 years, you would need some $4.437 million to do the same things you could do today with $1 million.

The whole operation would not have increased your purchasing power unless some of your original $1 million was invested in something that could appreciate over those 50 years to compensate for the impact inflation will have. Our current world has no escape hatch for inflation, taxes, or death.

Again based on figure (2), with inflation at -1.4%, your original $1 million would be worth only $494,000. So for sure, you do not want to leave your $1 million dollars in cash. The problem will get worse should inflation be higher.

As shown previously, a 4% inflation rate would reduce that $1 million dollars to:

$$FV = \$1M \cdot (1 - 0.04)^{50} = \$129,885$$

The conclusion should be: do not leave your money in cash. But, technically, your money is always there in some form. It will depreciate in time, whatever you do. If you increased the inflation rate to 6% (and we have seen worse in recent years), in 50 some years, your original $1 million dollars would be worth:

$$FV = \$1M \cdot (1 - 0.06)^{50} = \$45,330$$

Does this get the point across that you cannot leave your money in cash or under the mattress. It is not a safe place.

You need to invest your money. So, let's do the exercise. You put your $ 1 million dollars in stocks with an expected growth rate of 6.9% as per figure (1). In 50 years you should get:

$$FV = \$1M \cdot (1 + 0.069)^{50} = \$28,112,000$$

and find it reasonable. But there is a problem with that. And that is, it does not account for inflation. If you put the average forward inflation at 4%, you should get:

$$FV = \$1M \cdot (1 + 0.069 - 0.04)^{50} = \$4,176,311$$

We could say inflation cost you some $24 million. You invested your $1 million dollars hoping to get $28,112,000 in 50 years, and all you get is: $4,176,311, and you should be satisfied with that. No way. If you put that much effort into building your retirement fund, it should be for more, a lot more. Fifty years is a long time, but the potential 35^{+} years in retirement also is.

You Have To Do Something About It

You are not able to control inflation. It is not of your doing. It originates from your government printing money for which it did not do any work. And you bare the burden of all its effects. So whatever you will do, you will have to compensate for this inflation and do more if you want capital appreciation and not just stand still and have your capital depreciate.

We could rewrite the future value expectation equation as:

$$\mathsf{E}[FV] = PV \cdot (1 + \hat{g} - \hat{I}_r)^t$$

which does suggest that your projected growth rate should exceed the inflation rate; otherwise, you would be losing some of your purchasing power. So, whatever you do, you first have to jump this hurdle: $\hat{g} > |\hat{I}_r|$, meaning that your expected average growth rate must outperform coming inflationary pressures.

However, even that is not enough. You also have to make a real difference, and it is not by having your expected growth rate ($\hat{g}$) equal or tending to the general and secular stock market trend $\bar{r}_m$ of 6.9% which, as stated previously, did not generate that much after inflation. Recall the above equation: $FV = \$1M \cdot (1+0.069-0.04)^{50} = \$4,176,311$ which might give you an average net return of only 2.9%.

The equation offers only a few alternatives. We could rewrite it again as:

$$\mathsf{E}[FV] = PV \cdot (1 + \bar{r}_m + \alpha - \bar{I}_r)^{50}$$

where $\bar{r}_m + \alpha = \bar{g}$ with the alpha (α) accounting for the skills you will bring to the task, and where $\bar{r}_m = 0.069$ is your expected long-term market average. So, within that formula, we have accounted for the initial value of the investment, your investment knowledge (skills), and the net expected return, including inflation over the next 50 years.

Nonetheless, we should add something else to this mix, and that is the expenses associated with the management of those assets:

$$\mathsf{E}[FV] = PV \cdot (1 + \bar{g} - \bar{I}_r - \bar{e})^{50}$$

where $\bar{e}$ represent the expenses viewed as a drag on portfolio growth. It puts more pressure on $\bar{g}$. The expenses $\bar{e}$ are inevitable and proportional to the portfolio size and the trading activity. The more you trade, the higher the expected expenses.

