How To Make It Anyway

Or How To Retire With A Lot More Than Enough

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We all make decisions all the time. Some impulsively on the spur of the moment, while others need more time to mature into definite action.

We know we need a retirement plan. But, often, we might set it aside as some long-term project we could start at any time, giving us years to find a way to do it. We might already have a company-sponsored or government pension plan to which we contribute.

So, why should we have to do more?

The question is understandable.

Building a retirement fund can be an extremely long and boring endeavor. It could be risky if you do not have financial knowledge. But you do not need much.

This paper: **How To Make It Anyway** is all about common sense and is supported by mathematical equations that are centuries old. Step by step, I will try to help you build your retirement fund differently, requiring only a little of your time.

At 25 years old, looking 40 years ahead might not be part of your daily mindset.

But, once you reach 40 or 50, it starts to trouble you in new ways. You see on your horizon, even if it is still 25 or 15 years away, that your retirement age is coming to hit you in the face, and you realize you might not have enough money put aside to be considered a reasonable or secured source of income. Not to mention having enough to maintain the desired lifestyle for your loved ones.

If you do not build your retirement fund, it will be your choice.

Nobody can force you to do that except your government's universal pension plan.

If you want to avoid building an additional retirement fund. It is your right to say NO. Period. If so, you can skip the rest of this paper.

But I suggest you read it anyway. It might convince you that you should start your long-term retirement plan. It might also help someone you know, and you would be ready to express more views.

If you do not build this retirement fund,
you will be the only one responsible for not doing it.

Nobody has any obligation to compensate you for your lack of foresight in the name of some equity notion. In the retirement fund business, that does not exist. Grabbing someone else's money or assets without explicit consent is not redistribution; it is simply stealing.

This fund-building thing has no prejudice, no religion, no race, no gender, no sex, no country, or political inclinations. Do not bother yourself with any of that.

Be ready to see the equal sign all over the place. The equal sign can be brutal, especially when it says equal zero. So, we will try to escape that one. Nonetheless, the equal sign in an equation can also set inescapable guidelines.

Paycheck To Paycheck, Not Enough

Living day to day, paycheck to paycheck, might not be enough.

You need to plan for where you are going and how you will get there. That is if you want more than just the basics in your retirement.

Will it be that hard to do?

It might appear so since most people retire ill-prepared with less than sufficient funds to live by. They will have to make do, meaning live within their limited resources. It will not be a voluntary simplicity lifestyle; it will be more like forced simplicity, living out their retirement with only the basics. They will have only a few options after retiring besides continuing to work.

The older you get, the harder it gets to build that retirement fund since time is a major component of its guiding equation.

But there are solutions to this. The easiest is to start early and as early as you possibly can.

We can compensate for lost time. Time is a critical factor in your estate and retirement planning, just as the assets you will put into it.

Many did not prepare for their retirement. And now, it is more a matter of catching up, if they can. Do not expect short-term miracles if you start building that retirement fund at age 60. You technically missed the boat. But you could still partially make it up.

We can compensate for some of the lost time within the time remaining before retirement. And then, once retired, take deliberate measures to increase the retirement fund further.

To look at ways to compensate for lost time gets us back to equation (1) given in my recent paper[1] which is restated next:

$$\mathsf{E}[FV] = PV \cdot (1 + \mathsf{E}[\bar{g}])^t \tag{1}$$

The expected future value depends on the expected average growth rate $\bar{g}$ applied to the initial capital (PV) over many years. The average growth rate $\bar{g}$ could have for composition: $\bar{g} = \bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3$ expressing that your average growth rate can have multiple sources of alpha, starting with $\bar{r}_m$ the long-term market average.

The alpha is in excess of the average market return: $\bar{g} - \bar{r}_m = \alpha_1 + \alpha_2 + \cdots + \alpha_\psi$ and can have multiple sources.

We could view $\bar{r}_m$ as the most probable outcome from your market participation. The alpha points will depend on what you do that could exceed the market average. Note that you could also generate negative alpha, thereby reducing overall performance. But you wouldn't do that, would you?

We can use equation (1) to compensate for any one factor by enhancing the other two. You have less time; either start with a higher initial capital or a higher growth rate. You cannot get a higher growth rate, then put in more time or get an even higher initial capital.

We can use equation (1) to compensate for any one factor by enhancing the other two. You have less time; either start with a higher initial capital or a higher growth rate. You cannot get a higher growth rate, then put in more time or get an even higher initial capital.

The point would be to get the same outcome as someone else who started feeding his/her retirement plan earlier. We can see that equation (1) has no notion of "equity", none at all. It only speaks of value, in this case, a.k.a. money.

The years you delay starting your retirement plan can be very costly. It seems insignificant when you look at the first few years of the process, but it will develop into huge differences when viewed over decades.

[1] **Retire A Multi-Millionaire**.

Table #1 from the above-cited paper presents the case of a 25-year-old making contributions to his/her retirement fund for 40 years, up to retirement age 65.

Estimates were based on an expected long-term market average of about 10% often used as a proxy for long-term market returns: $\bar{r}_m = 0.10$. Buying the SPY ETF for the long term would do it. That is, it could provide you with the market's average return. Note that there is practically no effort in buying and holding SPY.

For example, saving 5% of one's salary per year would start with salaries of $24,000, $120,000, and $240,000, respectively. So, understandably, it is not everyone that can start making high monthly contributions. Nonetheless, some can and do.

It will have to be your savings that will fuel your retirement fund.

Basic Retirement Plan

Pension Contributions - 10% Return - 40 Years

Contrib. Monthly	Return Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	48,000	623,408	6.66%	31,620	2,635
$500	10%	240,000	3,162,040	6.66%	158,102	13,175
$1000	10%	480,000	6,324,080	6.66%	316,204	26,350

Table 1: Expected First Year Withdrawal.

The above table shows examples of 480 months of contributions (40 years). Each contribution has a separate 10% growth rate over the remaining time up to the 40th year. For the person contributing $100 per month, total contributions would amount to $48,000, which will have a value at age 65 of $632,407. With a 5% withdrawal rate, the first month's income at age 65 would be $2,635.

But that is 40 years from now. The cost of living will have increased by then due to inflationary pressures. The question is: Would the above fund be enough? The answer would appear subjective. How much is enough? We need to define what is enough. It will vary from person to person.

The picture changes should the starting year of your fund be at age 45, giving you 20 years to accumulate your savings before retiring.

The worst part might be that over those 20 years, you might not get that 10% market average. In the past, we have had 20-year periods where the average market return was less than 10%. Also, many financial institutions will propose less than the 10% used in Table #1. Oddly, they will, at the same time, proclaim that they are the best at the game.

Pension Contributions - 10% Return - 20 Years

Contrib. Monthly	Return Rate	Total Contrib.	In 20 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	24,000	75,936	5.93%	3,796	316
$500	10%	120,000	379,684	5.93%	18,984	1,582
$1000	10%	240,000	759,368	5.93%	37,968	3,164

Table 2: Expected First Year Withdrawal (20-Year Plan).

Table #2 does not appear appealing or promising. Equation (1) was again used for its calculation.

The immediate question is: Will you be able to enjoy your retirement 20 years from now with an income of $3,796 for the year?

Please, do your homework. Ultimately, you will have to live with your investment decisions and your choices, not your financial adviser. Or whoever else is providing you advice?

It is not at age 55 that we should start considering building up that retirement fund either. You would be left with only ten years to make it up. This scenario could generate Table #3.

Pension Contributions - 10% Return - 10 Years

Contrib. Monthly	Return Rate	Total Contrib.	In 10 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	12,000	20,484	5.49%	1,024	85
$500	10%	60,000	102,422	5.49%	5,121	427
$1000	10%	120,000	204,845	5.49%	10,242	854

Table 3: Expected First Year Withdrawal (10 Years Plan).

Table #3 should shout at you: No way! Not for me! I will need a lot more than that!

Whatever the case, that it be Tables #1, #2, or #3, we have not dealt with the impact of inflation yet.

Inflation

We are not interested in scenarios making less. Those are always easy to do. All I will entertain are plans and methods for making more. The more, the better.

