Let me first start with a disclaimer. The ideas that I want to discuss here today are not related to my professional work and purely a sample of ideas I have gathered over the years through personal research and interest. First I would like to discuss the reason why we have derivative instruments. In light of historical context and current examples, we will look at how best to use derivative instruments. Then I want to talk about some valuation aspect of derivatives and choosing the right market(s) for one to be involved in. Finally I will try to illustrate a way to combine some of the ideas discussed here to be able to be better decision makers on derivatives and other financial instruments going forward.

In case you are wondering the background picture is a clay tablet containing the code of Hammurabi dating back to about 1750 BC, as enacted by the famous king of Babylon. There are some 282 laws written into code. Code 48 is particularly interesting to start our discussion as it stipulates the following: “if any farmer owes a debt, and a storm prostrates the grain, or the harvest fail, or the grain does not grow for lack of water; in that year he need not give his creditor any grain, he washes his debt-tablet in water and pays no rent for this year”. Hammurabi may not have been familiar with an option terminology, but he effectively provided a put option to the farmer.
As you know, derivatives markets have grown significantly since markets have become deregulated, often in multiples of the underlying markets they reference. Why have they become so prevalent? Maybe we should ask why they are used in the first place? Financial derivatives can be used to hedge or mitigate the risk for an underlying, create a non-linear payout/exposure to an underlying asset, for regulatory or tax arbitrage, or to speculate by getting a leveraged position on the underlying. However, out of these many reasons, the last one is probably the key factor explaining the high growth factor. As you combine ignorance and leverage you get very interesting results. Even combining a well thought good investment idea with leverage can be dangerous. This is because leverage by itself cannot turn a bad investment idea into a good one, however it can turn a good idea into a bad one by forcing you to exit on an adverse market move. And adding leverage to a speculation just lets things move along faster, and can be compared to pouring gasoline to fire (which will discuss later how this has played out in the historical context). Derivative based strategies would be more suitable when they create an exact offset/hedge on the underlying or when the investor is long the optionality (fully benefiting from the upside with no downside) with an attractively prices upfront premium payable to buy this option. We will see the in the next slides a few examples describing these strategies.
Let me start with a historical context for the use of derivative instruments in Turkey. Abidin Pasha, who was appointed as the president by Sultan Abdulaziz of what can be called the first predecessor exchange to Borsa Istanbul, advised against his fellow citizens to stay away from the derivative instruments on securities (and instead buy and hold the underlying securities themselves) in a book he wrote in 1874. In 1870s, there was a great deal of trading and speculation in government debt securities called “konsolid”s. At the time he wrote this book, more than 95% of the exchange trade volume was in derivatives on the underlying securities as opposed to the securities themselves. It is surprising to see that the mechanics of this organized exchange was very similar to the derivative exchange in operation today. A speculator could buy options, futures on the underlying debt instruments on initial margin, the derivative positions were mark to market and subject to ongoing margining as well as cash settlement at maturity. One could even engage in complex options such as cap, collar or strangle strategies. In addition, these debt instruments were also traded in London and Paris which enabled arbitrage strategies in case of any price discrepancies. The exchange was housed in Konsolid Han (formerly Havyar Han) in Karakoy (incidentally, neither of the buildings exists today). Abidin Pasha further advised to distrust the brokers who operate on the exchange, especially that they never engage in these speculative activities and instead happily collect their transaction fee on the back of this trading frenzy. For more information on this topic, I highly recommend that you read “Hava Oyunları” published by Scala who adapted Abidin Pasa’s writings to modern language.
Well if “caveat emptor” was a wise recommendation for anyone trying to be involved in the derivative markets of the past, modern times certainly call for one to be wary of self motivated financial promoters who do not necessarily act for our best interest in financial markets. How can we protect ourselves against the “advice” by others who may be motivated by self serving biases and other incentives which may not result in our financial well being? One solution may be to follow Taleb: “...safe rule is never to transact/believe someone selling you something who have no skin in the game”. What Taleb means by that your odds of success are higher, though far from guaranteed, if you know that the individual providing/selling you advice/product would be harmed if the advice/product does not prove successful than would be otherwise. And that harm does not necessarily need to be financial and can be non-financial such as losing reputation/status in society. Primitive societies worked better as a system as someone harming the group would be left out. Examples of situations with “experts” who have no skin in the game include companies with board of directors having no significant stake of their wealth invested in the companies they are meant to oversee, or market forecasters who do not necessarily lose if their forecasts differ significantly from the actual results (no downside risk with some/limited upside participation).
Of course Taleb put his money where his mouth is. Unlike the majority of the market participants who sells out of the money options to collect premiums (i.e. against scenarios which are very unlikely to occur), Taleb’s trading strategy involves buying deep out of the money options. Effectively, he loses money every day as his options expire worthless more often not, however he would make significant amount of money if an unexpected market or “Black Swan” event were to occur. Why is the implementation of such a strategy so rare in the market? The answer lies mainly in the domain of psychology. Nobel prize winners Daniel Kahneman and Amos Tversky have shown through their experiments that we are more willing to gamble when it comes to losses, however are risk averse to our gains. It is easier psychologically to have small winnings every day even though an unexpected event wipe out more than the cumulative gain in a few days.