From the last equation, the problem is not just managing the growth rate; it is to manage it for a long time. Since g, I_r, and e will behave like stochastic functions with drift, we should make provisions for such and adapt our trading programs to guide their outcomes.

The portfolio management problem is not about controlling trading expenses, even if you will do that too, or controlling inflation since you have no control over it. It is about a long-term and sustainable growth rate of sufficient size to make it worthwhile by over-compensating inflation and expenses. As stated earlier, a net 2.9% return over the next 50 years should not be considered even close to enough.

We have an equation to explain it all, but that equation gives a smooth ride. And that is not what you are going to get. That ride could be a real roller-coaster as depicted in figure (1).

Notwithstanding, we should look at that log chart's regression line. It is the expression for the expected long-term average market return $\bar{r}_m$, and therefore, the minimum expectation for anyone having a long-term horizon given in decades.

It is the regression line that is being played. The ride will be chaotic, but overall, over an extended period, your portfolio return curve on a log scale will approach the secular trend line of figure (1). Furthermore, that regression line can be easily extended, providing a ballpark figure and a forecast of what might be coming long term.

If the regression line of figure (1) is close to what you will get by trading, why not follow what it says? One, you should mainly invest in stocks for the long term and

hold for a long time. It does not mean you have to buy & hold on to stocks for the duration, only that you should be fully invested in the market most of the time to reap what the overall market average is providing. It allows you to switch from one investment to another at any time, adjust your portfolio allocations for whatever reason, and manage your investment portfolio as you see fit.

Figure 2 shows that the growth rate matters. But more importantly, that time does make a difference. The future value equation is an exponential function of time. The longer you are compounding, the more you will get. Nonetheless, inflation and trading-related expenses are dragging down your portfolio return.

Another thing figure (1) is saying is that your portfolio should be mainly in stocks since any asset combinations would produce less over the long term. As the length of the investment period increases, the probability of being ahead increases. You might not know, over a five-year period, if you will be positive or not. But over a 30-year period, your likelihood of being positive tends to a probability of one, making it a.s., almost surely. It is even more assured over a 50-year period. Should one take Mr. Buffett's bet on America? I think so.

Your Set Of Tools

The whole retirement thing is not about having the minimum to live on for some 30^{+} years. It is more about building your retirement fund as large as possible within your constraints.

Your first constraint is to never run out of money for whatever reason. The easy solution to achieve that goal might be to make your retirement fund so big that all the constraints will have minimal impact.

Can common sense prevail? Can you do stuff that will make you win no matter what?

Not just win the game, but win it big and without compromise. You do not want to gamble your life away on some "if this or that" thing. You want something as close to certainty as possible. You want that nice and fulfilled retirement. You want that peace of mind and financial freedom for yourself and your loved ones. You want to enjoy your retirement and stay in control.

Looking back at figure (1), what we should want is a regression line above the one displayed on that chart with the following characteristics:

$$\mathsf{E}[FV] = PV \cdot (1 + \bar{r}_m + \alpha_1 + \alpha_2 - \bar{I}_r - \bar{e})^{35}$$

where $\bar{g} = \bar{r}_m + \alpha_1 + \alpha_2$ and the alphas expressing the investment skills you can bring to the job. We already have $\bar{r}_m$ defined as the regression line in figure (1). What we need to determine and evaluate are the alphas in that equation. We know we will not be able to escape inflation, nor will we eliminate ongoing trading expenses.

The more trading the implemented trading strategy will have, the more those trading expenses will mount. Although we will try to minimize trading expenses, they will not control the investment methods.

Even with this, trading commissions should not be a priority since if they ever get to count and undermine your performance; it would only indicate that your trading strategy has a relatively poor CAGR potential and that you should look elsewhere for some alpha.

Should your alpha be non-existent, you would be back to underperforming market averages. You need that alpha to be there and be positive. A negative alpha would undermine your performance as if you were making efforts to make less than what is almost freely available as the market average: $\bar{r}_m$, which can be had simply by buying index funds.

