

The Secret of the Exponential Function in View of Mankind

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ABSTRACT

We have become accustomed to the fact that the economy in the individual countries and in the world needs continuous growth rates in order to ensure our prosperity. This is understandable, but mathematically wrong. Because regular quantitative growth means that exponential growth is created, which must lead to catastrophe. The exponential function implies that the average quantity must remain in a dynamic and sustainable equilibrium if disaster is not to occur. Not affected by this are changes in quality, as they occur in nature. If humanity does not change its purely quantitative objectives of production and gross social products, it can be predicted that it will not be able to persist.

Keywords: World economics, interest system, exponential growth, disaster ahead, capitalism

INTRODUCTION

We humans are used to thinking in linear terms, where past, present and future are linked linearly. Logarithmic or exponential behavior and corresponding developments obviously contradict our imagination. However, they are more often present in nature than linearity. For example, if our sense organs were linear, we would not be able to hear soft sounds, very loud sounds would overstrain our ears, we would not be able to see in the dark, and lightning would blind our eyes. This is what we call the Weber-Fechner law. The Weber-Fechner law (1,2) is the formulation of a psychophysical relationship in sensory physiology and states that a linear increase in the (psychically) subjectively perceived strength of sensory impressions is equal to the logarithm of the increase in the (physically) objectively measurable intensity of the stimulus.

Hereby, Weber's relation - that the difference amount sufficient for a just perceptible difference of the intensity of stimuli is in a constant relation to the stimulus strength - is extended to Fechner's relation by the theoretical assumption that, due to the same relative difference thresholds, a scale of sensation strength is to be defined with respect to the absolute threshold. This is applicable for different sensory modalities in the range of medium stimulus intensities. However, there is a sensation threshold and a saturation threshold (4). For medium and high sound pressures, the perceived loudness does not follow the Weber-Fechner law, but Stevens' power law (3) with $k \approx 0.6$: an increase of the sound pressure by a factor of root of 10 (10 dB) causes a doubling of the subjective loudness. We have become accustomed to these relationships without being aware of them. Unfortunately, this unconsciousness leads to the fact that even in economics we have no idea that the exponential function contains a secret, namely that it leads to infinity, and this infinity is a disaster (figure 1).

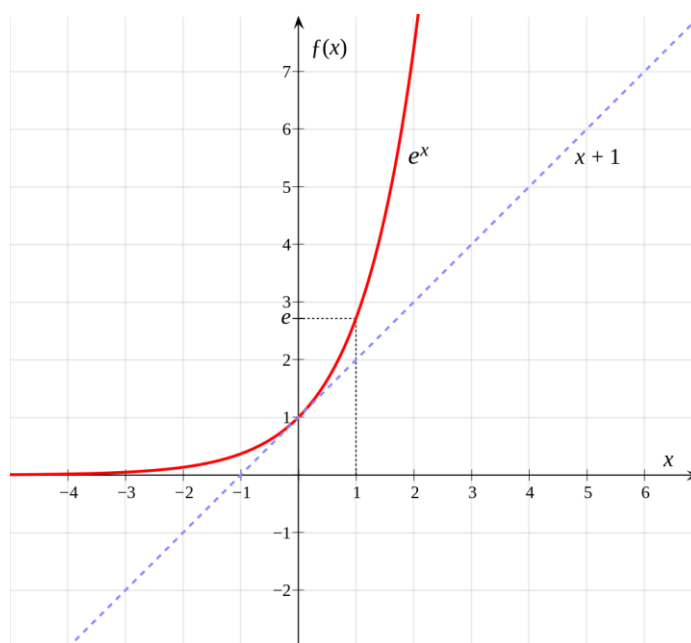


Fig. 1 : graph of the exponential function $y=e^x$ (red) with the tangent (light blue dashed line) through the point 0/1 (linear abscissa and ordinate) (4).

