Economical Sustainability and Crises: The application of economic logistic analysis in the research of financial crises

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The aim

...is to show that the economic logistic analysis, which is based on the theory of logistic management of capital, is a theoretical background for the stable economic growth. Therefore, on the basis of the possibilities of this theory, it is possible to reveal the characteristics of financial crises and to manage crises as well.

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Introduction (1)

- Economic sustainability is one of the essential and basic attribute (feature) of a successful public development.
- The economy of market is characterized by a fluctuation which regularly brings upturns and downturns to its members' activity.

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Introduction (2)

- Increasingly recurring economic and financial crises in the world show that there are no answers to many important questions, that newer market researches are required to develop new theories explaining crises.
- The breakthrough was made at Vilnius University a few years ago when the theory of logistic management of capital was made and developed. The theory explains the fundamentals causes of the rise of financial and economic crises.

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Theories of financial crises (1)

Financial crises

- Financial crisis is a situation in which the supply of money is outpaced by the demand for money, therefore the liquidity preference is money withdrawal from banks, bringing worse credit terms and forcing banks either to sell other investments to make up for the shortfall or to collapse.

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Theories of financial crises (2)

Financial crises

- References about financial crises amount to the beginning of our era and even earlier.
- Such as: Alexander Macedonian (the 4th century BC) had concurred the East and brought tons of gold to coinage it and pay for the war debts.
- Such a money emission has caused a financial crisis – the prices have doubled.

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Theories of financial crises (3)

Financial crises

- The oldest financial crisis of the New era is officially regarded as the Dutch Tulip mania (1637).
- There is enough information about Shanghai crisis (1910), the Great Depression (1929-1933), the Japanese real estate bubble (1980), the Internet bubble „Dot - com“ (2000) and others.

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Theories of financial crises (4)

K. Marx

- The creator of „The theory of crisis", K. Marx claims that the main idea of this theory is that the biggest contradiction of capitalism is a contradiction between the appropriation of a state mode of production and general private work.

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Theories of financial crises (5)

K. Marx

- It means that a free market concentrates all productive resources in a private market and then a profiteering involves the private market into the races of staple product making and when out of it comes the affluence – the supply exceeds the demand.
- He made the right resulting deduction. He deduced that the free market will crash if it is influenced by a globalization due to constantly recurring and uncontrolled overproduction.

Theories of financial crises (6)

J. Keynes and H. Minsky

- According to the theory of the variability of investments, represented by J. Keynes and H. Minsky, it can be claimed that the cause of the financial crisis is the variability of investments.
- J. Keynes considers that the main factors, influencing the variations, are investors' decisions and their level of changes, while H. Minsky orientates to the periodic financial instability caused by the investment decisions.

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Market capacity and its saturations (1)

Market saturation

- Currently, most of the negative economic phenomena are associated with the irrational behavior of market participants.
- Achievements of the economic logistic analysis showed that the periodic development of economy must trim simple fundamental explanation, it is the market saturation and associated with it overproduction.

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Market capacity and its saturations (2)

Market saturation

- Saturation refers to the completeness, filling up to the limit, filled to repletion, satiety.
- Markets can be closed and open or semi-closed. Semi-closed, especially closed markets can be saturated by expanding investment.
- All markets have their capacity (the capacity of infinite market is also infinite).

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Logistic growth (1)

P.F. Verhülst

- In the 19th century, P.F.Verhülst suggested the differentiated equation of population growth:

$$\frac{dK}{dt} = \left(1 - \frac{K}{K_p}\right) \cdot m \cdot K$$

- K –is an amount of population at a moment of time t,
- Kp –is a maximum value of the population
- m – is a factor that evaluates the growth rate.

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Logistic growth (2)

Logistic growth

- Applying *m* coefficient to the modeling of economic tasks (taking *m=ln(1+i)*), and also assuming that *t=n*, we obtain formula of the model of logistic interest (compound percent of limited growth):

$$K = \frac{K_p \cdot K_0 (1+i)^n}{(K_p - K_0) + K_0 (1+i)^n}$$

- The received model represents a limited (logistic) growth and therefore it is the most appropriate for modeling the long-term processes.

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Investment bubble simulation (1)

Net present value

- In the research of net present value by the classical method, formula of compound interest discount is applied. If the invested market is at least partially saturated, it is appropriate to use formula of logistic discounting.

$$K_0 = \frac{K_p \cdot K}{K + \left(K_p - K\right) \cdot \left(1 + i\right)^n}$$

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Investment bubble simulation (2)

Internal Rate of Return

- When internal rate of profit is calculated, the net present value of cash flow is equated to zero. According to the definition, the internal rate of profit (return) project is such a value of discount coefficient by which the present values of the forecast cash outlay and the forecast cash inflow become equal.