For instance, buying SPY, an exchange-traded fund (ETF) with its 500-stock portfolio, is an easy way to buy $\bar{r}_m$. However, that is all you will get. There is no alpha in SPY. It is a proxy for the market average $FV = PV_{spy} \cdot (1 + \bar{r}_m)^{50}$ which puts you back on the regression line in figure (1).

We look at charts like figure (1) for a few seconds and then move on without realizing what it says. Figure (1) states that whenever you entered the market over the last 220 years if you lasted some 30^+ years almost fully invested, you would have averaged close to the shown regression line. And it would have been as if you had played that regression line.

Another thing figure (1) says is that staying in cash for extended periods was not a great idea. Figure 1 gives inflation at a -1.4% rate. In recent years it has been higher, more like -2.5%, on average, as illustrated in figure (3) below.

However, the picture is even worse since, over the last two years, inflation was above the 4% mark, and thereby, the 2000-dollar would have lost more than half its value. Refer to my article: **Your Retirement, Your Time, Your Money** for more detail.

When designing or planning over the long haul, we should look at what might go wrong and compensate for or alleviate the impact of bad things that could happen.

It is why you plan in the first place. You do not go out there and build a bridge. First, you must ensure the bridge will be on firm enough footing to support its weight and heavy traffic and withstand all climate conditions of the last hundred years. It is the same when building a long-term stock portfolio. You do not want it to fail, and that is for whatever reason. If you do not prepare for the coming storms, how will you outlive them?

You will need a good stock selection process and sound trading methods. They could

be as simple as buying an indexed fund and holding on for the duration. Something like buying SPY is Mr. Buffett's recommendation for people not too inclined toward the markets. They have jobs to go to and might have limited time to dedicate to that long-term portfolio management endeavor.

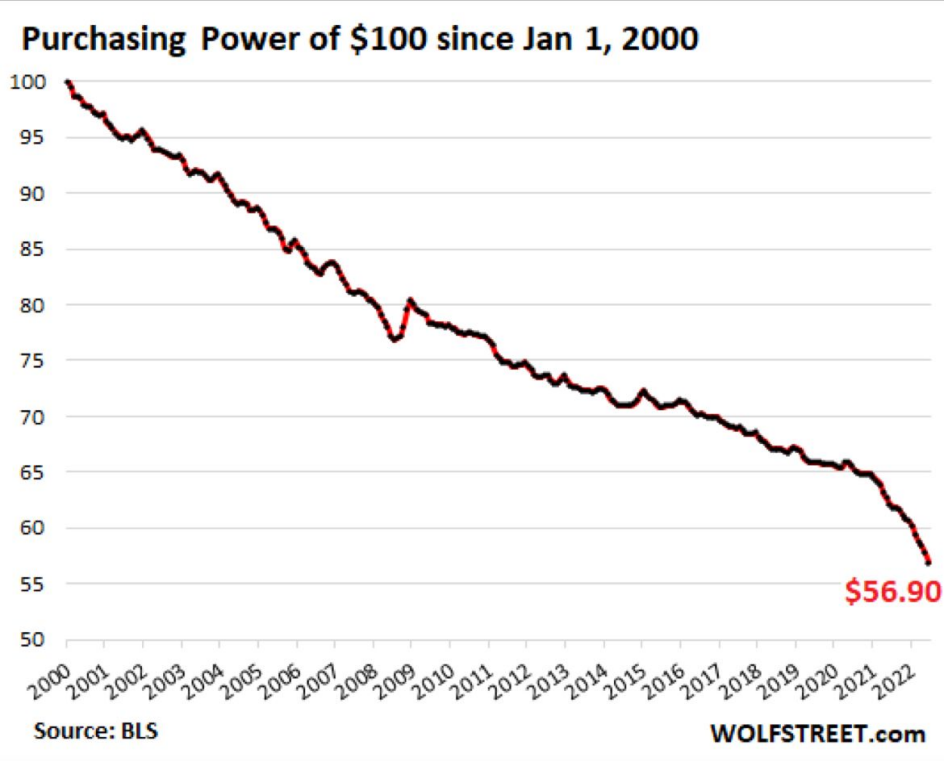

Figure 3: Purchasing Power of $100 Since 2000

At least, they would get the market average ($\bar{r}_m$) as depicted in figure (1). We cannot call that work since you buy SPY and then sit on it for 30 to 50$^+$ years. During that time, you could get:

$$FV = \$1M \cdot (1 + 0.069)^{50} = \$28,112,000$$

Nonetheless, you should go for more. At least for something closer to a 15% CAGR. The problem with that is what would be the means to achieve it? There again, it could be rather simple, and again will deal with the stock selection process itself.

SPY maintains its 500-stock portfolio with the same weights as the S&P 500 index. You could take the top 100 by value, invest in those, and be more profitable than if you were investing in SPY.

The reasoning is simple. If you order those SPY stocks by performance, the top group will have a higher average return over the same period. It is like taking the front-runners' average compared to the underperforming stocks in that group. That selection is ready-made. You can find it in the QQQ ETF, which tracks the top 100 stocks of the NASDAQ 100 Index.

So, buying the QQQ ETF instead of SPY should give you a higher CAGR simply due to stock selection. If you invested the same amount in SPY or QQQ, it is the same amount of work, one trade. Sitting on it afterward is also the same; you are just sitting on it.

The advantage is the higher expected return from QQQ over the long term.

$$\mathsf{E}[FV] = \$1M \cdot (1 + 0.15)^{50} = \$1,083,667,442$$

Now that is a game changer.

Whatever the future may bring, it would be more than enough to retire on. Even a 5% withdrawal on your first year of retirement at age 65 would be: $6,658,776. While in 50 years, that 5% withdrawal would be: $54,182,872 per year. It should be enough to pay for the beer and a few extras.

Yet, you did not have that much to do: one decision. Buy QQQ, sit back, and wait while you do whatever job you want or find interesting. No time spent on building that retirement fund; the QQQs would take care of that.

Some might say: but what if QQQ went bankrupt? It is not even a decent question. How could the top 100 wealthiest companies go bankrupt while part of the QQQs? It would be about the same as saying that our civilization collapsed. Even though there is a probability no one would take that bet. We have to look at reality. We have 8^{+} billion people to feed, shelter, and provide them health care, work, and entertainment. We are not going under any time soon. Don't worry. The sun will rise tomorrow, even if it might be too cloudy to see it.

Will the list of the top 100 stocks in QQQ change over time? Yes, but we do not have to worry about that either. The list is continuously updated, and any stock dropping off the list will be automatically replaced. We will not even see it when it happens, the stock is replaced by a new one, and the list still has the top 100 stocks. That, in essence, is a plus. The stock dropping off is because its value is declining, which says it should not be in your portfolio and should be replaced by another rising in value.

Buying and holding QQQ is an easy solution to participating in the market. It will require very little time and outperform market averages due to the built-in alpha ($\bar{r}_m + \alpha$) from the stock selection process.

Nonetheless, some might prefer to get more, like increasing their future CAGR pass the 20% mark. The reward would be considerable, for example, we have:

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

That is nine times more for that added 5% in CAGR. Is the quest for that added 5% in CAGR worth it? I would venture yes. What is needed is to add more alpha to the

future value equation, such as:

$$FV = PV \cdot (1 + \bar{r}_m + \alpha_1 + \alpha_2)^{50}$$

where $\bar{r}_m + \alpha_1$ is what can be done using the QQQs, and α_2 which could bring in the added 5% in CAGR.

The stakes are high. And it is all within reach, but to get there, you will need time and skills that can be easily learned.

