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**ЭФФЕКТ БАБОЧКИ В ЭКОНОМИЧЕСКОЙ ИСТОРИИ:
КОГДА КИТАЙ ЧИХАЕТ, ВЕСЬ МИР ПРОСТУЖАЕТСЯ**

“When the Wall Street sneezes, the World catches a cold” might have been an accurate description of economic reality until 2020. The current crisis is unlike most other economic crises of the past as it did not originate on Wall Street. In fact, the US stock markets are doing better than even before. Most observers today talk about a certain detachment of stock markets from economic reality. Never before in economic history was the oil price so low and the US stock market index so high, and the discrepancy between the two indices so high. The reason for this seeming paradox is that we do not really have an economic or financial crisis now. We have a crisis, but it is not primarily economic in nature. In fact, the economies as a whole might rebound stronger than ever before after the crisis.

First, I owe you an explanation of the term butterfly effect. It is used in several disciplines as a colorful metaphoric name for actually very sophisticated modelling methods, mostly in economics, weather science, meteorology, and in physics, where it is related to the so-called Chaos theory. I would like to start with a meme I saw on the internet recently. The caption of the meme goes something like this: ‘whoever said one man cannot change the world should say it to the Chinese guy who decided to eat a bat...’ This humorous observation very much captures the essence a butterfly effect. It is used to describe a situation in which a seemingly small, random, local event leads to enormous consequences for the entire world.

In Chaos theory scientists talk about what is popularly called the butterfly effect, the idea that a butterfly's wings might create tiny changes in the atmosphere that could

alter the path of a tornado. It is the idea that small disturbances in one area, can lead to huge events elsewhere. As the former Federal Reserve chairman Ben Bernanke put it, paraphrasing Lorenz, “a small cause — the flapping of a butterfly’s wings in Brazil — might conceivably have a disproportionately large effect — a typhoon in the Pacific.” The economic commentator Irwin Stelzer, director of economic policy studies at the Hudson Institute in Washington, says it the butterfly effect is getting ever more important given the intensity of all kinds of international links in the globalized world.

Anyone who doubts that we live an interconnected world hasn't been following the economic news. Greece catches a cold, and all of the 16 nations that make up the entire eurozone sneeze — one small nation it seemed held hostage the entire Eurozone.

First examples of the butterfly effect in economic history the so-called Long Depression of 1880s, but the first big one was really the Great Depression of 1929–1935. The butterfly effect has to do with global economy, it must be global by definitions. Historians speak of the first globalization (British Empire) and second globalization of the 1970s. All in all, the idea is that the economy must be like the climate or the weather — it must be globally connected and global in scope. Otherwise butterfly effect won't work, it will be limited to a local system.

The question arises: what does history tell us about economic crises that unfolded according to the butterfly effect scenario?

Everything is getting faster and faster. What changes with time is not so much the very nature of the scenario, but the speed with which the initial shock waves spread around the world. In 2020, Covid-19 spread within weeks and engulfed literally the entire globe. The 2008 financial crisis took months to do the same, but it spared some economies like in South East Asia. The Asian tigers' crisis of 1997 leads to the Russian default of 1998, a year later. The 1929 market crash leads to Hitler's capture of power in Germany in 1933. So what changes now is definitely speed. Also the direction, although this is certainly not the first time we see a disease spreading from East Asia.

Nonetheless, people often forget about how European diseases affected the New World. In fact, European microbes might have been even more devastating than the Chinese Black death. In conclusion, the direction is really not that important, the butterfly can flap his wings anywhere.

The “butterfly effect” was first coined by the meteorologist Ed Lorenz in a talk he gave in 1972, based on an earlier paper in which he observed that the solutions to a highly simplified weather model were sensitive to the initial conditions. When he slightly changed the inputs to the model and ran the simulation, the final outcome changed completely. This was like running a weather prediction model using slightly different values for today’s weather, and getting wildly divergent forecasts for the weather next week.

Because of Covid-19, all predictions, scenarios and models went to hell, they became completely irrelevant literally overnight. Economic statistics from January 2020 are completely off the chart now. Why shall we listen to economists ever again? Or demographers? Everything turned upside down. How can we make predictions ever again?

“Prediction,” the great physicist Niels Bohr is said to have once observed, “is very difficult. Especially when it concerns the future.” In science and economics, our lack of ability to foresee the future has traditionally been attributed to two theories — the butterfly effect, and the efficient market hypothesis — which have more in common than might appear.

So what do these theories, efficient markets and butterfly effect, have in common, apart from the fact that they both predict unpredictability, and they both made it into the public consciousness in the early 1970s? The first thing is that they are both based on a high degree of extreme sensitivity. The butterfly effect says that complex systems such as the atmosphere or the economy are unpredictable because they can be perturbed by minuscule changes. Efficient markets are unpredictable because they are so sensitive that they instantly correct for any slight change in the economy (including a change in

the weather), or to be more precise: in the view the economic outlook is perceived. The lessons that economists have drawn from this observation is that the more flexible an economy, less regulated one, the better for the well-being of all. The more rigid an economy, the less well able it will be to react to shocks, the more it will likely be to collapse wholly eventually.

Moving on to the current issues. Do we have a new Cold War between America and China? Not really because the level of interconnection between China and the US is huge. So the situation now is more like in 1914, when war lead to the collapse of world economy and finance. During the Cold War, there was almost no connection between US And Soviet economies. Why did the Soviet economy survive the 1930s Great Depression, or rather: was not affected by it? Because it was insulated. Is insulation the answer? Certainly not... As soon as the Soviet economy started to integrate itself with the world in the 1980s, most of it was killed by this process, largely because Soviet products could not compete on world markets.