Taleb founded Empirica Capital Management in 1999 to employ such strategies. He shut down the fund in 2005 to focus on writing and other interests. In his recent book “Antifragile” he again argues that the investors adapt barbell strategies to protect themselves against the unknown, effectively putting the bulk of a portfolio into safe assets whereas the remainder can be into riskier investments to be exposed to potential upside. This enables the investor to know the maximum possible loss of the portfolio whilst retaining the upside. Conversely, an investor who puts 100% into medium risk investments has a risk of total ruin from miscalculation of risks or “unexpected events”.
Valuation of options

\[ C(S, t) = N(d_1)S - N(d_2)Ke^{-r(T-t)} \]

\[ d_1 = \frac{1}{\sigma \sqrt{T-t}} \left[ \ln \left( \frac{S}{K} \right) + \left( r + \frac{\sigma^2}{2} \right) (T-t) \right] \]

\[ d_2 = \frac{1}{\sigma \sqrt{T-t}} \left[ \ln \left( \frac{S}{K} \right) + \left( r - \frac{\sigma^2}{2} \right) (T-t) \right] \]

\[ = d_1 - \sigma \sqrt{T-t} \]

Black Scholes formula (1973)

We know how to value vanilla derivatives, call or put options, by using the above Black Scholes (BS) formula. Whilst it is important to know this (and other things such as the put call parity) to value options it is probably even more important to understand the underlying assumptions of the formula. As with any other pricing model, BS has the usual assumption to operate under perfect market conditions (e.g. no friction costs, constant access to borrowing at the risk free rate and no arbitrage conditions). More importantly a key assumption of the BS model is that one does not know anything about the underlying security, and that it simply performs a random walk with a certain drift and volatility. Whilst this may be true in the very short run, the model severely misprices the options over the long run – especially when the underlying securities trade significantly below/above the intrinsic value of that asset.
Ted Williams was one of the greatest baseball players and is regarded one of the greatest hitters in the history of baseball with a close to 0.400 batting average (i.e. he failed to get a hit 60% of the time). In his book “the Science of Hitting” he describes how he carved his strike zone into 77 cells, each the size of a baseball. Williams knew that swinging at balls in the best cells (red ones in the picture) would allow him to bat pretty close to 0.400; deviating outside of that would reduce his average. Warren Buffett describes the level of the expertise by the term “circle of competence”. He mentions that the size of that circle is not that important, however knowing its boundaries is vital. The good thing about financial markets is that one does not need to know everything about all the asset classes or derivative instruments in detail. You only need to know in detail about a few assets or strategies and that may provide enough opportunities to earn a decent rate of return. The key requirement though is not to overstep the perimeter of the circle of competence. And there are strong psychological factors that normally are at work here. The strongest and the foremost psychological factor is envy. According to financial historian Charles Kindleberger who wrote the book “Manias, Panics, and Crashes”: “there is nothing so disturbing to one’s well being and judgment as to see a friend get rich”. And there is the natural tendency to imitate what others have done and worked so well in the past. That explains why Ponzi schemes become so popular, it is difficult not to jump on the bandwagon when everyone else is getting richer more quickly than you are. However, a prudent investor would simply look to win in the long run by “not being stupid” rather than by “being smart”.
Money as a derivative instrument?

