

Quantum Economics

Abstract: *The globalization is breaking-down the idea of national state, which was the base for the development of economic theory which is dominant today. Global economic crisis put emphasis on limited possibilities of national governments in solving economic and general problems of society. Does it also mean that globalization and global economic crisis point out the need to think about new economic theory and new understanding of economics?*

In this paper I will argue that globalization reveals the need to change dominant economic paradigm – from traditional economic theory (mainstream) with macroeconomic stability as the goal of economic policy, to the „quantum economics“, which is based on „economic quantum“ and immanent to the increase of wealth (material and non-material) of every individual in society and promoting set of values immanent to the wealth increase as the goal of economic policy. Practically the question is how we can use global market for our development!

Key words: *Economic quantum, An Individual, Innovation, Globalization, Development.*

Resümee: *Die Globalisierung zerstört die Idee des Nationalstaates, die war die Grundlage für die Entwicklung der heute dominanten ökonomischen Theorie . Die globale Wirtschaftskrise hat angegeben, die begrenzten möglichkeiten welche nationalen Regierungen haben in der Bewältigung wirtschaftlicher und allgemein Probleme der gesellschaft. Ob das gleichzeitig bedeutet, dass die Globalisierung und die Globale Wirtschaftskrise andeutet auf die Notwendigkeit für eine neue Denk waise über die neue Wirtschafts Theorie und neues Verständnis von der Ökonomie?*

In diesem Aufsatz versuche ich zu zeigen, dass die Globalisierung enthüllt die Notwendigkeit, des dominanten wechsels der ökonomischen Paradigmen - von der traditionellen wirtschafts Theorie (Mainstream), wo die makroökonomische Stabilität das Ziel ist der Wirtschaftspolitik, an die Quanten - Ökonomie, basierend auf wirtschaftlichen Quanten, und das Ziel der Wirtschaftspolitik entspricht der Zunahme des Reichtums der einzelnen in der Gesellschaft und die Entwicklung des Systems das Wertes auf ihr basiert. Praktische Frage ist, wie zu nutzen ist das globale Markt für ihre eigene Entwicklung.

Stich wörter: *Quantum Ökonomie, Individual, Innovation, Globalisierung, Entwicklung.*

Резюме:

Глобализация разрушает идею государства-нации, которая была основой для разработки сегодня доминирующей экономической теории. Глобальный экономический кризис показал, что национальные правительства имеют ограниченные возможности в решении экономических проблем и проблем всего общества. Заодно, означает ли это, что глобализация и мировой экономический кризис указывают на необходимость мышления о новой экономической теории и новом понимании экономики? В этой работе я попытаюсь показать, что глобализация вызывает необходимость изменить доминирующую экономическую парадигму от традиционной экономической теории (mainstream), в которой макроэкономическая стабильность является целью экономической политики, до квантовой экономики, целью которой является повышение богатства каждого человека в обществе и развитие системы ценностей соответственно. Практический вопрос, как использовать преимущества глобальных рынков для собственного развития?

Ключевые слова: *квантовая экономика, человек, инновации, глобализация, развитие.*

1) General remarks

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1.1) The Problem

Did the global economic crisis stress out the need to think about new economic theory, new understanding of economics? Did the global economic crisis point out the fact that national governments have limited possibilities to solve many problems in their economy and their society? Why is the number of member countries in „The Board of Directors of the World Economy“ increasing – first it was G-7, then G-8, and now G-20, along with growing aspirations to the „global government“? Does the development of technology, especially new communication technology, make world’s economy „global feudal economy“? If these are some of the vital questions; if this is the reality in which we live, should we, as economists, be enslaved by the books, the ideas or the mysteries from the past or should we find the way out of such ideology through the new ideas?

1.2) The Starting Point

Indisputably, economic theory is becoming more standardized every day (main-stream). Such standardization basically leans onto the idea of nation-state. Contemporary economic theory has developed on the idea of national state during 17th, 18th, 19th and 20th century. Today, the globalization is breaking down the classical national state, i.e. national borders vanish and thus the classical form of national state disappears. But, this leads us to the question whether contemporary economic theory, which is based on the nation-state concept, can survive?

Similarly, economic theories are often protecting the interests of ruling elites or the interests of one nation. Can we think of Adam Smith’s book “An Inquiry into the Nature and Causes of the Wealth of Nations” as of an attempt to protect economic interests of England in North America through free trade? If we blindly transfer some theoretical concepts valid in well-developed West and implement them in small countries and undeveloped regions, because we believe in their neutrality (speaking of scientific, not political terms), will it bring those small countries to the economic slowdown in most cases? Does it mean that the same measures can be applied in all countries: the big ones, usually “emitters” of these theories; and the small ones, usually absorbers?¹

There is also the question for economists (but not only for that profession): did we use the transition to shape one special and specific theory of economic development? Did we use that unique laboratory to check for validity of some standard economic indicators? Did we notice the germs of life?

