A special interest – in finance
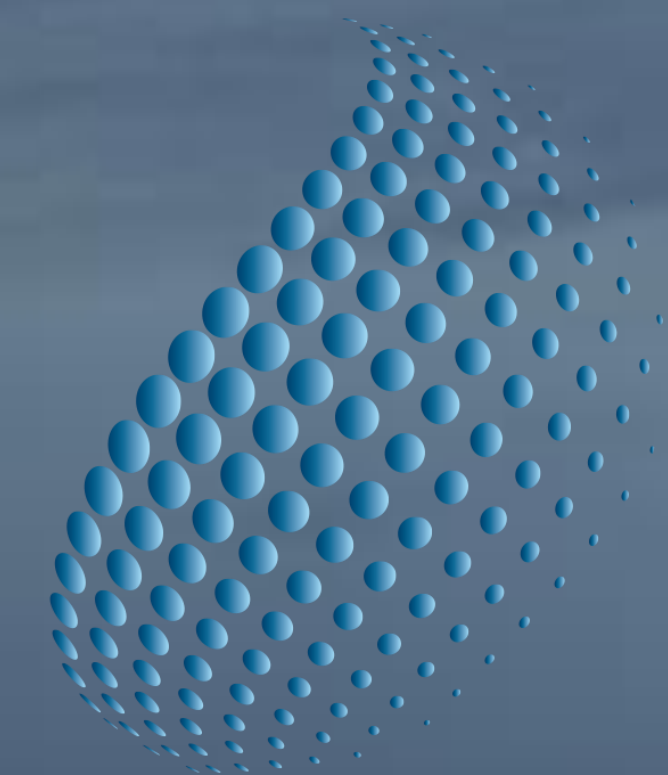
By Oddbjørn Dybvad

I never stop being surprised by the variety of special interest that people are passionate about. Some are very interested in ancient Egyptian pharaohs. Others are passionate about researching various aspects of tanks in World War II. Kyoto University in Japan offers a doctoral programme in "manga," or comics originating in Japan.

In finance, there is one topic that I find particularly interesting. Which I think explains in large part why stocks are priced the way they are. This super interesting topic is "hyperbolic discounting".

The discounting of cash flows in the dividend discount model are discounted using what is called "exponential discounting". This discounting method is the standard method for discounting cash flows. We all know it by heart from our business school exams. All investors use it, because most have probably only learned about this discounting model. But what does this way of discounting cash flows actually mean, and is it the right way to discount cash flows?

The traditional way of discounting, exponential discounting, is "time insensitive", meaning that you have the same relative decline in the discount factor as time goes by. This is the rational way to look at economics. Consequently, cash flows that are far in the future are not worth much under exponential discounting.

Hyperbolic discounting

Behavioral studies of humans show that we do not act as traditional economic theory claims. We are not rational. Our way of discounting as humans is "time-sensitive". In other words, we use different discount rates depending on how long it takes to get a payoff.
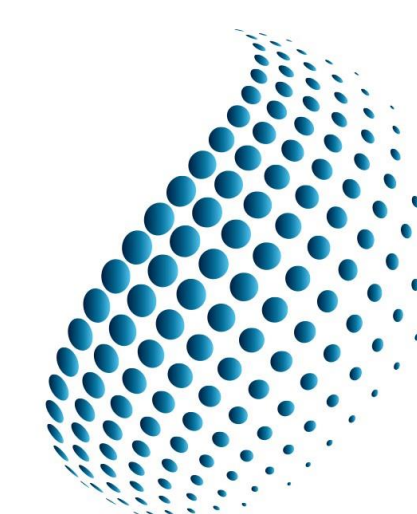
Consider the following two examples.

1) You can choose between receiving $100 today or $110 in one year. In experiments, people have a strong tendency to choose $100 today to get the instant gratification.

2) You can choose between receiving $100 in ten years or $110 in 11 years. In this situation people tend to be willing to wait an extra year to get $110. Since the instant gratification is not there anyway, we act more rational and think we can just wait one more year until year 11 instead of receiving the payout in year 10. It is so far into the future anyway.

