A brief history of time.. and markets

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In the nineteen-sixties, mathematician Benoit Mandelbrot noticed something that experienced traders had known for long: that time at the stock exchange does not always run the same. Using fractal theory, Mandelbrot showed how market time differs from regular, linear time that we are accustomed to using. "Trading time accelerates at times of high volatility and then slows down again at times of stability," he writes in his book The Misbehavior of Markets, and data prove him right.

For example, if you missed only twenty-five of the most profitable days in the previous five decades, your return from US stocks would drop by half (CAGR 3.4% vs 6.7%). A mere twenty-five days in fifty years! It shows that stock exchange profits are not subject to normal distribution, quite contrary, the ultimate result is dominated by boundary events. Time runs unevenly. On certain days there happens more than does throughout another entire year.

The relativity of time

'And so what?', one could object. It only emphasises how unpredictable markets are, which is not really anything new. Of course. But it also uncovers another – a far more important – aspect of stock-exchange investing: that is, that the stock market is not some deliberate construct of several financiers and entrepreneurs, but rather, a reflection of the profound nature of society, or nature itself. In other words, that it is not artificial, but natural and true.

The relativity of time is, obviously, not exclusive to the domain of financial markets. It was postulated as scientific theory by Albert Einstein, but it also emerges in other, less obvious variations – such as in literature or psychology.

According to Einstein, time runs faster in the proximity of huge masses and it also changes in relation to the speed of the observer. His conclusions may seem impractical to us – we rarely find ourselves in the proximity of a black hole or at the speed of light, so we could experience the dilatation of time for ourselves – but their impact is unquestionable. Einstein also noted that time perhaps does not flow from one point to another, as we tend to see it. This attribute is created by our perception, as Stephen Hawking noted in his book Brief History of Time, and this parallel will come in handy later. Now I want to mention three less scientific, but perhaps more illustrative, examples.

Three examples: Jung, Ulysses and Notre Dame

1) In examining the unconscious, that is, the certain subliminal, collective experience of humankind that is only manifested through derived phenomena (note the analogy to the stock market that also links subliminal *value* to derived *price*), psychologist Carl Gustav Jung focused his attention on dreams. He showed that dreams are not at all random, but that they carry important information about the state of the unconscious. The problem is that a collective experience, and hence also dreams, are not subject to our traditional idea of causal connections and timeline. In a dream, for example, something happens and then one of the characters decides to rewind the story back to the beginning and play it over, differently. This is impossible in the "real" world. Modern brain research shows that dreams come at once, within several seconds at most, but still leave a trace of as much as an hour in a person's memory. "Traditional" time does not work in connection with the unconscious.

2) Another example may be in found in James Joyce's novel Ulysses. Although it is a variation on Homer's epos (corresponding to it both in extent and in the names of its chapters), the story crams into a single day. Joyce's literary technique successfully reduced the time-frame while retaining the impressiveness of the original. Furthermore, the effect is multiplied by the seeming discrepancy between the male and female elements. Seventeen of the eighteen chapters are told from the male standpoint, whereas only one, the closing chapter, is told from a woman's point of view. This will, nevertheless, only seem unjust to someone who has not really read the book. The female element is not at all side-lined, quite the contrary. In his last chapter, Joyce altogether avoids punctuation (which steps up cascaded and inter-related nature of thoughts), and tells a story of essentially the same extent in far lesser time. The storyline of Ulysses somehow defies time, too.

3) The last example brings us back to the financial market. Scientists from Notre Dame University noticed that the growth rate for conceptions begins to fall several quarters prior to economic decline. Hence, it is not merely a pro-cyclical response to less favourable conditions, as has been assumed to date, but women, in some kind of a subliminal manner, *anticipate* the upcoming problems and act accordingly – they "slow down" biological clocks. All this indeed indicates that the financial market belongs to a broader "stream of life", in which time does

not run linearly.

Mathematical tools

This has two important consequences for an investor. He must be more cautious in using mathematical tools (DCF models or indicators such as CAGR, WACC, ROIC, etc.), as they are calculated in linear time. Modelling gets very difficult when you do not know whether – speaking in exaggerated terms – the entire next decade will not, by chance, develop within the course of the next year. Analogously, the investor has to accept the importance, even ground-breaking nature of certain events. What if it is necessary to invest into production, to buy a rival or to submit a patent *today* because a certain time-slot is open *just now* and tomorrow will be too late? In a world of non-linear time, waiting "till tomorrow" may cause years of a competitive advantage lost (so many such examples can be seen on the market!) because it is not certain how fast will time run.

These pitfalls can discourage many from even attempting to understand markets, but I think that they also include a recommendation on how to face the uncertainty: by emphasising the present moment and infinity. Well, if time flows unevenly and we cannot predict it, the only reasonable thing is to focus on two limit points – the present and infinity. Working in the present the best one can, and setting one's investment time-frame for infinity.

A lot has been written about the ability to live in the present moment, and I will not add to it. Infinity, that is another story, because we rarely think outside of the bounds of our lives. In a democratic society, few things are related to this cloudy extremity because we value finite intervals with discretion to change (political terms, employment contracts, leases, loan fixings, etc.), as a guarantee of justice. We are trying to reduce the impact of "good origin", and we agitate against elitism and nepotism – the vices of transferring power without corresponding merit. We are scared of the term "forever", be it in an aristocratic or communist context, because it leads to stagnation and inefficiency. And still, an infinite investment timeframe can be useful.

It can be useful because we recognize that wealth is created of the principles of Weber's protestant ethics, that is, from deferred consumption, reinvestments, compounded interest, at best if done unlimitedly. We also know that the parameter that most strongly influences the outcome of any DCF model is a terminal value, i.e. an approximation of infinity, and thus we lose immensely when we give up an effort to understand it (and use GDP growth as a proxy for all companies instead). Attention to infinity does not mean that we will never sell our shares. We only want to think about them that way (like an aristocrat about his family), but we are free to act opportunistically (like pure capitalists).

The infinite investment timeframe is "only" a thought experiment. Its purpose is to ensure the right psychological set-up. If you accept it, you worry less about the inflation rate, quantitative loosening, Shiller's P/E, and other similar phenomena, because in the face of infinity, they are minute. What will interest you the most will be the people managing the company you have chosen. If they are good, they will adapt to every new macroeconomic situation as well as to technological and social changes, and if the environment became so hostile that it would be better to wind the company down, they will timely do it and return capital to stakeholders. They will also ensure smooth operation because they will be able to select reliable successors to ensure that the cycle will – like in nature – continue.

Buffets family

"He is one of the three people who could bring up my kids – and I count myself and my wife in that number," said Warren Buffett about one of his managers. His intuition is going in the right direction. Pondering about time and wealth cannot end elsewhere than at a consideration of the continuity of the human existence. "If we missed out on something larger in life, we have missed life," says Carl Jung. By "something larger", he means eternity. Because only a connection to the infinite "shows us the essence and makes us not focus on trivialities". If we are successful, eternity begins at every single moment of our lives, and we transform into it. In such a moment, presence and infinity are one, simultaneously, and they do not need to flow anywhere. That is why they are the best answer to the paradox of non-linear time, which only arises – as Einstein and Hawking knew well – from inaccuracies of our language and thought.

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