Does the economic crisis force us to think on our own and to implement solutions which are somewhat contradictory to the experience?

1.3) The Idea of The Paper

¹ Here, I have no attention to write on the „double standards“: a country implements one theory or one concept, and recommend the other theory and different concept to other countries. From this perspective we can say that there are two main groups of economic theories and economists tend to recommend the one. Which one they will recommend depends on the fact who is taking their advice: their children or children in Africa. In most cases they recommend „simple“ theories to the other, while they implement „useful“ theories. (See more: Reinert, Erik „Globalna ekonomija (translation of *Global Economics*)“, Cigoja, 2004, p.p. 14.)

The main idea of this paper is to encourage non-linear thinking and non-inertial discussions; daring and courageous in comparison to usual standards. How can we move from the logic of “rearranging chairs on the Titanic’s deck” to the logic of “jumping into the small rescue boat and going to the coast”? This might look pretentious, but I believe that sometimes it is very useful just to point out the differences among approaches to some problems in order to find new, more efficient solutions for them. A solution can be efficient only if it is vital and comes from the practice and life!

In the paper, I want to emphasize the need to think about the change of paradigm – from the one which treats macroeconomic stability as the goal of economic policy, to the one which considers that main goal of economic policy is to increase individual wealth (understood as material and non-material wealth) and to develop the system of values immanent to the wealth-increase. This new proposed individual-wealth-increase paradigm is related to the development based on economic quantum, and as such, it is the first step to establish quantum economics. In the more general terms, the question is whether we can explain today’s economic reality by existing theory.

2) The Paradigm – The View on the World

It is not possible to explain economy and economic phenomena out of contemporary ideological context. Throughout the history people felt the need to create some ideological framework and used it to organize their life and activities.

Such ideological framework provided explanations on each “how” and “why” from everyday’s life. Rifkin said that “the most interesting aspect of the dominant view on the world in a society is that, at individual level, people who follow that view, are mostly not aware of the way it influences their activities and their perception of reality around them.”² The dominant view on the world in the society strongly influences our perception and our understanding of reality, that we cannot even imagine any other view on the world.

This prevailing view on the world; the dominant understanding of the world; and the concept we use to explain every-day’s phenomena is something that we call the paradigm.

Thomas Kuhn wrote one of the most influential and the most popular books of the 20th century: “The Structure of Scientific Revolutions”. He looked for the answer to the question: **“In what ways does the science develop?”**

Does the science develop by adding new scientific facts to the existing ones? That increases the quantity of accumulated facts. It is as if we load a barn or pantry, or increase the number of books in our library, and think that it expanded our knowledge...

However, Kuhn said that the science has developed through the changes of prevailing paradigms. The change occurs when current understanding of the world is changing under influence of the new ideas. The change occurs when we look at the world around us in different way.³

² Rifkin, Jeremy „Entropija – nov pogled na svijet (translation of *Entropy – the new view on the world*)“, MISL, Zagreb, 2002, str.25

³ Kuhn derives the notion of paradigm from the notion of „normal science“. This term is used to describe the research which is firmly based on one or more scientific achievements from the past, which are believed to be

This change happens when certain scientific view, certain paradigm gets into the crisis. It is in the crisis when it's not capable to explain many phenomena from ordinary life. Thomas Kuhn asked about the reaction of scientists to the occurrence of such crisis. „... Although they can start to lose faith, and to consider alternatives, they don't give up the paradigm that brought them to crisis... They don't analyze deviations from the rule as potential examples of an opposite paradigm (... explanations of different paradigm)...“⁴

The crisis causes the scientific revolution – the change of former paradigm. Why?

The crisis leads to the change! Each change of the world is already the new interpretation of the world. “Nothing can be radically changed, without the radical change of the dominant thought (without the radical change in the way of thinking).” (Žarko Paić)

It means that the change of paradigm is not being done through accumulation of knowledge, but through scientific revolution – the change in the hypotheses that make the foundation of a science. Certainly, the revolution is happening through evolutionary development of new way of thinking! This new way of thinking spread the seed of the revolution which could eventually encircle new theory.