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Investment bubble simulation (3)

Internal Rate of Return

- Therefore easier case when cash flow consists of only two members is taken: the invested sum and the only member of income. Furthermore, investment is assumed as equal to one monetary unit (m.u.)
- $K_0=1$, and $n=1$ we obtain a rate expression of internal income for one period.

$$i = \frac{K - 1}{1 - \frac{K}{K_p}}$$

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Investment bubble simulation (4)

Internal Rate of Return

- A table is made, where *K=1,1* (an annual rate of interest 10%) and *Kp>1,1*.
- The degree of filling market is expressed by the ratio *K/Kp*. In order to get even variation of degree of market fill, appropriate and potential meanings of capital *Kp* should be chosen.

Kp	10^8	11	5,5	3,67	2,75	2,20	1,83	1,57	1,38	1,22	1,10
K/K_p	0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	0,99
i	0,1	0,111	0,125	0,143	0,167	0,2	0,25	0,333	0,50	1	10

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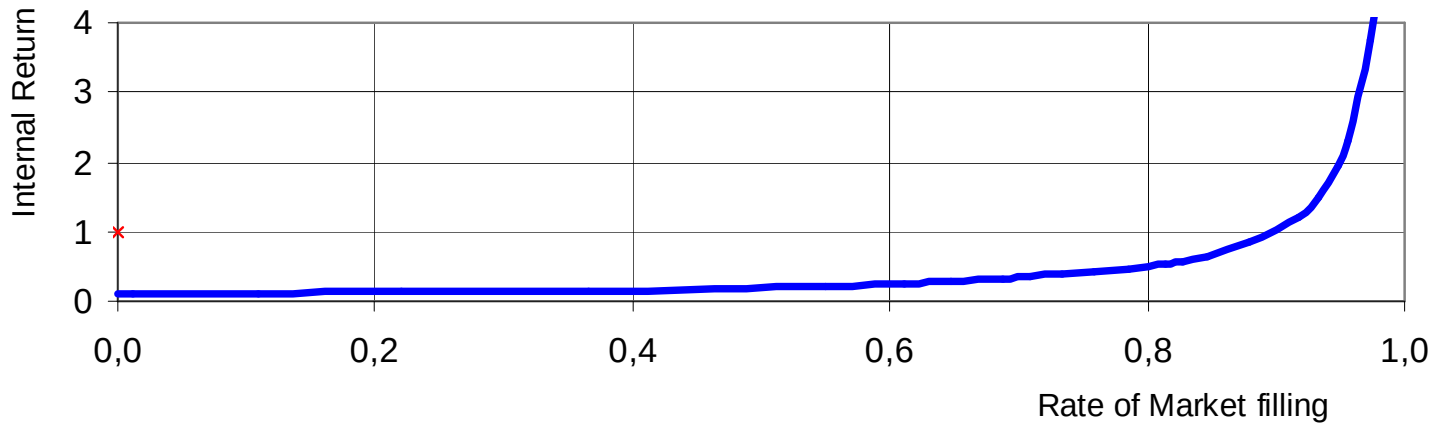
Investment bubble simulation (5)

The degree of filling market



Pic. 1 The dependence of investments „buy-sell (after a year)“ of a rate of internal change on a rate of market filling when Ko=1 and K=1,1; Kp>1,1

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Investment bubble simulation (6)

Economics paradoxes

- The growth, raised by the growing market saturation, increases profitability notably, blows the bubble of prices and at the same time evokes concealed overproduction in the market.
- The main cause of the crises is the economic paradoxes. One of them is a paradox of increasing profitability. It can be defined so: if the capital is invested in the closed market, then the saturation of that market increases by the capital (overproduction) and the profitability of that investment (capital) increases.

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Conclusion (1)

- A conclusion of this research would be that the satiety of the market destroys the sustainability of economic development: satiated market becomes very profitable; although at the same time it becomes unstable: a small decrease in saturation can cause a significant drop in profitability and thus initiate a panic in the market.

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Conclusion (2)

- After evaluation of all this, it can be argued that the economic logistic analysis is the foundation of the sustainable economic growth and therefore, according to the opportunities of this theory, it is possible to reveal some characteristics of financial crises and to manage the crises. Economic logistic analysis gives an opportunity to reach the sustainable economic growth, rather than “exploding”.

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