The challenge in example 2, in which you decided to wait 11 years, is that when you approach year 10, you would rather get the instant gratification of $100 than wait another year. In other words, people avoid waiting the closer they get to the end of the waiting period.

In the short term, people are irrational, but in the longer term, they choose the rational option.

The basis for the hyperbolic discounting model is human behavior. The pattern that emerges from the way people choose as time goes on follows what is called a "hyperbola". People do not appear to use a constant discount rate as exponential discounting purports to do. In economics, hyperbolic discounting is a time-inconsistent model of discounting. People make decisions that are much more similar to hyperbolic discounting than exponential discounting.

In hyperbolic discounting, valuations fall very quickly for periods close to the present because we want instant gratification, but they then fall slowly for longer periods that are deferred. The hyperbolic model discounts more than the exponential model at the beginning and less than the exponential model for very long term events.
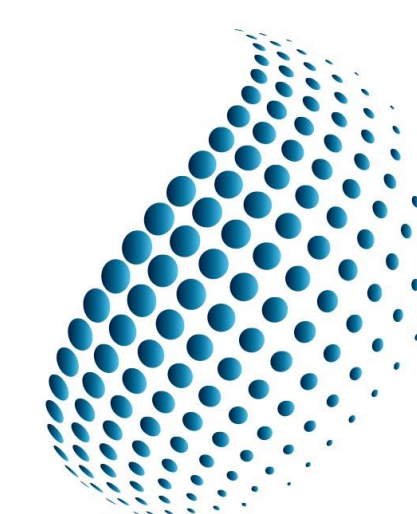
Hyperbolic discounting states that discount rates are greater in the short term than in the long term. What does all this have to do with finance and the valuation of companies?

Hyperbolic discounting in finance

In the hyperbolic formula, the present value of short-term cash flows is lower than in the exponential model, but the present value of longer-term cash flows is higher than in the exponential model. Consequently, the terminal value in hyperbolic discounting for companies with durable competitive advantages, will be higher than in the model we know from business school.