Since Tables #2 and #3 are of little interest. Let's concentrate on Table #1 with a 3%

inflation rate, giving us Table #4.

Pension Contributions - 10% Return - 40 Years - 3% Inflation

Contrib. Monthly	Return Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	48,000	262,481	4.34%	13,124	1,094
$500	10%	240,000	1,312,407	4.34%	65,620	5,468
$1000	10%	480,000	2,624,813	4.34%	131,241	10,937

Table 4: Expected First Year Withdrawal - 40 Years - 3% Inflation.

Table #4 is a significant reduction compared to Table #1. Take the $500 per month contribution; your total portfolio went from $3,162,040 to $1,312,407 due to the impact of inflation alone. It is a 58% reduction as you reach retirement age.

So yes, inflation will have an impact.

It will be even worse should inflation be higher. Inflation is slowly chewing away at your fund. You have to find ways to compensate for this portfolio degradation.[2]

Even 1% more inflation applied to Table #4 would have an impact. Refer to Table #5 with the same table as Table #4 but with an average 4% inflation rate.

Pension Contributions - 10% Return - 40 Years - 4% Inflation

Contrib. Monthly	Return Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	48,000	199,149	3.62%	9,957	830
$500	10%	240,000	995,745	3.62%	49,787	4,149
$1000	10%	480,000	1,991,491	3.62%	99,575	8,298

Table 5: Expected First Year Withdrawal - 40 Years - 4% Inflation.

We increased the inflation rate by 1%, and it had that much impact. We should have had $3,162,040. This total was then reduced to $1,312,407 due to the 3% inflation. And now, it is down to $995,745 due to the added 1%.

Is inflation bad for you? Yes, it is.

Does it need to move by much to impact your future? No. Even a 1% increase will affect your retirement nest egg.

Inflation does have an impact, and it is your job to minimize its effect or, better yet, totally compensate for it.

[2] This was covered in recent articles, which you can find on my website.

Not only will inflation reduce your retirement fund before you retire, but it will also reduce it after. The money lost to inflation is not coming back.

Instead of starting your retirement with $3,162,040 and having its income stream, you might be starting your retirement with $995,745, a significant setback. And only due to inflation.

We can view the first 20 years in retirement as $\$995,745 \cdot (1 - 0.04)^{20} = \$440,122$, meaning you would lose more than half of your pension funds over those 20 years. It will decrease even faster since you will withdraw income from it every year.

Equation (1) can be adjusted to account for inflation, as in

$$\mathsf{E}[FV] = PV \cdot (1 + \mathsf{E}[\bar{g}] - \mathsf{E}[\bar{I}])^t = PV \cdot \prod_{i=1}^{N}(1 + g_i - I_i)$$

The expected average inflation rate is concurrent to your average portfolio growth rate ($\bar{g}_i$). Inflation is applied to all periods and will have an exponential impact.

Contributions are monthly amounts added to the portfolio, which will grow at the average portfolio rate.

We could view each period as part of a linked chain of returns where we also add contributions to our retirement fund. We can express it using the following series of equations, each feeding the next with its specific growth rate ($\bar{g}_i$) and contribution c_i.

$$\begin{aligned}
&FV_1 = (PV_0 + c_0) \cdot (1 + \bar{g}_1)^{t_1} + c_1 \\
&FV_2 = PV_1 \cdot (1 + \bar{g}_2)^{t_2} + c_2 \\
&FV_3 = PV_2 \cdot (1 + \bar{g}_3)^{t_3} + c_3 \\
&\qquad\quad \vdots \qquad\qquad \vdots \\
&FV_{n-1} = PV_{n-2} \cdot (1 + \bar{g}_{n-1})^{t_{n-1}} + c_{n-1} \\
&FV_n = PV_{n-1} \cdot (1 + \bar{g}_n)^{t_n}
\end{aligned}$$

The outcome at each stage is fed to the next. As a single equation, it would be more like the following, which has only its first four terms:

$$FV = [[[PV \cdot (1 + \bar{g}_1)^{t_1} + c_1] \cdot [(1 + \bar{g}_2)^{t_2}] + c_2] \cdot [(1 + \bar{g}_3)^{t_3}] + c_3] \cdot (1 + \bar{g}_4)^{t_4}$$

It could be extended to the number of years $N = 40$. You could add more contributions with their respective growth and inflation rates. All considered within their respective contexts. The contributions could also be of different sizes as if adding money from another source.

However, we will presently consider the fixed monthly contributions to facilitate calculations. We are averaging the growth rate and the contributions over the entire portfolio-building phase.

It would be difficult, if not impossible, to estimate the outcome of the above equation since it would require predictions on $\bar{g}_i$ and $\bar{I}_i$ for every month i over those 40 years. You would understand the futility of this should you have seen anyone trying this over 40 years and then comparing their projections to the actual outcome.

That is why I went for the "for-loop" approach and used average growth values without loss of generality. We will consider the entry point and its exit, namely, the present and future value, with whatever path in between.

You get to the same final value, and that CAGR is easy to determine. It is the same as equation (2) in the above-cited paper and a simple rearrangement of equation (1):

$$\left(\frac{FV}{PV}\right)^{1/t} - 1 = \bar{g} \tag{2}$$

We should observe that the outcome of equation (1), even though smooth, is the result of the average of what appears as a stochastic process with its almost unpredictable ups and downs. If you have PV, FV, and t, $\bar{g}$ will result no matter what these values are. And it justifies using $\bar{g}$ as an estimator since using it will result in FV, the future value.

There is no hype in this paper. All the numbers used are ordinary. An initial stake of $100k is not unusual. There are over 10 million millionaires in the US alone. Making 10% on stocks has been the average for decades, more like over two centuries. So, these are not high expectations. Investing in the QQQs could get you up to a 15% CAGR.[3]

Python pseudo-code for this fund with contributions could be as simple as:

```
# initialize variables
for month in range(months * years):
    total_fund = total_fund * (1 + rate_month - inf_rate) + contrib
print(total_fund)
```

The above "for-loop" snippet was used in producing Tables #1 to #5. It generated all the tables in this document with, at times, some adjustments in the variables. In some cases, inflation was zero for some purpose. For instance, when it was included in the average growth rate, like in the salary expectation calculations.

Compensating For Inflation

You cannot escape inflation. It is not of your doing. But you can compensate for it.

[3] See **Retire A Multi-Millionaire**.

Here is equation (1) again with a touch of inflation and some remedial moves:

$$\mathsf{E}[FV] = PV \cdot (1 + \mathsf{E}[\bar{r}_m] + \alpha_1 + \alpha_2 + \alpha_3 - \mathsf{E}[\bar{I}])^t \tag{3}$$

Where the alpha you bring to the plate is your doing. You are adding alpha sources to your investment program to compensate for the return degradation due to inflation and possibly other sources like non-productive investment decisions. An average zero return ($\bar{g} = 0$) does not make you any money. However, based on equation (3), with $\bar{g} = 0$, you can lose money like in Tables #4 and #5 due to inflation.

The intention is to raise the average growth rate high enough to compensate for the inflation rate. And while at it,[4] not only exceed it but push to overcompensate?

It should appear relatively simple, from equation (3), we need the sum of alpha sources to exceed the inflation rate: $(\bar{r}_m + \alpha_1 + \alpha_2 + \alpha_3) > |\mathsf{E}[\bar{I}]|$. We will have to generate that alpha ourselves. It is usually not given away for free.

For example, we can estimate the impact of a 4.0% inflation rate over 10 years using: $FV = PV \cdot (1 - 0.04)^{10} = 0.6648 \cdot PV$, while viewed over 20 years it will generate: $FV = PV \cdot (1 - 0.04)^{20} = 0.4420 \cdot PV$. After those 20 years, you would be left with 44 cents on the dollar. It is quite a drawback on your retirement account and cost of living in general.

Consider it a ”non-gift” from your government since they are making it happen. They are the ones printing the money. Regardless, they will try to convince you that it is for your good; they do it for your benefit. Hogwash.