THE INTEREST SYSTEM

Let's take the compound interest system as an example. In Islam, taking interest is forbidden, possibly a wise decision. The political insight of Aristotle, that the taking of interest destroys a community in the long run, is explicitly confirmed in the Qur'an (5).

In Islam, interest is considered harmful to society from an economic, social and ethical perspective. For this reason, Allah, the Exalted, forbids the taking and giving of interest. As background information, it is useful to know that the holistic approach to life that Islam imposes on every believer also determines the methods of business and financial activities. The essential principles of Shariah, the part of Islamic law that establishes practices and activities, dictate that investors must not engage in transactions that are speculative in nature, involve interest payments, or contain contractual uncertainties. In addition, all transactions must be secured by assets.

Islamic Finance consistently takes into account the completely different way of thinking in Islamic finance. Western capitalism, for example, is based primarily on the profit motive of individuals who can steadily increase their capital through interest income. Islamic finance is different: It also recognizes private property, the market and competition, but focuses on the additional benefits that a certain product creates for the common economy. This understanding of economics goes back to the Prophet Muhammad, who expressly forbade Arab merchants to pay or accept interest. This prohibition of interest is recorded in the Qur'an. In the Torah, an interest rate of 3% is considered acceptable. If you are a customer of a credit card company today, you will be amazed at interest rates of e.g. 12 to 23% (6). This used to be called usury. But we are used to it.

What makes this system exponential? It is the interest on the interest rate. An exponential process is a process in which a quantity increases exponentially. The increase is proportional to the currently existing value. Such a system must lead to a catastrophe. This is shown in the financial system by the fact that crash situations occur at regular intervals. And it is not rare that weak currencies are terminated because of inflation and replaced by new currencies.

THE WORLD ECONOMY

In the area of currencies, individual countries are affected, which can help and possibly save themselves by introducing a stronger currency. But what is to be said in the field of macroeconomics? Here, the dogma of the necessity of an uninterrupted increase of the gross social product prevails. Remaining the same is called stagnation. An inflation rate of 2% is targeted and considered normal, as is an increase in production of at least 2%. In China, an annual growth rate of 6% was considered the minimum. According to the law of the exponential function, this must lead to a catastrophe.

One could now ask whether one could not orient oneself to nature. Nature knows an exponential development only in the initial stage, after some time a dynamic equilibrium develops regularly. Thereby decreases and increases are approximately equal. This equilibrium is only minimally unstable, it is very adaptable and stable in the long term. Even after natural catastrophes such as earthquakes or volcanic eruptions, a new equilibrium emerges after a few years. This is natural and this is good. It is compatible with a qualitative growth. Why is man not willing - or able ? - to take this as an example ? Why does man think that a quantitative growth is necessary ?

OUR SITUATION

A lack of quantitative growth is curiously called zero growth and considered a danger. On the other hand, if industrial production continues to increase (also as a result of the use of robots, computers and artificial intelligence), but the sales and consumption of the world population have reached a limit, this alone will lead to a world economic crisis. The solution so far has been a war or several wars, which led to a destruction of the prosperity of the people and created a new demand. This is apparently a law of capitalism, especially of turbo-capitalism.

As a positive example, consider a tree: it grows continuously until it reaches a size predetermined by its genes. Then the quantitative growth ends and it changes to a qualitative growth, i.e. an improvement of the foliage and the roots in order to be more resistant to negative influences. The same is true for the virgin forest: growth and degeneration or loss are in dynamic equilibrium. Such a system is stable overall. The present economic system of mankind is not.

CONCLUSION

In contrast to the current reality, the taking of interest was declared problematic and rejected in ancient cultures. Also the permanent quantitative growth in the economy was considered unnatural. This is logically quite correct. A permanent growth of the production and of the gross social product leads, through the law of the exponential function, to a collapse and a disaster (concretely: to wars). Acceptable and in accordance with nature is only a qualitative growth, i.e. a replacement of inadequate methods and means by better, more sustainable and more

advanced products. The quantity and the value of the products remain thereby on an identical level. This should be strived for in order to spare mankind a catastrophe.

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