On Returns

In 2018, the price of 1 Bitcoin hit the $27,000 mark. Everyone (male young millennials for the most part) wanted in on this new hot investment. Around these times, the total value of all existing Bitcoin in the world reached a whopping $500B, an amount sure to turn heads of even the most conservative investors. But, just like anything else that has had a meteoric increase, it also had an abrupt price landslide. By March 2019 the price of Bitcoin was back around $7,000. A lot of people entered at $19,000 and then, having seen their dreams shattered, they liquidated their positions. It took a whopping 3 years for the price of Bitcoin to recover back to $19,000. Most people who entered at the peak had sold by then. The moral of the story is if it sounds too good to be true, it probably is. Or in other words, if the gains are extraordinary, they must come with extraordinary risk attached.

Time after time we see examples of assets that start gaining in price very quickly. Examples abound. A more recent phenomenon at the time of the covid-19 pandemic are meme stocks. People usually invest in stocks and some of them write in online forums about these decisions. This is not new. The novelty was that many people received Government aid, and saw their savings accumulate as expending got restricted. They went online and found that some people were making easy money. Someone had chosen a stock and decided that its true value was much higher than its current price. So, they went and bought as one does and then posted their opinion on Reddit. Wall Street Bets was the name of one of the most popular forums. The way rational people value a stock is by assessing their capacity to generate future cashflows. The reasons given by these non-professional investors were more based on sentiment than on reality. They claimed for example that GameStop (ticker: GME) was the store where they have been buying videogames since they were kids and therefore it wasn't fair for this company to disappear. That they had faith in the future of this company

regardless of the opinion of the company managers who had come to the realization that their client based had clearly been shrinking and with it their prospects. But because many people piled up, guess what? The price of the stock went up very quickly.

This is usually due to a rapid increase in demand along with a fixed supply, this is basic Economics. The question always is, how sustainable is this? It's usually not so much the thing itself that gains value so quickly but the idea that spreads among people about such thing. When there's rain, it's not that taxi services increase their cost, it's that there are many more people wanting rides at the same time, but the amount of available taxis and rides is fixed. Therefore, price increases are the free-market attempts to efficiently decide who gets the service first. Theoretically, whoever needs it more should be willing to give up more cash to get it. Obviously, there are income and wealth inequality implications because not all market participants have access to equal amounts of cash, but that's a topic for another book.

Because ideas about needs and wants can spread rather quickly among a vast population, prices can increase very quickly as well. However, just as quickly the opposite idea can spread as well generating price movements in the opposite direction.

None of this is good or bad, it just happens. Some people would prefer that the prices were more stable so that they can have access and satisfy their needs and wants without having to give up as much cash. Other people like the volatility in prices because they try to make a profit from buying low and selling high. The latter are also needed for a market to work correctly. These people tend to take ownership of things when nobody wants them and relinquish it when everybody is demanding it again. For this service, they get compensated, but again, nothing goes without risk.

Throughout this book we'll introduce concepts that are key to understanding the Investment decision making. The first one is the concept of Return. This is the most obvious

way to compare investments. We can calculate the absolute return of a trading operation by subtracting the purchase price from the selling price. When you do this, you automatically end up with a profit number measured in a particular currency. It could be positive or negative, because you either make money or lose money. For example, if you bought a car for $25,000 when it was new and you sold it for $26,000 one year later in the middle of the pandemic because there were no new cars being delivered, you made $1,000 profit and this is what we call the absolute return. Now, imagine I also bought a kayak for $300 and sold it for $400 one year later. What's the reason for such an amazing return you ask? Well, one good summer day I took it to a lake and there was this father with his kid who was really interested in buying it right there and then from me. His own kayak had suffered an accident, and the quality family time got completely broken. Therefore, I got an absolute return of $100. Now which of these operations gave you a better return? $1,000 for the car vs $100 for the kayak, we could immediately say, the person trading the car made more money, and if these were transactions that occurred only once and there's no expectation of repeating them, then we can conclude our analysis here and say confidently that you made more profit with the car than I made with the kayak because you had a higher absolute return.