One could go even further by adding more alpha to the mix:

$$FV = PV \cdot (1 + \bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3)^{50}$$

where α_3 could add another 5%$^+$ in long-term CAGR. Finding ways to do it is compelling since, as shown in figure (2), the outcome could even exceed a 25% CAGR. But that is a story for another day.

P. S.:

There are two parts to your retirement fund.[5] The first part is where you build your fund, and the second is where you retrieve some income from it.

We could write it down as:

$$FV = PV \cdot \left[(1 + \bar{g} - \bar{I}_r - \bar{e})^{35}\right] \cdot (1 + \bar{g} - \bar{I}_r - \bar{e} - \bar{w})^{35}$$

as in the case of a 30-year old looking at some long-term retirement planning.

You have the first 35 years up to retirement at age 65 and then the other 35 years to reach 100 years old. The second part allows a withdrawal rate w to provide the income stream during retirement. The critical point in that equation is the growth rate you will achieve. If it is insufficient, meaning it barely exceeds inflation and trading expenses, it will not get better after retirement when you will also want to withdraw some income.

You want during retirement to have: $\bar{g} > |\bar{I}_r| + |\bar{e}| + |\bar{w}|$. You want the growth rate to exceed the sum of the dragging factors on your fund. So, right up front, you would want $\bar{g} > 0.10$. Having $\bar{g} < 0.10$ will start depleting your future fund at a rate equivalent to $\bar{g} - 0.10$. And thereby also gradually reducing your withdrawals should you use a fixed percentage. Not that desirable a scenario.

The emphasis should be on the growth rate ($\bar{g}$) you should achieve. There are things that you cannot do much about. Inflation is one of them and will be there whether you like it or not. The same goes for trading expenses which should include all costs

[5] It could also be viewed as your investment fund, even as a generational fund for your children.

related to your portfolio's management. Also, that 4% or 5% withdrawal in retirement should be of sufficient size to accommodate whatever you might want to do. You could go from the desired withdrawals and design backward to what needs to be done to achieve those goals.

There is another way. Make your portfolio so big that related expenses will not matter.

The more alpha you bring to the game, the better. That is what will count. So you make provisions for an inflation rate of 4%, trading expenses of 1%, and a withdrawal rate of 5%. We can rewrite the above equation as:

$$FV = PV \cdot \left[(1 + \bar{g} - 0.04 - 0.01)^{35}\right] \cdot (1 + \bar{g} - 0.04 - 0.01 - 0.05)^{35}$$

From the equation, we realize we do have to make it to 65 before retiring, and then survive another 35 to reach 100^{+}. We are left with only two variables to determine: one is the initial capital put to work PV, which you know from the start, and second, which is more the result of a question: what kind of growth rate can you achieve?

We have already established that you could easily get $\bar{g} \approx 0.15$ over the entire period by buying QQQ. So, you are left with that undetermined initial capital PV. There too, the more you can put to work, the better.

How much alpha can you generate since it all boils down to that?

As shown with the QQQs, you can get 5 alpha points almost for free. Can you add more alpha to your trading procedures to enhance profitability?

Whatever concept you have can be tested on historical data. Doing backtests can demonstrate the validity of those ideas. You do a backtest as a validation process to show how your trading strategy would perform under actual market data.

Should your strategy not perform well under test, you know what to do with it.

Look up my article: **QQQ To The Rescue** and its related articles where you will find more ideas on how to do it yourself including a program to get you started. That program needs protective measures to reduce drawdowns which will still happen going forward. Nonetheless, that program can give you a starting point where you could further enhance its alpha potential.

