

University of Sopron
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The „Entropy” of Portfolio Management

Theses of doctoral (PhD) dissertation

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1. Description of the topic

The author began his doctoral research in the fields of sustainable finance, responsible asset management, and self-sustaining portfolio. As the first step of the research, he created an investment strategy from the intersection of general systems theory and chaos theory, which is intended to illustrate the spontaneity and self-development inherent in systems. The Rolling Nuts Portfolio was created after determining the ratios of the financial portfolio, the investment elements and the way of trading. The interdisciplinary modeling that forms the basis of the portfolio allows us to come to novel findings in the field of finance by combining the achievements of different disciplines. The dissertation presents the initial steps of portfolio development and the results achieved so far in recent years. Thus, a taste can be obtained - through a primary example - of the benefits of passive investment strategies and the role of financial markets in self-sufficiency. Last but not least, we can see what funds and additional research goals a financial portfolio based on the distribution of nature can provide in the field of today's financial challenges.

2. Antecedents, research methods

Since its emergence and spread in the 1970s, chaos theory has overturned the dogma of the reductionist approach in more and more disciplines. The place of study of the parts torn from the whole is taken by the way of thinking in the whole, in the whole. In parallel with this paradigm shift, the methodology of systems theory and system thinking developed. Today, these two perspectives hold arm in arm, holding a multitude of joint conferences with an increasingly populous research camp in the affected areas.

Understanding complex systems requires transitional thinking between disciplines. The doctoral dissertation aims to serve as such an interdisciplinary blend and as a whole of the results of the research career started 10 years ago, in which the author places his own field of science, economics, as a third field in the research. The dissertation seeks self-care mechanisms for the individual, if society so desires, that today's capitalist economic system can offer as an affordable solution. The man of the future must reckon with the unsustainability of pension systems, and if he is to ensure the well-being of old age that seems commonplace today, he must also learn new mechanisms for survival as individuals. For survival, because on the one hand, prosperity prolongs life, and on the other hand, it is

also possible that someone's life after work depends solely on public care systems. These supply systems can also be inspired by the topics discussed in the dissertation, as the ultimate goal of the research is to bring order to the complex system of investment decision-making, which can help the well-being of all stakeholders as a decision-supporting method.

The research is interdisciplinary in nature, which means that it takes systems theory as a starting point, uses the achievements of chaos theory to model the model and integrates all this into a usable model in the field of portfolio management. Systems theory is based on the notion that the sum of several parts of the whole (has a self-sustaining power), which is why the structure and behavior of real phenomena can only be mapped from a systemic point of view. The science of systems research attempts to discover isomorphic structures in the subject of various natural and social sciences, which it then reduces to usable patterns with the principle of correct simplification.

The modeling was based on the Mandelbrot set, which, as the most complex mathematical pattern, paradoxically proves its infinite existence by setting a limit on it. Since this particular mathematical form is an infinite and rather “irregular” shape, its accurate measurement is not really possible using classical geometry either. A

heuristic procedure had to be used to eliminate this. Mintzberg's diagram of organizational development defines the living space of organizations in a pentagon, a pentagon that the author also managed to show around the Mandelbrot set. However, correcting the Mintzberg figure, the managed but missing dominance has already been measurably represented here.

The Rolling Nuts model thus synthesized has already proved to be sufficiently accurate to be included in the asset management field of economics as a model for portfolio building and management. The model determines the 1: 1: 1: 4 ratio of investment elements, which allows 4 different focuses. In addition to diversification, a model has been developed based on the model, which makes investment portfolios manageable already in its life cycle, thus taking advantage of the self-sufficiency provided by the capital market. The model and portfolio management methodology have been tested over several phases and cycles to lead to relevant results regarding the findings. Differences and possibilities in both statics and dynamics were explored, on a theoretical, empirical and benchmark basis. Alternatives have also been developed, the relevance of which has been demonstrated by primary results, so that the decision-facilitation model and methodology offer more and more opportunities for diversity.

3. New and novel findings of the research

- ✓ The research reinterpreted the Mandelbrot set and simplified it to a usable sample.
- ✓ The author has set up his own portfolio model.
- ✓ The author has developed his own portfolio management method.
- ✓ The dissertation depicted and made measurable the dominance of Mintzberg.
- ✓ It provided an alternative novelty for the guaranteed element investment category, based on primary research.
- ✓ It has been demonstrated the passive profitability of the capital market, highlighting its important role in self-sufficiency.
- ✓ It has been introduced the concept of natural order (entropy) to the field of economics in a novel way.
- ✓ It has been developed a new, dynamic lifecycle management that can increase the return on static portfolios.
- ✓ The author has discovered order in the complex decision-making system of portfolio management.
- ✓ Proved the hypothesis of a self-sustaining financial portfolio.
- ✓ The average annual return of the portfolio model synthesized by the author is: 9.8% – taking into account all aspects of the research.
- ✓ The universal model can serve other sciences.

Theses of the Dissertation:

T1: Diversification between asset classes justifies the passive profitability of the capital market.

The author proved that even by offering a small number of decision alternatives, passive sources can be drawn directly from the capital market. This finding may play an important role in self-care at the private and institutional levels as an alternative source of funding. It has been proven that diversification between investment asset classes can also take advantage of this opportunity, the extent of which can be increased by portfolio management.