Now the connection between China and US is not just about trade — it is about sovereign debt. It's more than just two economies trading with each other. It's like a tree and a parasite — symbiotic but also mutually parasitic relation. It's pretty much one organism. Chimerica is an apt term coined by US scholars. Hence, the trade war going on between the two powers has an enormous effect on the world the scale of which cannot be overestimated...

There is a widely popular conspiracy theory, in 2020, China tests the world for *prochnost*'. Each crisis is indeed a test. But I do not think it has been planned. A more useful theory than conspiracy theories is called a creative destruction theory. Its author is the Austrian economist Joseph Schumpeter. Survival of the fittest that is generated by this endurance test caused by an unpredictable external shock is actually good for the consumer, he says, for markets, for all of us, not in the short run of course, in the long run. What does not kill you makes you stronger, a kind of survival of the fittest, is an image often used by Schumpeter. One reason why socialism fails, he accurately

predicted, was that it was intentionally insulated from shocks. This seemingly comfortable insulation this lead to stagnation, lack of innovation, in general — to *zastoy*.

So if globalization is unavoidable, is butterfly effect an unavoidable side product? I would like to argue that in the end butterfly effect is good for the overall system, as a bigger, more interconnected system is better able to equilibrate some shocks that an insulated system. In other words, a small system likely be destroyed by, for instance, a tornado, a big system will be shaken but it will recover, and it will come out more resilient to future shocks of that kind. It is like a big bridge or a skyscraper. If the wind or the earthquake is strong, the entire structure vibrates. If the impact of the pressure was localized only on one element, that element would simply break, and the entire structure would collapse.

Joseph Schumpeter's theory explains why companies such as google or facebook or any digital online business are doing well. It is not due to conspiracy or luck, but because they are able to predict the future better, and hence they profit. I'd like to give an example with airline companies. For a long time already we had a trend of people refusing to fly to academic conferences' just to give a 15 minute talk. Nonetheless, the tradition persisted. Not just academic conferences — think about heads of states, flying just to have so behind the closed doors talk for five minutes. Now it turns out that most of this activity that previously involved flying can be done online. So will air business collapse? Some of it will. Not all of it. Self-correcting mechanism of markets will come into play to achieve a desirable equilibrium. If some industry or some form of human activity becomes outsized — like too much air traffic, markets will come up with a solution. If markets don't, than nature will come up with a solution. So yes, the costs of this transformation are huge for people who get unemployed etc, but in the global scale, the end result might be in sum beneficial.

What is new about the current crisis is the speed in which money flows from one sector to another. In the past, it took decades to close down the coal sector in Britain. Now, in the flexible neoliberal era — it takes a few days to fire workers, but also to hire

new workers, to realize new investments. This flexibility, while disliked by many, might be a good thing... If we had full state-command economy, the economy would be much slower to react. Think how many directives from politburo it would take to turn a Soviet *obshepit* into a take out or a delivery chain. It would take months, the population would starve in the meanwhile. Now for companies like Yandex, it takes days to reorient entire profiles of businesses. So yes, of course it is bad when someone loses a job. But think about it this way. The easier in a system it is to fire someone, the easier it is to hire. This is the beauty of liberal markets that many critics don't see, they just focus on the firing aspect, not on job creation. And the current global economy is able to create jobs at an amazing speed.

What is different in the current crisis from the patterns we know from history:

- Covid is not exactly a butterfly that once fluttered his wings and then disappeared. The butterfly stayed and spread its wings everywhere. The problem here for any social science, sociology, economics, is that events such as pandemics are fundamentally unpredictable. Or rather — their timing is unpredictable. So, the unpredictability is a constant feature. Other butterfly effects — like a flood or a fire, is an event that goes away rather quickly. Covid might stay with us for quite some time.

- Question of historical analogies or parallels. Many look at the Spanish influenza to look for some hints or answers. The problem is that we never know what will repeat itself in history, what will stay the same, what will change. Coronavirus as a disease is not really new, even if Covid-19 has some distinctive features. What is new is the simultaneous, the severity of reactions of governments, and the technical ability to move so many aspects of life to an online dimension.

- There have been voices that the anti-epidemics measures, the economic lockdown, hurt more than the disease itself. I'd like to say a few things here. No one can compare human life lost to whatever material deprivation. The problem is that when economic crisis is big enough, then more persons are likely to eventually lose life because of reasons other (suicide, hunger, other diseases) than due to the virus itself. I

heard anecdotal evidence that the number of deaths from suicide has been higher in Poland in April 2020 than due to the virus itself. So, we have to be careful when we say that certain measures like closing borders and grounding planes saves lives, because the effects of a collapse of entire industries might also be serious and include human lives lost, and if not lives, then certainly jobs or psychological trauma. And another thing to consider is that the effects of an economic crisis are like with effects of certain long-term diseases like AIDS or radioactive exposure — they become visible only after years or even decades of observation.

In conclusion, the whole difficulty with this butterfly effect, not just in economics but in general, is that the duration of the initial event is much shorter than its consequences. It is likely that we will learn to deal with Covid, or at least to live with it, like with seasonal flu, perhaps soon, but the long term consequences of the current experience, social, psychological, etc, will be truly historic — they will last for decades, if not centuries, like the Black Death that many historians link to the a whole new sensitivity that lead to the Renaissance. So, let me finish with this optimistic accent: people will get so tired of the digital worlds, overdose, like kids in Poland who are taught to stop smoking by smoking a a whole pack at once. We will miss the real world that we will learn to better balance online and offline realities and to better mix virtual and physical realities.