Let's put some numbers in the above equation. The first part is easy. It could be:

$$FV = \$1M \cdot \left[(1 + 0.15 - 0.04 - 0.01)^{35}\right] = \$29,102,437$$

or with an added 5% to CAGR:

$$FV = \$1M \cdot \left[(1 + 0.20 - 0.04 - 0.01)^{35}\right] = \$133,175,523$$

As for the second part, where retirement begins, it will start with what was achieved in the prior 35 years. This would give with a 5% withdrawal rate:

$$FV = \$29,102,437 \cdot \left[(1 + 0.15 - 0.04 - 0.01 - 0.05)^{35}\right] = \$155,013,474$$

for the 15% CAGR, and with the extra 5 alpha points:

$$FV = \$133,175,523 \cdot \left[(1 + 0.20 - 0.04 - 0.01 - 0.05)^{35}\right] = \$3,742,556,737$$

On your first year in retirement, your 5% withdraw would generate an income of: $\$29,102,437 \cdot 0.05 = \$1,405,122$ and with the extra 5% in alpha, you should get: $\$133,175,523 \cdot 0.05 = \$6,658,776$. Those withdrawals would increase at a 5% rate in the first case and by 10% per year in the second case over the 35 years in retirement. The fund would have ended with either $\$155,013,474$ or $\$3,742,556,737$. Again, depending on an added five alpha points.

We should realize that those alpha points will require trading and investment skills. They are not given away, even though some of it is almost free just by participating in that stock market game and selecting the QQQs.

Another easy consideration is that you could contribute monthly or yearly to your retirement fund. Buy QQQ shares at every opportunity. Build up your inventory. You have extra cash, a bonus, or an inheritance; put some of it in QQQ.

QQQ will be there for many many years to come, and if ever something goes wrong, you will see it coming. Your program's protective measures will kick in. Nonetheless, I would go for even more alpha. For example, take only the top 50 stocks in QQQ. That would also raise the alpha a bit higher than QQQs expected CAGR. The list of the top 100 stocks will change over the years; even all could change, but you will still be left with the top 100 performing stocks, whatever QQQ's composition.

Since this fund will be totally under your control, you could sell shares at any time you wish should you need some of that money. You could treat your fund as your personal long-term piggy bank.

I hope this article demonstrate that those extra alpha points are valuable. In the examples above, the numbers might appear excessive, but they should be considered quite ordinary. What is uncommon is the time interval, looking at 70^{+} years building your fund.

Over the first 35 years, you are building that investment or retirement fund. And then, for the next 35^{+} years, you transform it into your retirement income stream and the legacy fund for your loved ones.

You could also have your results in between, even exceeding those numbers. It will all be a matter of how much alpha you can extract from the market or your other

investments since you are not limited to a stock-only portfolio. Whichever way you want to do it, stay focused on your alpha generation. Over the long term, adding more alpha will be beneficial, and its pursuit your challenge.

Note that there was no hype in this presentation. All the arguments were simply common sense. It started by considering time and its implications in building a retirement fund. The first requisite was that the fund should survive and prosper for the duration no matter what knowing that your fund can not go bankrupt in the long term.

The portfolio survival problem was solved by using QQQ or its content to achieve your goal. A retirement fund large enough to supply you with all the income you might need during the 35^{+} years you might be in retirement. Already, by having selected the stocks in QQQ and by bringing some enhancements ($\alpha_1 + \alpha_2 + \alpha_3$), to which you should add some downside protection, you outperformed the market average r_m and increased overall performance even more. At least, that is what figure (2) is saying.

Your portfolio would continue to grow for the duration, even while in retirement. You had a single decision to make: buy QQQ and follow its content.

You are not looking to be number one, meaning having the highest CAGR in the world over a 70-year period. Your objective is to have more than enough money to live the life you want worry-free of financial constraints. The plan presented adheres to the future value equation shown throughout this paper. Nothing exaggerated, just following secular market trends and, in a way, also taking Mr. Buffett's long-term bet on America.

Anybody from any walk of life can do this. The market is not discriminating. A greenback is green for everyone. Your job is to find the initial capital. Make that decision, and hold on for a wild ride.

It is a long journey to your financial freedom. But from the start, you know you can get there with all the rewards to celebrate your accomplishment. And to top it off, that journey will mostly be sitting down on your bunnies since after you make that first and single decision, you will only wait and be patient.

Wishing you the best.

Guy R. Fleury