T2: Alternative investments yield higher returns than bond-type investments.

In today's globally low economic interest rate environment, there are more profitable alternatives to bonds, which was supported by the author in his dissertation. As a further alternative, the inclusion of the gold and commodity investment categories has been shown to increase yields, thereby partially replacing bond types.

T3: The exchange rate-independent self-stimulating effect of profit realization has been proven.

The author has shown that one exchange rate-independent trading per year has a higher return, even at transaction costs, than passively managed, passively managed portfolios. This proves that the repetition of the investment portfolio allocation pattern underlying the research within size ranges has a self-stimulating effect on the overall performance of the portfolios - even increasing the return on investment regardless of the exchange rate.

T4: Increasing the number of investment items only increases portfolio returns to a certain extent.

In the dissertation it was proved that excessive diversification, although it excludes risk, at the same time reduces returns. The optimal number of investment items corresponding to the applied research sample came out to 4. It has been shown that the 4-element diversification of the Rolling Nuts model is capable of double-digit annual average yields.

T5: Thesis of self-sustaining portfolio.

The author has demonstrated several alternatives to a self-sustaining financial portfolio with a wide range of results. It has been proven that self-organization is a self-stimulating, buoyant phenomenon in the complex investment decision-making system of portfolio management.

T6: The Mandelbrot set can be simplified into a portfolio diversification strategy that even proves Mintzberg dominance.

The principle of correct simplification has been demonstrably proven even in an infinite pattern. The revealed Rolling Nuts symmetry can be called focusing diversification, proving that heuristic synthesis yields more effective portfolio returns than benchmarks. At the same time, the model makes it possible to measure the dominant force that characterizes all the organizations discussed by Mintzberg.

4. Conclusions and recommendations

In today's world, those who do not take the opportunity to access a passive source of income directly from the capital markets are / will be at a competitive disadvantage compared to those who exploit it, if not today, but in the longer term. Simplified solutions can be applied more widely, therefore I consider it a relevant proposal to apply the model and method presented in the dissertation in the relevant field of portfolio management. The aim of systems theory of economic activities is to illuminate and understand the environmental conditions of decision making. Such a framework is provided by the Rolling Nuts method presented in the research, while providing heuristics for decision-making procedures and saving essential decision-making with alternatives, while leaving room for further rational (and irrational) decisions on strategic management issues. Chaos is a mysterious form of order. Science has always valued order, but we are beginning to notice that chaos can lend science other benefits. Chaos makes it easier to respond quickly to external stimuli. Organizations “learn” over time through the processes of planning, implementation, and feedback, which is recommended in all three strategic management phases to apply the now synthesized Rolling Nuts methodology.

The following conclusions and suggestions can be formulated through the research explored in the dissertation:

- ☆ It is advisable to exploit the self-sustaining power inherent in the system properties of portfolios at the level of individual and institutional self-care as well.
- ☆ In the economic environment of today, it is even more recommended to use the passive profitability power of the capital market.
- ☆ It is recommended to monitor market and environmental changes with portfolio reorganizations to achieve better returns.
- ☆ Further exploration of alternative investments is needed to achieve the returns usual in previous decades.
- ☆ It is advisable to incorporate natural order into more and more disciplines.
- ☆ It is suggested that the model explored by the author be subjected to further, in-depth research to explore full understanding.
- ☆ The 1: 1: 1: 4 distribution revealed in the dissertation allows us to conclude that this is an applicable pattern in the field of portfolio equipment.
- ☆ In order to facilitate the current decision-making process, it is advisable to associate the revealed method with the model.

5. Future presentation of the research, further proposed research directions

The self-sustaining power in portfolio management has just been demonstrated in the doctoral dissertation. The extent of this force and the wider possibilities of its exploitation can form a further direction of research. In the future, the author laid the necessary foundations for this in his dissertation, which also paired a decision strategy that offered a sufficient alternative to research directions. It is advisable to broaden the research spectrum to longer-term portfolio analyzes, a larger number of investment instruments and the development of life-cycle management processes. Regarding the Rolling Nuts sample, the goal can be to find out which interpretation is the most profitable alternative and to which strategy can be fitted.

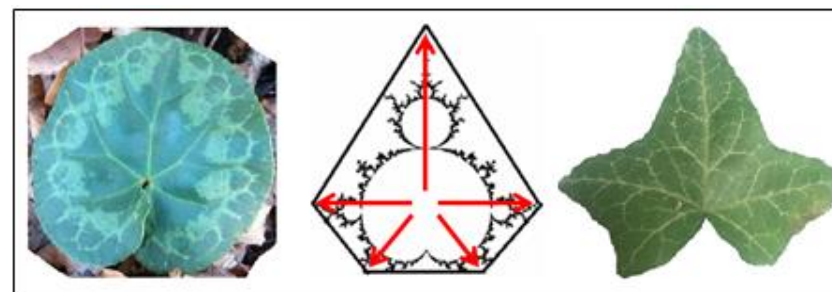


Figure 1: The System of 5 Forces – cyclamen, Rolling Nuts, ivy

Source: own editing (2020)

6. Author's list of publications related to the topic of the dissertation

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