You are pressed by time and inflation, not to mention your ability to put some money aside. Your capital, meaning your money, is a valuable part of the future value equation. With $PV = 0$, you are not going anywhere.

Tables #4 and #5 above should emphasize that inflation matters over the long term. A 3% or 4% might not yield much influence over a single year, but it will show its weight over many years. Even with a 2% inflation rate, after 20 years you would get $FV = PV \cdot (1 - 0.02)^{20} = 0.6676 \cdot PV$. Your dollar would now be worth 67 cents.

Inflation will show its face not only every year but every day. And on that basis, it gets by almost unnoticed. The day-to-day participation of the 3% rate is 0.00822%, while at 4%, it is 0.01096%. Day to day, the dollar does not wander far from one penny.

The change would be 3 or 4 cents on a dollar for the year. And because of it, we do not look at it so much. But, in building a retirement fund, inflation can carry more weight, as seen in the examples above.

[4] See **Fixed Fraction Position Sizing** where methods to overcompensate inflation are proposed.

You can start compensating for inflation by investing your money and not keeping it under your mattress. For example, you could put it into QQQ, as was proposed in my paper.[5]

You can also compensate for inflation by putting more money on the table and raising the average growth rate.

However, time might be limited, just as the CAGR and the capital.

Based on the tables presented, inflation can cut into your results. Furthermore, that impact will continue after you retire, and your fund will still compound over the long term.

You could have 40 years before you retire and another 30^+ years after. We could see the consequences of inflation over 70 years: $FV = 1.00 \cdot (1 - 0.03)^{70} = 0.1186$. Whatever money you initially had would be worth 11.86 cents on the dollar by then. If inflation were at 4%, you would be down to 5.74 cents on the dollar. Starting with $1,000,000, you would have $57,409 left in buying power in your retirement account.

It will be an uphill battle to prosper and compensate for inflation over the long term.

Your First Objective

Your first objective was to have enough money in your retirement account to provide a relatively stable and substantial income stream.

Your first objective was to have enough money in your retirement account to provide a relatively stable and substantial income stream.

This objective is expressed in equation (4). The first phase gives you 40 years before retirement. The second phase is an unspecified number of years in retirement, where you could extract 5% per year as income.

$$FV = PV \cdot (1 + \bar{g} - \bar{I})^{40} \cdot (1 + \bar{g} - 0.05 - \bar{I})^{t-65} \tag{4}$$

You could get to 100 years old and more. You will want your fund to provide more than a steady income stream. You should want your fund to grow even while in retirement. This way, your income stream would also grow even if you took a small percentage out of it each year.

Equation (4) cascades, meaning the second phase can only engage after the first phase. Also, requesting your income stream should not fail you before you die.

Your fund could continue growing if $\bar{g} > |0.05|$. Meaning the average growth rate

[5] See Tables #3 and #4 of **Retire A Multi-Millionaire**.

should exceed the withdrawal rate. However, we should also include the inflation rate, making it $\bar{g} > |0.05| + |\bar{I}|$. If you put inflation at an average 3% level, you would need a growth rate superior to 8% to maintain your capital and buying power at the same level while in retirement. You would need an even higher CAGR should you want your retirement fund to also grow during retirement.

Should you be limited in time, you could have something like the following:

$$FV = PV \cdot (1 + \bar{g} - \bar{I})^{20} \cdot (1 + \bar{g} - 0.05 - \bar{I})^{20} \tag{5}$$

where you have 20 years to build up your fund and 20 years after to enjoy it.

In both equations above, you would want a sufficient income stream while in retirement. Whether you have more time or not, the equation does not care, but you will because it can make quite a difference.

You are in a compounding environment, and the ending periods have significantly more impact than the starting years. Compare the difference over the length of the investment periods:

$$FV = PV \cdot \left[(1 + 0.15)^{40} - (1 + 0.15)^{30}\right] = 201.65 \cdot PV$$

If you started with \$100,000, the difference would be: \$20,165,177. It would be more if there were more time or the growth rate was higher. As another example, say you had more time, then

$$FV = \$100,000 \cdot \left[(1 + 0.15)^{60} - (1 + 0.15)^{50}\right] = \$330,034,130$$

Your time has value! So does your initial stake. If you dared start with one million, the last equation would translate to:

$$FV = \$1,000,000 \cdot \left[(1 + 0.15)^{60} - (1 + 0.15)^{50}\right] = \$3,300,341,300$$

Why do those calculations? To show the cost of delaying your retirement fund.

Reaching the same final value will take ten years more if you start ten years later. So, the \$330,034,130 is your cost of delaying ten years. Just as the \$3,300,341,300 should you have started with a higher stake. It gets even higher should you start with a higher stake, CAGR, or delay more. As they say, you are on the clock, and time is money.

The Fund Building Phase

We will start by looking at the building stage, where you provided the initial capital, the monthly contributions, the average growth rate, and the time interval until retirement.

We will go back to equation (3) to see how we could compensate for inflation.

Which alpha sources could be part of equation (3)? We have for expected growth rate:

$$\mathsf{E}[\bar{g}] = \mathsf{E}[\bar{r}_m] + \alpha_1 + \alpha_2 + \alpha_3$$

Where $\bar{g}$ is the sum of the average long-term market return plus the sources of alpha.

We can get $\bar{r}_m$ by buying a proxy to a market index like the S&P 500. For instance, SPY could do that job. Over the long term, you would get the same expected return (10%) or about the same as the S&P 500 Index since SPY is a proxy mimicking that index.

Your first source of alpha could be from making a better stock selection.

But you do not know the future better than anyone else for those 500 stocks, so how could you do that? EASY.

SPY is composed of the top 500 most valuable stocks on NASDAQ. And picking the top 100 of those stocks would raise the average return of your portfolio. It is basic: the average of the top 100 performers is higher than that of the top 500.

The top 100 stocks on NASDAQ are part of the NDX Index. Therefore, taking its ETF proxy, QQQ would do the job. QQQ is equivalent to investing in the 100 stocks part of NDX. Furthermore, QQQ will be continuously updated to mimic the NDX weights and composition. Therefore, you should obtain close to the same overall return as NDX by buying QQQ since it is a tracking copy of NDX but tradable.

This was greatly elaborated upon in my last paper.[6] It showed QQQ outperforming SPY since 2010. The spread between those two curves (QQQ vs. SPY) increased over the period, indicating that the alpha from the stock selection process was not only there, it was also sustainable.

Another source of alpha would be to trade better. But I will not go into that right away. We have other matters to discuss. Nonetheless, there are other sources of alpha available. Note that we are not trying to predict the market, only observing how it behaves and how we could take advantage of it.

Based on equation (1), your objective is to get the highest future value possible $\mathsf{E}[FV]$ that could satisfy your retirement needs.

You could build your retirement fund backward from what you want to get to what you need to do to get there.

[6] See figure #1 in **Retire A Multi-Millionaire**.

Depending on your age, you could start from there and project what you need using equation (1), but this time using your current salary as the base. Say you make $50,000 per year and will average about a 5% pay raise per year. You make this calculation from age 35, and some 30 years later, should have for salary:

$$FV = \$50,000 \cdot (1 + 0.05)^{30} = \$216,097$$

If you are making $100,000 per year, the same formula would give you at age 65 a salary of $432,194.

> Let's state upfront that upon retiring at 65, you want to continue having a revenue equivalent or better to your salary and have it grow at the same 5% rate for the rest of your life.

It would mean you need $216,097 or $432,194 to maintain your lifestyle. And while in retirement, your income should continue to grow at a 5% rate, a problem we have not managed yet.

We throw those numbers on the table without realizing that your retirement fund should be of a specific size to generate them.

Calculations give that you should have a retirement account valued at $4,321,942 for the $50,000 salary and $8,643,880 for the case your starting salary was $100,000. At 65, your first-year withdrawal would be $216,097 for the $50,000 case. And, as expected, $432,194 for the $100,000 scenario based on the fund value. Your retirement fund needs to grow to those amounts to maintain your lifestyle for the first year. We have yet to deal with the years coming after.