On the other hand, if you had $25,000 and you knew that by the end of the month, you'd be able to sell everything you bought with this money, would you prefer to buy one car or 83 ($25,000/$300) kayaks? Let's calculate the profit for each case. I'd get just $1,000 profit from the one car and $8,300 (83 * $100) from selling all the kayaks. In this toy example, it makes much more financial sense to use the money to buy and sell kayaks than cars and our verdict would be completely reversed.

To avoid this process of finding how many kayaks we could get with the initial investment, we can calculate the percentage return by dividing the profit by the initial investment instead. For the car it is $1,000/$25,000 = 4%. For the kayak, $100/$400 = 25%. This is an easy way to make both investments comparable. However, we need to keep in

mind all the assumptions that we discussed before: for example, that we can buy and sell the whole $25,000 inventory within a month. This is usually not a problem in the financial markets, where there's plenty of liquidity and trades usually execute in a matter of seconds.

We are going to be using the concept of percentage return quite a lot as it's one of the most fundamental pieces of information we can get. It's useful to remember that to aggregate percentage returns over time we need the mathematical formula: Total Return over T number of periods = $(1+r1)*(1+r2)*...*(1+rT) - 1$

Even though we tend to care more about the total amount we make in currency, percentage returns allow us to compare different opportunities on equal grounds: the amount of initial investment required.

Now, the immediate temptation is to start using percentage return to compare all investment possibilities. As good as percentage return is, we can't stop there because we can derail ourselves when comparing across opportunities with different levels of risk. For example, a T-bill (Treasury bill) is a financial instrument that allows us to lend money to the US government, and it will surely pay us back our initial investment in a fixed amount of time with some interest unless the US Government defaults on its debts. Although this could happen, the US is considered the most trustworthy borrower in the world. On the other hand, investing in TSLA stock is much riskier. An average investor who has a fixed short investment horizon (i.e. < 1 year) has a very significant probability of losing money. Stocks prices are volatile, they can move by large percentage points in short periods. And if it happens that you need your money back immediately, you have a good chance to have to sell at a bad time, before there's a chance for the stock price to recover its upward trajectory. Therefore, even though the T-bill will pay much smaller percentage returns than some stocks or cryptocurrencies or more speculative vehicles, it may still be a better investment for some people depending on the level or risk they are comfortable taking.

See, if we only compared percentage returns, we couldn't possibly stay in the game for long. Most people who stay at this level, end up losing much of their investment. On the other hand, the recent history is plagued with evidence of investment professionals who ended up building multi-billion and multi-trillion empires by paying attention to this additional dimension of asset returns. In the next chapter will talk about this other dimension and how it helps preserve wealth and build fortunes.

This is because the returns of all assets are linked to their particular level of risk (or volatility). Think about it. If you could choose between two assets that tend to have the same returns but one of them oscillates more than the other, wouldn't you prefer the one that oscillates less? The price oscillation is a real danger because you may be pressed to unwind the position at a bad moment. Only investors who pay attention to risk and learn how to manage it properly can be successful in the long run.

On Risk

A few years after my first and brief attempt at managing a portfolio, I tried again. This time I was equipped with much more financial knowledge as I had taken CFA exams and a course on financial derivative instruments. I pooled my savings with one of my closest friends and invested $20,000 USD in call options on the Mexican Stock Exchange index ETF (EWW). The index started the year at around 45,000 and all the analyst predicted it ending in 50,000 by the end of the year. So, I went and did the most naïve thing: I bought $20,000 USD worth of call options with a strike price that related to the index hitting 48,000 according to my own calculation. Now, call options are really cool instruments because if you are right, they don't just pay you the percentage gain of the index, but can potentially pay much more as they are built as non-linear instruments. The higher the index the larger

the percentage gain you make. To the point that you can quickly make 200%, 300% or even 500% of your investment if the index has a return percentage large enough in the 50 to 100% range.