There are various kinds of mathematical expressions for the hyperbolic formula. I will not go into them, but will try to simplify the hyperbolic function using an example of a 20-year cash flow where the discount factor is decreasing over time. The falling discount factor reflects the way experiments point to how we as humans make tradeoffs, represented by the hyperbola. The resulting figure shows the discount rates using the exponential function and a hyperbolic assumption:
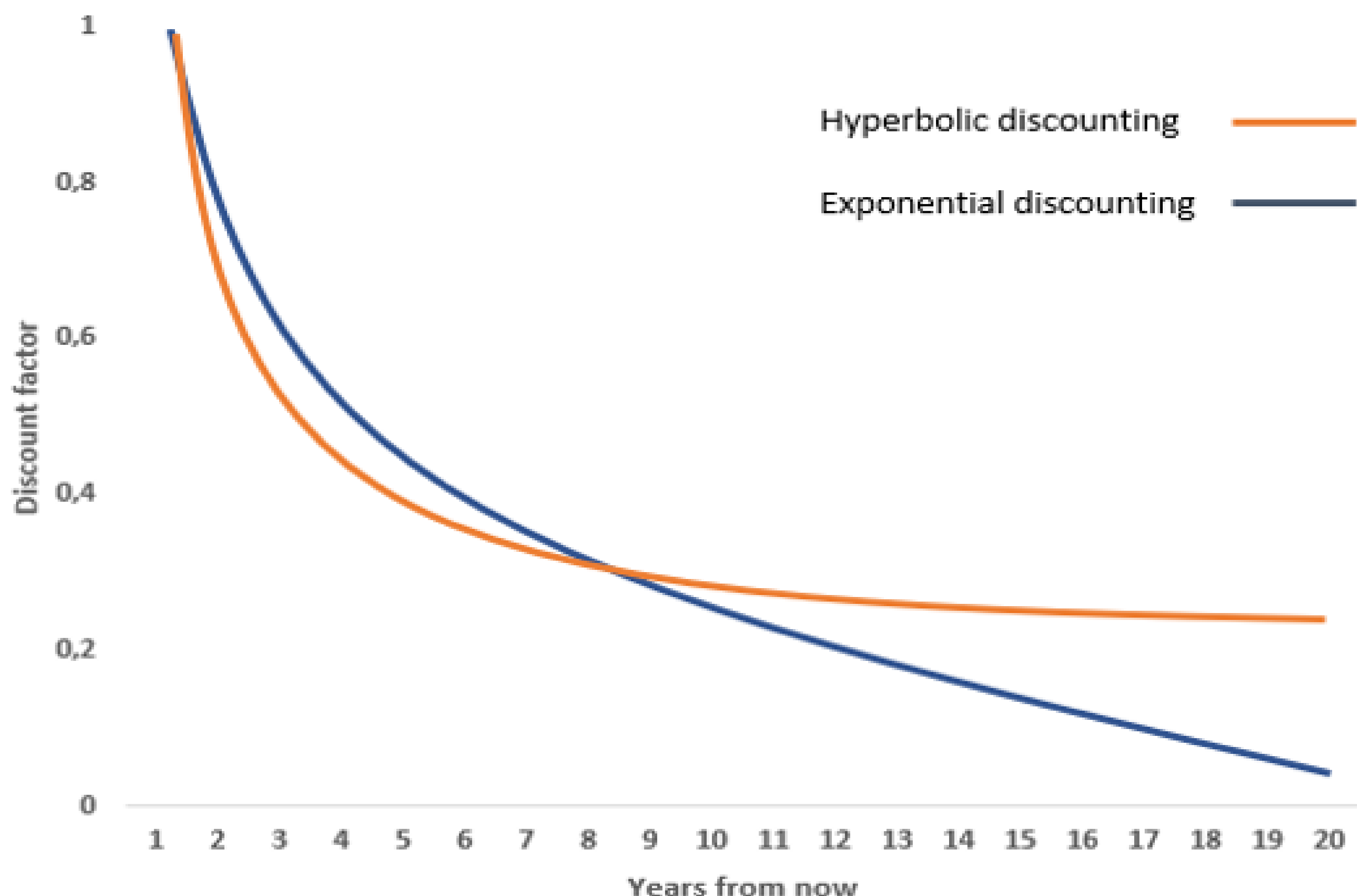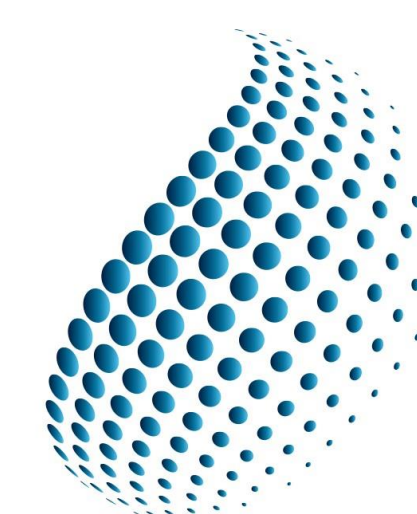
You will notice that by discounting the cash flows with a hyperbolic function, the present value of the firm is higher than with exponential discounting for companies with long term competitive advantages. In the example illustrated above the present value of the cash flow using the hyperbolic function is almost 40% higher than using the exponential function!

To sum up

I am not advocating that you should flip all your DCF models and start using hyperbolic discounting. The reason why I find the topic very interesting is that hyperbolic discounting might be one reason why very strong companies with highly predictable cash flows long into the future are priced much higher than other companies in the stock market. I think that market participants, in aggregate, price these stocks by discounting their cash flows with a discounting mechanism that is closer to the hyperbolic discounting method than the exponential discounting method.

By using traditional exponential discounting to value very long term cash flows you might actually undervalue these strong long term compounders that we invest in significantly.