It is usually hard to visualize these things, so based on Table #1, adjusted to 30 years before retirement at 65 with all other conditions the same, we get Table #6. This way, we can compare oranges to oranges.

<u>Pension Contributions - 10% Return - 30 Years</u>

Contrib. Monthly	Return Rate	Total Contrib.	In 30 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	10%	36,000	226,049	6.32%	11,302	942
$500	10%	180,000	1,130,244	6.32%	56,512	4,709
$1000	10%	360,000	2,260,488	6.32%	113,024	9,419

Table 6: Expected First Year Withdrawal. - 30 Years

The outcome is far from Table #1 or what you need.

The above makes you think you need more after reaching retirement age. Nonetheless, it would not be enough. You will need a revenue source that can increase with time due to inflation and at least act as if indexed. We could set a formula for that too.

It is a significant difference when you put numbers on the table. Say you try to compensate for inflation starting with your $216,097 salary level at age 65. And would like to maintain that lifestyle. The outcome, trying to compensate for inflation, would mean that at age 95, if you could average the 10% CAGR, you should have:

$$\$216,097 \cdot (1 + 0.10 + 0.03 - 0.03 - 0.05)^{30} = \$933,958$$

At 95, your income stream for the year should be at $933,958 to sustain your lifestyle and buying power. And that is if you managed to compensate for inflation.

You now need a 13% CAGR to maintain your 5% salary equivalent growth rate. However, we have not said where you will find that extra 3%.

That last equation did compensate for the effect of inflation but only compensated for it. It did not bring you added buying power. It only maintained your lifestyle at the same level for those 30 years.

We have yet to explain how you would get that added 3% on your portfolio. Even if we have evaluated your retirement scenario, your income stream after age 65 is not accounted for. And being retired, you are out of a job.

Say your portfolio growth rate was, on average, 5%. Not having the 3% to compensate for inflation would reduce the above scenarios. For the $50,000 case which grew to $216,097, it would now be subject to:

$$FV = \$216,097 \cdot (1 + 0.05 - 0.03 - 0.05)^{30} = \$86,656$$

where we now extract a 5% income per year. So, at age 95, what would be in the account is $86,656 and not $933,958.

If you do the same calculation for the $100,000 case, you would get:

$$FV = \$432,194 \cdot (1 + 0.05 - 0.03 - 0.05)^{30} = \$173,312$$

and not $1,867,917. Maintaining your lifestyle after retirement may be challenging. You might even find it ugly if you do not compensate for inflation.

> All those 30 years in retirement, you would not have seen your lifestyle grow beyond your revenues. And we have not even covered taxes.

But it could get uglier. Say you passed your fund to some financial institution charging you 2% per year in management fees, for what services does not matter. Only that it is there. The above equation would now be:

$$FV = \$432,194 \cdot (1 + 0.05 - 0.02 - 0.03 - 0.05)^{30} = \$92,766$$

so that at 95 you would have $92,766 left. And all the while, you would have seen your 5% withdrawals shrink year after year until you had $4,638 to live on when you needed $933,958 to maintain your lifestyle. That could be a definition of misery.

What You Need

First, you will need better returns on your investments.

It does not have to be stocks. It could be anything you want. However, those assets will have to appreciate with time. Therefore, your collection of pet rocks or Beanie Babies should not qualify.

You will have to keep an eye on your average growth rate $\bar{g}$ and find ways to make it rise to 15% or higher. It is your way out of this inflation conundrum: a higher return than the inflation rate and the 5% withdrawals.

Second, you will need to provide the money. More than the monthly contributions before retirement. While in retirement, you must invest in assets that can continue to appreciate even more with time.

Third, we assume you want to start your retirement with at least the same level of revenue as the last year's salary or income. The problem is that for your first year of retirement, there will be no salary coming. It is your retirement fund that needs to compensate for this. And every year after.

You need a retirement fund of sufficient size to accommodate you with 5% withdrawals per year scheduled for the rest of your life, no matter how long it will be. And hopefully, a very long time.

We have nothing on how much you saved for your retirement or how you could have done it.

> That was a flaw in what was just presented. Your salary is not the basis for your retirement calculations. Your savings are. Your last year's salary measures your lifestyle. It is what you put away for a later date that matters.

Your salary indicates what you might need while in retirement. Somehow, you will have to adhere to the concept of delayed gratification.

> *You will need to build on your savings in the years before your retirement. And remember, whatever the size of your retirement fund, it will have to last you a lifetime. That could easily be for 30 years or more.*

Equation (4) can determine the future value of your initial assets.

However, I will base the following on the Python pseudo-code presented earlier, with a modification to include an extra annual contribution to compensate for the lost time.

So, let us build two scenarios where you are 35 and have 30 years before retirement. One with a salary of $50,000, the other $100,000 per year. Based on equation (4), with a 4% average annual increase, their salary should grow to either:

$$FV = 50,000 \cdot (1 + 0.04)^{30} = \$162,170$$

or

$$FV = 100,000 \cdot (1 + 0.04)^{30} = \$324,340$$

If they could manage just 2% more over those years, they would get:

$$FV = 50,000 \cdot (1 + 0.06)^{30} = \$287,175$$

or

$$FV = 100,000 \cdot (1 + 0.06)^{30} = \$574,349$$

We are not talking about huge differences, only a 2% increase in the average raise over the years. But, you know, it might not work that way. Nonetheless, over those 30 years, you could get there anyway, with its ups and downs. Inflation could give you a boost. And move you even higher since your salary is subject to inflation. And that could impact your buying power.

The above calculations show how much you might have had at age 65, depending on your initial salary and average pay raises. It is from there that you need to extract what will be your income stream.

If you live paycheck to paycheck, there is little room for savings. However, whether you like it or not, you must save.

If you do not do it, it will have been your choice. There is always the excuse that you might have never been in a position to do so. Sorry for that.

Instead of buying a $500,000 house, buy one for $400,000 and put the $100,000 in your retirement account. The same goes for cars, travel, or entertainment. Fix how much it will cost, find something equivalent but less expensive, and put the difference in your retirement account. With time, it will add up. It is just like anyone putting their change in their piggy bank. The point is you will be doing this for 30 years or more, and it will add up. You get a bonus or a pay raise; put a part of it in your retirement account.

Building Your Retirement Fund

It is your job to make your retirement years secure and worthwhile.

We are not kidding about this and do not intend to gamble your life on a dime.

You want whatever retirement fund you design to be sufficient to support you and your loved ones for a lifetime and then some since you might also want a legacy fund of substance for those you will leave behind.

So, let's go back to the basics.

The first question: How much can you put aside?

That should be from 2 to 7.5%, and even 10% of your salary. Follow Mr. Buffett's advice: put the savings away first, and then live with the rest. The question becomes: How much do you make?

I will take the case of a 35-year-old planning to retire at age 65. Start him/her at a salary of $50,000 and give them a 4% average annual raise over those 30 years before retirement. Equation (1) can estimate the salary at age 65:

$$FV = 50,000 \cdot (1 + 0.04)^{30} = \$162,170$$

Total cumulative salaries received over those 30 years would be $2,916,416. We need to feed that retirement fund out of this sum.

In those 30 years, you could earn about $3 million, starting with a $50,000 salary. How much of that could you put away without being too much of a burden on your lifestyle?

We will go directly to Table #5 from **Retire A Multi-Millionaire**[7] and use it as an example of what you could do, but with a 15% CAGR.

To do this, we invest it all in QQQ, which, on average, maintained a 15% CAGR and could possibly do about the same going forward. If you think not, then find some alpha to improve your CAGR.

To recall that QQQ scenario, the plan was to have a $100,000 as initial capital to which was added a $100,000 loan, treating the payments as if contributions to the retirement fund. The retirement account handles the repayment of the loan. The loan is received upfront and invested in QQQ, and all payments are extracted, month after month, from the account. At the same time, you do the monthly contributions as given in Table #7.

Adjusted for the 30-year interval, the 15% growth rate, and loan repayment, we would get the fund's total value at age 65 as in Table #7.