As you would imagine, with great potential profits, there comes great potential losses. You can easily lose 100% of your original investment, as I would painfully find out soon enough. In addition to this, the potential for huge earnings is illusory. See, smart mathematicians with advanced algorithms working at large and well-funded global banks are in charge of pricing these instruments at all times. They already have calculated the probabilities beforehand. The price of the option already reflects this probability. So, for an option to provide a profit to the buyer, something really unexpected needs to happen. See, the options I had bought were priced so that I wouldn't make a profit. What would have had to happen for me to make a profit? That Mexico found an untapped reserve of oil as large as 10 years of its current production, maybe? Perhaps it would have required something even stronger than that. You see as opposed to bad news; good news just doesn't come up like that. On top of all this, I decided to follow the consensus of economists paid by the banks, yes, the very banks that profit from selling these options.

But we haven't talked about the most important mistake I made. It's somewhat hidden in the story I just told. It was the amount of money I invested in a highly speculative strategy. I put $20,000 at risk of fully evaporating. And I went in with no risk management strategy. What would I do if the value of my portfolio went down by 10%, 20%, 50%? Did I have a stop loss? Did I have a take profit point? Did I know what was my value at risk every single week? The answer is: I didn't know and no, no and no.

Just like lottery buyers I focused on the potential profits and forgot about the potential loses. I didn't estimate probabilities. Moreover, I went all-in and all the way. I saw the value of my portfolio reduce to $18,000 in the first month and I thought, it still has a lot of time to recover. Then, a stream of hope, it went back slightly above $18,500. By the 6th month in, the

value was down to $7,000 and a month later it was at $2,500. Every time, I made my decisions based on wishful thinking: “it still has time to recover”. One thing I haven’t mentioned is that the value of an option decreases in time just due to the past of time because the probabilities of large moves become smaller. So, I should have realized that by the time it went below say $15,000, there was no way back to breakeven. But I refused to see it.

Summarizing, the errors I made were:

1) Took too much risk and didn’t know my stop-loss beforehand

2) I believed in the consensus of top economic analysts

3) I conveniently ignored the inherent risk characteristics of the investment: most detrimental in this case was the feature that options value decay with time as we approach the contract’s maturity. Also, you learn about the nonlinear behavior, even learn to model it mathematically, but when it represents money, you are losing by the day or by the hour, it has a different and even more potent shock factor.

My worst transgression was that I was blind to risk. Risk is such a real thing. It can sound very abstract and hard to define precisely as it’s a very common word that we use colloquially, but it tends to materialize quite unexpectedly.

Risk in Investments is a very real concept. It impacts investors because we are forced to make decisions under uncertainty, consciously or not. And no type of investor is immune. Institutional investors, when returns are lower than expected, start getting redemptions or an increase in the margin required by the broker/dealer. Retail investors, if they are rational, they should have a maximum loss that they are willing to tolerate and if not, they will be pulled by increased unexpected expenses or decreased income not to mention the emotional roller coaster. All these forces, create pression for investors to unwind their investments at very inconvenient times which cause permanent losses.

Therefore, we shouldn't ignore it, nor fear it, but consider it carefully when making investment decisions.

Formalizing the concept of risk

The first one to recognize this formally was Markowitz in 1952. Borrowing from optimization theory and practice, which by then had been amply used in many industrial applications, he proposed that in investment return could be the thing we want to maximize (quite obviously), and risk could be the thing we tradeoff for returns.

See, he recognized that to make more returns, investors have to incur in more risk. This is usually the case as all of us would prefer more return with lower risk attached to it, but we are all competing for it. So, if we recognize an opportunity to obtain larger returns for the same level of risk, we would quickly buy into that opportunity, and because everyone who see it would try to do the same, the price to participate would quickly increase until the opportunity disappears because the level of return at a higher price is lower and rationally the same anyone can get for the amount of risk incurred.

This is, when the relationship between risk and return gets broken the market acts rapidly to restore it. And while market participants can potentially realize extraordinary returns, these opportunities are temporary. Therefore, unless you are dedicated to find and take profit from this kind of opportunities, for which you require to have specialized information, you will have access to the same level of return that the rest of the market has given a certain level of risk.

Markowitz proposed we measure risk to make it a very tangible concept: Standard deviation