How should one think about “money” as a financial instrument? In a metallic currency system, paper notes are convertible into the underlying coins. Strictly speaking their value is derived from the conversion into the intrinsic value of the metal coins (e.g. gold, silver or copper). The word banknote is actually a relic of the times when the banknote was used as a credit instrument, a promise to pay money usually gold. However the current dollar is itself the thing that is being paid. Today’s dollar owes its value to being the “legal tender for all debts, public and private” as printed on that paper. This was not necessarily so throughout the history of the U.S. Until 1900, the U.S. currency system ran on bi-metallic standard (gold and silver). By the Gold Standard Act of 1900, the dollar was defined at slightly less than 1/20th of an ounce of gold. However, after the Great Depression, Franklin D. Roosevelt’s administration devalued the dollar to 1/35th of an ounce of gold. Then on Aug. 15 1971, Richard Nixon redefined the currency as no fixed weight of gold. At a stroke of a pen, the dollar became an uncollateralized fiat currency, effectively slips of green paper with no intrinsic value. Whilst there are set of fixed rules established by the Central Bank for determining the quantity of money, one cannot be 100% certain that those rules would be observed at all times to keep that value stable over time.
In financial markets, the buyer of a call option has to pay a premium to the option seller upfront. The reason for this, as you know, is that the option buyer benefits fully for the potential upside of an underlying asset, however does not bear any losses on the downside. The upfront premium payable by the option holder offsets this benefit by letting the option buyer “suffer” in case of a downside scenario. Participants in financial market have developed a number of pricing tools to calculate the fair value of this option by discounting the probabilities of future payoffs that would benefit the option buyer. Outside financial markets, however, the participants have not yet developed these insights, let alone recognize the very existence of these options. The above picture on the left hand side may be a familiar sight to those of you who are frequent travelers to the airport. Close to the entrance to the airport you see a long line of vehicles parked on the side (at times extending to a number of km’s) who are there to pick up their friends and relatives arriving on domestic or international flights. However, instead of parking their car at the parking lot for a fee they prefer to wait on the side for free, effectively creating their own parking lots. On the right hand side you can see the fees payable to the parking lot at the airport otherwise. The more they wait there the higher the potential payoff for them. If you take into account the hassle of going in/out of the parking lot, security checks at the airport etc. one may wonder why anyone would think of any other alternative other than the free option. Solution? That is easy, let us stop selling people options for free. Do you think there would be any buyers of this option if there is an upfront premium payable by the option buyers, especially if the option is more than fairly priced to compensate for the additional (often unforeseen) costs that these option buyers cause in endangering traffic flow.
Airline industry has been requiring the use of checklists for pilots for many years which has enabled the industry to command the lowest fatality rate compared to other modes of transportation. The industry is notorious to continuously update this know how in order not to repeat the same mistakes in pilot control and aircraft designs and more importantly provide for unexpected events. Dr. Atul Gawande, who is a practicing surgeon and a journalist, describes in his book “The Checklist Manifesto” how the use of checklists can significantly reduce the error rate in surgeries. We could apply the same concept in financial markets where we can identify certain filters and check points to identify whether the proposed investment really is a “good investment” or alternatively how to define the lousy investment so that we never make that one (“inversion principle”). These points can include some of the common pitfalls and failures that other investors and companies have experienced in the past and therefore would enable us to avoid repeat similar mistakes in the future. Another advantage of the checklist would be to avoid the “consistency and commitment” bias where we immediately rush to act on an idea without checking for all of the data or by disregarding conflicting or contradictory evidence. This is especially relevant for leveraged instruments such as derivatives which immediately light up the “greed” side of our brains. The first item on our checklist may be Taleb’s rule: “does the person transacting with you have any skin in the game”? 

Use of checklists in finance
Any questions