Had we given ten more years to this plan, meaning having started at the age of 25 instead of 35, we would get Table #8.

[7] The paper presents how it got to that portfolio scenario.

Initial Capital: $100k + Loan $100k - 15% Return - 30 Years

Contrib. Monthly	% Rate	Total Contrib.	In 30 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	15%	236,000	13,644,524	14.48%	682,226	56,852
$500	15%	380,000	16,413,836	13.37%	820,692	68,391
$1000	15%	560,000	19,875,476	12.63%	993,774	82,814

Table 7: Expected Return - 15% - $100k Initial Capital - $100k Loan - 30 Years.

In the example, the 7.5% $100,000 loan payments were paid off directly from the retirement account in both cases. Therefore, it did not impact the monthly contributions. Table #8 does point out the importance of the added ten years. It would be even more dramatic if you could add some alpha to the equation.

Initial Capital: $100k + Loan $100k - 15% Return - 40 Years.

Contrib. Monthly	% Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	15%	248,000	60,431,007	14.73%	3,021,550	251,796
$500	15%	440,000	72,837,429	13.62%	3,641,871	303,489
$1000	15%	680,000	88,345,457	12.94%	4,417,273	368,106

Table 8: Expected CAGR - 15% - $100k Initial Capital - $100k Loan - 40 Years.

For example, adding 5% in alpha points to Table #8 would generate Table #9 with the loan repaid from the account.

The difference between Tables #8 and #9 is just that added 5% in alpha points. It should make it worthwhile and desirable to find those 5 points.

Initial Capital: $100k + Loan $100k - 20% Return - 40 Years

Contrib. Monthly	% Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	20%	248,000	464,737,119	20.73%	23,236,856	1,936,405
$500	20%	440,000	531,691,071	19.41%	26,584,554	2,215,379
$1000	20%	680,000	615,383,510	18.55%	30,769,176	2,564,098

Table 9: Expected CAGR - 20% - $100k Initial Capital - $100k Loan - 40 Years.

Not everyone could handle Table #9, but those who could would be well equipped to handle their entry into retirement. At 65, based on the $500 contribution scenario, they could dispose of $2,215,379 on their first month in retirement. And the withdrawals would increase every month so that for the year, the total withdrawal would be $26,584,554.

We had a first year of withdrawals of $158,102 in Table #1, and here we are with $26,584,554 for the year.

Tables #7 and #8 are readily available by investing in the QQQs. You make the monthly contributions while at the same time paying off the 7.5% loan as described in my paper: **Retire A Multi-Millionaire**.

The loan is an addition to the initial capital of $100,000. Those are the only administrative things you need to do, which means that during those 30 or 40 years, you would have nothing else to do than pay back that loan directly from the retirement account. It should not be difficult since it would be your retirement account, which is totally under your control.

You could do whatever job you have without having your retirement portfolio requesting much of your time. You may put in an hour a week with the course of action presented. So, this is not time-consuming; most of the work is in the background.

The monthly contributions, just as the loan repayments, could all be automated. Whereas, Invesco would continuously maintain QQQ's stock composition to mimic the NDX Index, including any change to its list.

As for obtaining the loan, the whole portfolio could serve as collateral. From the start, the portfolio would be worth twice the loan's value and grow from there with very high expectations. At least, that is what the above tables and equations are saying.

Anyone starting their retirement according to either Tables #7 or #8 should find themselves at age 65 with little worries financially. Those amounts are more than sufficient to have peace of mind. They far exceed what the continuation of your salary could have generated. They most certainly overcompensated for inflation without even trying.

Could you do more? I thought you would never ask.

All that has been presented so far has been easily doable. It is not some pie in the sky. It is something you can do on your own. Let's dig deeper and get it up a notch or two.

For example, say you added a separate annual contribution of 4% of your salary. This yearly contribution would also increase since your salary would increase. Taking Table #9 as a basis, was added to it this 4% annual contribution based on the $50,000 starting salary at age 25, giving Table #10.

Initial Capital: $100k + Loan $100k - 20% Return + 4% Annual Contribution

Contrib. Monthly	% Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	20%	445,653	497,039,558	19.17%	24,851,978	2,070,998
$500	20%	637,653	563,993,510	18.49%	28,199,676	2,349,973
$1000	20%	877,653	647,685,950	17.95%	32,384,298	2,698,691

Table 10: Fund - 20% - $100k Initial Cap. - $100k Loan - 40 Years - 4% Annual.

How about starting with a salary of $100,000? Instead of starting with an extra $2,000 annual contribution, you would begin with $4,000 added to the fund. Both are not that large. However, they will nonetheless impact the overall fund over those years. In case you wondered what the impact would be, see Table #11, which has an initial salary of $100,000, and where 4% is put into the fund each year.

All these scenarios depend on the options you take, how much you dispose of, and how much you will contribute to your fund. Each contribution you put in will come out at the other end, having appreciated while in the portfolio.

The extra annual contributions get easier each year as your salary increases.

Initial Capital: $100k + Loan $100k - 20% Return + 4% Annual Contribution

Contrib. Monthly	% Rate	Total Contrib.	In 40 Years Total Value	Real CAGR	First Year Withdrawal	First Month Withdrawal
$100	20%	643,306	529,341,998	18.27%	26,467,100	2,205,592
$500	20%	835,306	596,295,950	17.85%	29,814,797	2,484,566
$1000	20%	1,075,306	679,988,390	17.50%	33,999,419	2,833,285

Table 11: Fund - 20% - $100k Initial Cap. - $100k Loan - 40 Years - 4% Annual.

We have provided examples of how you could build your retirement fund based on a salary of $50,000 and $100,000 and with an extra annual contribution of 4% and with an initial capital of $100,000 to which was added a $100,000 loan paid off from the investment account itself. All of these are options you can take depending on your available means to execute your scenario. Make adjustments to fit your circumstances. You could adapt these scenarios to any spreadsheet.

Do plan for your retirement. What you will achieve by age 65 will be the foundation of what will come after, meaning how you will manage your fund while in retirement.

The presented scenarios are not for everyone. First, you need the means to execute any of them and then the determination and perseverance to stay the course for years.

All the scenarios were feasible. It should be the most crucial point of this paper (**How To Make It Anyway**). It might not be overnight gratification, but you can get there by giving it time.

All you have to do is meet the initial requirements and conditions. Or design a suitable strategy using the above as guidelines.

You supplied all the money in these tables with your contributions. It includes the initial capital you put in and the loan you got that you will have to pay back like anybody else would have to. The latter scenarios provide you with much more than you need to start your retirement phase.

You should also realize that, in many cases, you do not have to wait until retirement to start profiting from your fund. And that would be starting with Table #7 onward.

Tables #7 or #8 with their 15% CAGR, requires no effort. None at all.

It is given simply by buying QQQ and feeding it your monthly contributions.

All you have are administrative decisions. Do I do this or that? And it is up to you to choose your options. You did not have to guess where the market was going, nor did you have to predict anything. All you did was make Mr. Buffett's bet on America and then sit on your "bunnies". Your portfolio was secure by its composition. All it contained were the best-performing stocks out there. None of the stocks would go bankrupt while on the list. Those stocks that might go bankrupt will have dropped off the list long before they do. And what is not in your portfolio cannot impact your portfolio.

For Tables #9, #10, and #11, you will need an alpha source for those added 5 alpha points. And that could require some work, but not that much, maybe a few hours a month. There are methods to get those 5 points. Perhaps the easiest would be to buy Berkshire Hathaway shares. They have maintained an average growth rate of 20% for over five decades. How many money managers have been able to do that, and that their shares are available to the public?

The Advantage Of Building It Yourself

This point should be emphasized more.

Building your fund is totally under your control. It is also your choice to do it or not. No one can force you to do anything. There will be no financial institutions with rules and regulations. The same goes for government rules or obligations. No one will remind you, motivate, or push you to do it. It is simply your prerogative.

You can add more money to your retirement fund and make catch-up contributions anytime and for any amount you want. And for any reason at all. Go ahead; it is all under your control.

You need to extract some of the funds for whatever; it is your money, and you can do with it what you want and when you want. Nobody can force the withdrawal of funds or charge you penalties and fees.

With your fund's monthly and yearly contributions, you are cost-averaging the QQQs over the entire investment period. The same as if you were buying an annuity contract with its preset limitations and obligations. Except, you are doing it yourself with no contract or fees attached.

The initial stake (including the loan) is a core position over the portfolio's life. Each month, on average, you add more to your fund, and each month, your portfolio grows. You will be buying more and more of the QQQs over the years. Your stock inventory will gradually increase.

> It looks like buying an annuity for your retirement but without the constraints. An annuity does not rise once you retire, and it can fade away if its contract is time-limited and might leave you with less income at a critical time.

The loan you contracted, even if you pay it back from the retirement account, is front-loading your portfolio and increasing your initial stake. It is what is making a difference.

Such a move could be increased since the retirement account will pay for it over an extended period, giving you the initial boost, and have those funds grow at a higher rate – by the spread between your average CAGR and the interest rate on that loan.

Such a method is appropriate only if you know in advance that your portfolio's average growth rate will exceed the interest charged on the loan.

The loan should be for an extended period even if it will cost more in interest so that the front-loading of your portfolio may have more impact. After a few years, you realize you could easily pay back that loan. Nonetheless, keep it. Once you extract money from your portfolio, it is not there to appreciate anymore. You are looking at the long-term of things.

If you do the calculations, you might be interested in such a loan every ten years to further boost your portfolio. You would have more than enough by then to easily afford the extra payments.

Your portfolio will grow at about the same average rate as QQQ. This rate had a higher CAGR than SPY (a proxy for the market's average performance).

You can increase your CAGR by being more selective.

Say you only buy the top 50 stocks part of QQQ. Automatically, the average return from those 50 stocks will be higher than the average from the 100 stocks of QQQ. It is due to its composition and the selection process itself. It gives you a simple way to increase your overall CAGR above QQQ's performance level. It is not some foresight or a visionary thing. It is common sense that anybody could apply.

You can also go for higher return scenarios able to outperform market averages. Using QQQ as your stock selection strategy of choice provides you with its own benefits. As was given in my paper: **Retire A Multi-Millionaire**, over the last 13.5 years or so, QQQ averaged an annual growth rate of 15.7%. It enables the execution of Tables #7 and #8, which already would provide interesting benefits.

What is important about the QQQs is its stock selection process and what it does.

You could do the same job yourself by selecting the top 100 stocks from the S&P 500 Index. It is just that, using QQQ, the selection process and maintenance are done for you. I like the no-work thing when it is worth it.

There will still be, 50 years from now, the notion of the top 100 stocks of whatever NASDAQ might be by then, should it still be there, transformed in some way. If not, you can still get the top 100 stocks from whichever market data provider to replace them. The list of the top 100 most valued stocks is here to stay for a very long time. Any internet stock screener could provide you with this list.

You are investing your future on the notion that there will be 100 of the highest-valued stocks. You know which ones are on the list now. We do not know which ones will drop off the list and be replaced by new ones. Nonetheless, you know there will be such a list; it should not disappear anytime soon. And should something happen to an exchange like NASDAQ, you will see it coming and make your selection manually, if need be, or use other means that will be available at that time.

Having your stock portfolio built around the QQQs makes it highly liquid. You can track it at any time and see how it behaves. You can add and subtract shares at any time you want without restrictions. It is almost the perfect long-term vehicle to build a sustainable and manageable retirement fund. It could provide the income stream you might want or need during retirement.

A QQQ-based portfolio requires very little maintenance of your own. Any change to the ETF is performed in the background. Your job is just to sit on it. There will be very little work.

Instead of leaving almost nothing to your heirs after running out on your annuity payments, you will have accumulated quite a legacy for your loved ones since, as proposed in **Retire A Multi-Millionaire**, your retirement fund can continue to grow at a higher rate than your withdrawals.

I would still suggest you go for the added 5% in alpha points or better. It does make a difference. Compare Table #8 to Table #9 and Table #10 with its added special annual contributions.

Getting to the 20% CAGR is not unattainable. You already have Mr. Buffett, who, for over 50 years, has maintained his CAGR at the 20% level. So why should you not be able to do the same, or even better? You do not need that much transformation to raise the QQQ's average growth rate by that 5%.

Also, the $100,000 loan you took is providing you quite a boost. You will see the repayments on your retirement account, but those payments will not come from your salary. Only your contributions will. The loan repayments were about $8,000 a year in the given scenarios. Over the period, they will have a total cost of $315,874. It is more than what you put in initially. Then why do that?

The reason is in the math of what you are doing. Say you only invested in the QQQs, leaving you with a 15% CAGR. And you wanted to know what would be the impact of that loan. For instance, the last year's payments would have the following value:

$$\$100,000 \cdot ((1+0.15)^{40} - (1+0.15)^{39}) = \$3,493,872$$

where we look at the return for the last year. One year's repayments is producing that amount. The year prior, it generated the following:

$$\$100,000 \cdot ((1+0.15)^{39} - (1+0.15)^{38}) = \$3,038,150$$

and so on as you look at the outcome of all those years.

That is why you are very interested in putting down that $8,000 a year, especially since it will be from the retirement account and not your banking account, meaning your pocket.

The situation changes if you can get that 20% CAGR. On the 39th year you would have

$$\$100,000 \cdot ((1+0.20)^{40} - (1+0.20)^{39}) = \$24,496,193$$

and on the 38th, you would get

$$\$100,000 \cdot ((1+0.20)^{39} - (1+0.20)^{38}) = \$20,413,494$$

That would be the main reason to find ways to set up that loan. It would bring a total of $146,977,157 to the portfolio before retirement. My advice: give them the $8,000 per year. Especially since it comes from the retirement fund itself, based on the 7.5% interest rate, it will cost you $315,874 over the period. In total, it is a rather good deal.

You could take a second mortgage on your house but have the payments paid by the retirement account, not your salary or bank account. Also, you could borrow that loan from your parents and pay them the 7.5% interest. Being close to retirement themselves, they might appreciate having a 7.5% return on their money. Most of all, they would be helping you, and you them.

We usually see taking a loan to invest in the market as bad. It could be in the short term. It can be the same as putting one's portfolio on margin. And that is where it can be risky.

Here, the loan is over an extended period where the market can recover long before any real damage could be done. You owe about $8,000 per year on a portfolio that could be valued in the millions. Also, since the loan is not with them, your broker cannot give you any margin calls during any market drop either.

The reason we can do this and benefit from it is also simple. You are front-loading the equivalent of about 12.5 years of your contributions, which will start earning right from the start. And they do deliver quite a punch. That single administrative move can add $146,977,157 to your portfolio. It is making you ready to retire.

"Wait A Minute!"

Let's recap. You tell me you want me to borrow $100,000 and put it in the stock market. You must have lost one or two there! Even Mr. Buffett will tell you that it is not that bright an idea to use a lot of margin in playing the stock market. It might be what could be called "risky".

With his experience and wisdom, he has seen many traders failing at such a task. The stock market should not be played fully margined. What will you do if the market drops and the broker liquidates some of your positions? They protect themselves first, not you. In a way, they also protect you from yourself. The point is, you could lose. You could even lose it all.

I understand perfectly. But, there always seems to be a "but" to all those things.

All you will do is related to equation (1). Whatever your expectations, your objective is the highest growth rate $\bar{g}$ over the investment interval. Your search is for the investment methods that can give you the highest growth rate without undue risks.

You have to put capital on the table. It is your money, and you do not want to lose it.

It has to serve in building your retirement so that your fund can supply you with sufficient income to fully enjoy your retirement until you die. And that could be a long time. You could be over 100 years old by then.

Therefore, your fund has to last as long.

A second purpose of building your fund is to leave a substantial legacy to your loved ones. We will propose ways to help you get there and do it all with longevity in mind.

Here is the rationale for leveraging a bit. There will be no broker margin. None at all. You are using an outside loan that you intend to repay fully. It will be your priority to make those monthly payments as agreed upon at the rate of interest you could get.

For example, you buy a house for $500,000. You get a 30-year mortgage of $400,000 at 7.5% interest and put a down payment of $100,000. You feel secure taking on that mortgage, even if it is a $400,000 debt that you have to pay back with interest. Your bank feels safe because the abovementioned house collateralizes your loan. You do not repay the loan for three months; they will seize the house, and bye-bye the down payment, and with it, all those $2,797 per month payments you might have made. After 30 years, you have paid off that mortgage. You would have paid off $1,006,869 to the bank and be mortgage-free.

You sell the house after those 30 years. It has appreciated at a 5% rate over those years and now sells for $2,160,971. You make $1,154,103 on the deal but have no home and some capital gain taxes to pay. Also, you have to buy a new house. But now, the average house is priced at $2,000,000. You restart the operation and buy a new home with a new mortgage unless you downsize considerably.

So, why is the above of any use in explaining the fact that your $100,000 will be placed in stocks with all we know about how risky it could be?

At least, in the mortgage thing, you get out ahead. You put in $100,000 down, you paid $1,006,869 to live in your house and got $1,154,103 out of it. That is about an 8.5% on your $100,000 investment, and you had a nice place to live in. Even though the house only appreciated at a 5% rate. Your purchase used leverage for 30 years, with the bank having less and less risk in supporting that mortgage as the years passed, with more and more incentives to take it back. So, do make those payments.

Here is the rationale for putting $100,000 in the QQQs. QQQ, with its 100 highest-valued stocks, is a market index proxy. We have made the point that no matter what, QQQ will be around 50 or 100 years from now in one form or another.

There will be a list somewhere of the 100 wealthiest companies. You could even extend that to around the world. So, we are not worried about having the QQQs disappear into bankruptcy.

We readily admit that this list of 100 stocks will change over the years, but there will still be 100 stocks on that list since those dropping off for whatever reason are replaced by new ones with even better long-term prospects. Over the years, you might see the whole list gradually replaced by newcomers. But you do not have to worry about that since the list is maintained up-to-date.

The $100,000 in QQQ should appreciate at the same long-term average rate as the NDX Index. You could be in a more secure financial environment than real estate or bonds. If not, at least get higher long-term expected returns. No matter, those investment candidates (stocks, bonds, real estate) will be there over the long term. And that is the point.

If you want a retirement fund to last for 75 years and probably more, you should start by investing in things that will last and can appreciate over time for that long.

What is proposed is to have an initial capital investment of $100,000, to which you will add monthly and potentially annual contributions. To this, you will add a $100,000 loan that you must pay back as specified above.

This way, you get an initial portfolio valued at $200,000, to which, each month, will be added a monthly contribution and make the loan payments as scheduled. None of the stocks are margined, so there can be no margin calls or fees. You are paying off the loan to another party than your broker, so your broker could not issue any margin-related call.

The market goes down, so will QQQ. That is part of investing in the market: it will constantly go up and down. We are investing in the QQQs because you are in it for the long term. QQQ is averaging market price gyrations. We have been building a retirement fund for decades and want minimal intervention in the portfolio's positions. Nonetheless, I recommend putting in some protective measures to alleviate the impact of those drawdowns. But first, we are in it for the average long-term growth rate and intend to hold long-term to benefit from it.

The new contributions will buy more QQQ shares while the whole inventory value will gradually rise in sync with the market. And since you picked QQQ, it should rise faster than SPY.[8]

So, what can we say about this deal? Let's look at the math again.

You have initially $200,000 invested in QQQ, of which $100,000 is a loan to repay from the retirement account. You supply the $100,000 initial capital and the monthly contributions, which can be deposited into your account automatically. Your retirement account makes the scheduled loan payments directly from the account. So you can automate both processes.

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[8] This has been demonstrated in recent papers.

QQQ has an expected 15% long-term CAGR.[9] So we should expect the portfolio to grow, on average, at about the same pace. Starting at age 25 with a base salary of $50,000 increasing at a 4% rate per year, and with a $500 monthly contribution, the portfolio should grow over the years as shown in Table (#12). The portfolio results included the loan repayments.

You could do more by changing some administrative moves and enhancing the investment method to raise the CAGR to 20%$^+$.

What you are technically buying with the loan are the last few years of compounding. You pay them over the investment period (monthly payments), but the total loan is applied upfront. In this case, it is doubling the initial capital.

We have: $FV = 100,000 \cdot (1 + 0.15)^{40} = \$26,786,354$. By adding the loan, we get: $FV = 200,000 \cdot (1 + 0.15)^{40} = \$53,572,709$, and we should extract $315,874 to pay off the loan over the period.

Fund Building: 15% Return - Init. Cap: $100k - Loan - $100k - $500 Contrib.

After Year	Growth Rate	Period Init. Fund Value	Value End Of 10 Years	Total Contrib.	End Ten Year Salary
10	15%	200,000	844,539	260,000	74,012
20	15%	844,539	3,706,430	320,000	109,556
30	15%	3,706,430	16,413,836	380,000	162,170
40	15%	16,413,836	72,837,429	440,000	240,051

Table 12: Expected Return: 15% - Init. Capital: $100k - Loan: $100k.

With QQQ at the 15% pace, the loan is worth: $\$26,786,354 - \$315,874 = \$26,470,480$. Is it worth $658.07 per month or $7,897 per year? That is the question you need to resolve. I have an easy answer to that one.

Had you gone for the QQQ 20% growth rate, meaning that you made some efforts to add a 5% alpha, you would have had: $FV = \$200,000 \cdot (1 + 0.20)^{40} = \$293,954,313$. It would not change the loan cost. Therefore, after costs $293,638,439 will remain.

That extra 5% in alpha points is worth pursuing. And by the way, Mr. Buffett has managed to keep his 20% average CAGR over more than 50 years. So, getting that 5%$^+$ extra to your 15% CAGR is more than possible.

Using Table (#12) as a base, you can increase the CAGR to an average of 20% over the 40 years, giving you Table (#13).

Table (#13) should add some perspective on the value of that added 5% alpha. You

[9] See figure #1 in **Retire A Multi-Millionaire**.

Fund Building: 20% Return - Init. Cap: $100k - Loan $100k - $500 Contrib.

After Year	Growth Rate	Period Init. Fund Value	Value End Of 10 Years	Total Contrib.	End Ten Year Salary
10	20%	200,000	1,394,202	260,000	74,012
20	20%	1,394,202	10,073,963	320,000	109,556
30	20%	10,073,963	73,160,686	380,000	162,170
40	20%	73,160,686	531,691,071	440,000	240,051

Table 13: Expected Return: 20% - Init. Capital: $100k - Loan: $100k.

are ready to enter retirement with $72,837,429 in the account at the 15% CAGR, while at the 20% average CAGR, you could start your retirement with $531,691,071. Once again, it is a matter of choice. Which is it you prefer?

Nonetheless, I would go for Tables #8, #9, #10, or #11. It is a choice you can make. Do you want to be even more aggressive? There appears to be room for that, too.

We always look for better ways to build our retirement funds, yet ordinary methods are available. They only need a little commitment, an initial push, and perseverance. All the methods described here could be classified as administrative.

You build the setup you want and then let it ride.

Over the past 40 years, there were 12 years where the S&P 500 had a down year. There was only one instance where you had three down years in a row (2000, 2001, and 2002). There were no instances of two down years in a row. But that is not the critical point. What you are looking for is FV, the future value of your fund, and it is in your grasp.

FV is the amount that will start the next phase of your retirement plan. And the path to get there will not matter anymore. It will be part of your past.

All this becomes your way of making your bet on America.

You build your retirement fund up to retirement age. After, the next phase kicks in.

The Retirement Phase

You are in for some surprises! Even though we will be using the same equations and the same Python pseudo-code snippet already presented. Your retirement fund will behave differently. Contributions will have stopped, monthly or yearly. And your loan payments will have ceased.

All you will have is your monthly increasing income stream while in retirement. It is the time for you to reap the rewards you have sowed. And it will be much more than enough to do anything you want.

You have reached retirement age. Depending on your chosen scenario, it will set the beginning value of your fund and start your retirement phase from there.

The main objective is to extract sufficient income from your fund to do as you please. This document often says that it is your money, after all.

You chose the scenario of Table #8 where you had a $100,000 in initial capital to which you added a $100,000 loan at 7.5% to repay from the account at $658.07 per month. Based on the $500 contributions made and using the average return close to the QQQs, you would reach the total portfolio value given in Table #8.

The total portfolio value of Table #8 (the $500 contribution case is $72,837,429). It becomes the initial value of your fund going into the retirement phase.

We can break the retirement phase down into 10-year periods. Thereby producing Table #14. Each 10-year period gives the ending value of your fund along with the first-year and first-month withdrawals at the start of the next period.

It means that from Table #8 where you ended with a possible $3,021,550 as annual withdrawal, you would have in Table #14 $16,170,686 at age 75, giving you a starting income of $1,347,557 on the first month of the next 10-year period.

Table #14 entirely depends on the value of your retirement fund entering the 10-year period. Having put your money in the QQQs, you are entitled to QQQ's long-term average return, which was at 15%, the same rate used while building your portfolio. We should remember that QQQ mimics the NDX Index and is also a market proxy outperforming the S&P 500 benchmark.

Once Retired: 15% Return - Init. Cap: $100k - 5% Withdrawal

Age	Growth Rate	Init. Fund Value	Value 10 Years Later	First Year Withdrawal	First Month Withdrawal
65	15%	72,837,429	323,413,716	16,170,686	1,347,557
75	15%	323,413,716	1,436,025,860	71,801,293	5,983,441
85	15%	1,436,025,860	6,376,261,021	318,813,051	26,567,754
95	15%	6,376,261,021	28,311,958,537	1,415,597,927	117,966,494

Table 14: Expected Return: 15% - Init. Capital: $100k - Withdrawals: 5%.

The same code snippet with minor modifications could serve to calculate all this:

```
# initialize variables
years = 10
w_rate = 0.05/12        # withdrawal rate 5\%/year
total_fund = fund_plus  # fund value from 65, each 10 years
for month in range(months * years):
    total_fund = total_fund * (1 + rate_month - w_rate - inf_rate)
print(total_fund)
```

Every ten years, the ending value of the previous period starts the next, where the same rate of return is applied. The yearly withdrawals will increase year over year according to Table #14, where we have its value at the end of 10 years.

All you needed was a starting point: the ending portfolio value at age 65.

You could do many of these scenarios, like when we considered building your portfolio up to retirement. The difference is in the use of the fund. There are no longer any monthly contributions; that phase has passed. No longer any annual contribution, that has passed as well, and no more loan repayment since it was all paid back in the accumulation phase of this process.

What you have is simply extracting your monthly income stream while having your retirement portfolio grow.

It is the most critical point of all in this paper. Your portfolio continues to grow while in retirement. It is not being depleted or stable as with an annuity. All because you are doing it yourself and on top of it all, with minimal effort. Now, that is remarkable.

The most critical point in this paper: **How To Make It Anyway**, is the increasing portfolio value while in retirement.

It is much better than having some annuity that some financial institutions regulate, sometimes forcing you to make preset withdrawals or limiting your catch-up moments. It is your retirement fund, and you can do whatever you want.

So, you die old and rich. I hope you enjoyed the ride.

Oh! **One more thing.**

You could have considered Table #9 as the entry point to your retirement at age 65. Say you used the $500 per month contribution plan with the loan and initial capital as given in Table #9; it would generate Table #15.

Your entry point for the retirement phase from Table #9 was $531,691,071 for this scenario. The major difference between Tables #9 and #15 comes from separating the building phase, which lasted 40 years, and the retirement phase, which kept the fund going another 30 years. Note that at the age of 95, we also get the potential value of the fund at age 105. Those last ten years are a real knocker.

Once Retired: 20% Return - Init. Cap: $100k - 5% Withdrawal

Age	Growth Rate	Init. Fund Value	Value 10 Years Later	First Year Withdrawal	First Month Withdrawal
65	20%	531,691,071	3,864,466,281	193,223,314	16,101,943
75	20%	3,864,466,281	28,087,926,339	1,404,396,317	117,033,026
85	20%	28,087,926,339	204,150,210,833	10,207,510,542	850,625,878
95	20%	204,150,210,833	1,483,815,789,038	74,190,789,452	6,182,565,788

Table 15: Expected Return: 20% - Init. Capital: $100k - Withdrawals: 5%.

In its retirement phase, the fund is growing exponentially at an average 20% rate while extracting 5% of its value every year as income for our retiree. The difficulty will be to maintain that 20% CAGR while in retirement.

It must be thought out, planned, and executed according to sound portfolio policies. And you have years to put it all in code and have your computer do the job.

Note that we have not talked once about predicting the stock market, only about following established long-term market trends. We have stayed general because we always dealt with expected averages without knowing what they would be. We used guesstimates based on what was. As simple as that. Furthermore, you can redo all the tables presented and calculations at any time. Even improve on the design.

The above numbers are fabulous (Table #15). I agree. One could even say incredible. Yet, all you did was apply equation (1). The challenging part will be to maintain that 20% portfolio CAGR. Nonetheless, those are the numbers. And they are feasible.

It is also what your 5% in alpha points are worth. Can you grab some?

At age 75, your withdrawal for the year would be $193,223,314. For the first month, it would be $16,101,943. If you could continue at the same rate for another ten years, then at age 85, your withdrawal for the year would be $1,404,396,31, and your first month $117,033,026. I suspect you might say just as I would: it is enough to pay for the beer and a few extras. Who could spend $117,033,026 in a month and have it rise every month after that? At age 95, you could spend $10,207,510,542 for the year.

Yes, life will become more expensive. But not that much.

What will prevail are the two parts of equation (4), which is a simple extension of equation (1).

What could you do to maintain that 20% CAGR average over 70 years? How close can you get to it? Or, better yet, by how much can you exceed it? All questions you should ask and answer. You have a roadmap.[10] [11]

Hopefully, **How To Make It Anyway**, will also be of help.

You have here an investment method that will outperform over 90% of investors. The other 10% might be using the same techniques you will.

As extraordinary as I would like to put it, it is time that is making a big difference.

The doubling time for a 20% compounded rate of return is 3.81 years (the same as for Mr. Buffett, for instance). On average, a portfolio would double in size every 3.81 years. A straightforward representation is 2^n. After 10 doubling times, you should be at $2^{10} = 1,024$. Therefore, after 38.1 years, your portfolio should have grown by 1,024 times its original value. And 3.81 years later, it should redouble to 2,048 times the initial capital.

Over 70 years, you have 18.37 doubling times, which gives you $2^{18.37} =$ 338,782 times the initial stake. It would transform $100,000 into $33,878,254,043 simply because you provided the time and the growth rate. There is nothing more in there than what is in equation (1). Thereby making it all rather ordinary stuff.

Nonetheless, it is the value of that 20% CAGR and why we should work for it and have it operate for a long time on our behalf. A retirement fund is a good place for that; a 25-year-old might have another 75^+ years to go.

Here is a little and gratuitous bit of advice for parents. Facilitate your child's ability to build their retirement fund as early as possible by giving or loaning them the initial stake to get started. Time is on their side, really on their side. You would give them the full extent of equation (4). And that could be your most incredible legacy, a little push in the right direction. Instead of waiting to die to leave them anything, help them along the way and early.

You will see the same recommendation in the **The Age Of The Individual Investor**, which suggests that you start your child's retirement fund from birth, thereby giving them up to 100 years to build their fund and making them financially worry free from a young age.[12] Your foresight will make a difference. You could give them Table #15.

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[10] **Retire A Multi-Millionaire**.

[11] **Sitting On Your Bunnies Might Be Your Best Investment Yet**.

[12] It is estimated that half the children under five will reach 100 over the next century.

There are at least 100 million[13] relatively small investors that could do this. Are you one of them?

Guy R. Fleury

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[13] US working adults between 25 and 45.