3) Physics – The Foundation of the Paradigm

People were always interested to understand nature and natural phenomena ever since. But for very long time, the human society believed in the world revealed by old Greeks: Ptolemy's world with the Earth as the center of the Universe and the Sun rotating around the Earth... In just one century, Galileo, Kepler and Copernicus brought us into “the other world”: The Earth is rotating on its axis and around Sun... These are the reasons to point out the fact that the science of physics – which discovers and explains natural laws – dominantly influence the view of people on the world around them, i.e. the paradigm. Isaac Newton, who genially discovered the laws of mechanics, established the new view – new paradigm, which is known today as **mechanistic paradigm** or mechanistic view on the world. Of course, it would be unfair not to mention Francis Bacon and Rene Descartes, who laid down the foundations of this paradigm.

Mechanistic approach is the view on the world more adapted to machines, then to people. „I don't find any difference between machines, made by some craftsmen, and the different bodies, created by the nature. ...I consider that human body is the machine. ...My thought makes comparison between a sick man and a badly constructed clock, or a healthy man and a well constructed clock.” (Rene Descartes) The thought of Descartes, later developed by Newton, make the foundation of mechanistic paradigm, which is still, after 200 years, the base of our view on the world around us; the base of our way of thinking.

In the meantime, the development of physics, especially the theory of relativity (Einstein) and the quantum theory (Max Planck) clearly shows defects of the mechanistic view on the world

the foundation for the development of relevant science in the future. Such achievements are usually explained in textbooks – elementary and more advanced one. The textbooks are elaborating the main findings of the dominant theory and illustrate it with examples from the practice... Before textbooks were created these dominant scientific concepts could be found in Aristotle's physics, Ptolemy's Almagest, Newton principles and optics, Franklin's electricity...“ (Kuhn, Thomas „Struktura naučnih revolucija (translation of *The Structure of Scientific Revolutions*“, Jasenski i Turk, Zagreb, 1999, pp. 23)

⁴ Kuhn, Thomas „Struktura naučnih revolucija (translation of *The Structure of Scientific Revolutions*“, Jasenski i Turk, Zagreb, 1999, pp.89

in explaining some natural phenomena, so the science need new approach – so called **holistic view on the world**. The world around us is not understood as the set of the isolated pieces, but as the complex world; not as closed system, but as **the open world of dynamic equilibrium**; not as the world based on the causality principle (cause – consequence), but as the world based on (Heisenberg's) **“indeterminacy principle”** (uncertainty) and market spontaneity (Hayek).

In addition to previously said, Heisenberg emphasized that today's world: “is not divided into different sets of elements, but into different sets of relations...”. He created the foundation of holistic approach: objects in focus of analysis are not being differentiated by its nature; they are not essentially different, but their essence is the same. „We can only make differences between the **type of relations** important for certain phenomena. For example, when we speak about the chemical influence, we speak about stable relations completely different from those explained in Newton mechanics... Thus, the world around can be explained as the stable tissue of occurrences in which different types of relations replace one another, overlap and merge until they finally determine the structure of the tissue.“⁵

Can we implement some of the previously elaborated experience in economics?

The science of physics, along with other natural sciences, has discovered that totality of relations and shaped some general principles through the quantum theory.⁶ This theoretical approach, developed under the hat of the science of physics, influence the development of what we call holistic approach and holistic view on the reality.

⁵ Heisenberg, Werner „Fizika i filozofija (translation of *Physics and Philosophy*)“, Kruzak, Zagreb, 1998, pp.84-85

⁶ There is also an opposite opinion that the science of biology, not physics is more relevant for explanation of economic phenomena. Biology is emphasizing the organic approach. It is oriented on qualitative more then on quantitative processes; it is based more on experience and practice, and use inductive approach, while the scientific method in physics is more deductive. Biology promotes implementation of Darwin theory in explaining changes in the society – such as innovations and creative work.

4) Smith and Newton – the Importance of Natural and Spontaneous Forces

Adam Smith's book "An Inquiry into the Nature and Causes of the Wealth of Nations", published in 1776, widely accepted as "The Bible of Economics", is the product of the spirit of the time it was created, as any other creation made by a man. According to the Heisenberg the spirit of time is „also an objective fact, as anything else what is considered to be the fact in natural sciences. That fact brings out certain characteristics of the world non-dependent on the time, which, as such, can be considered as eternal“.⁷ Professor Steve Pejovich has similar opinion, shaped through his interactive thesis.⁸

Adam Smith's book reflects the spirit of the time it was created, which originated from Newton principles.⁹ As Newton, Smith speaks about the world which is perpetually moving. While the unity of physical world is achieved through gravity forces, in the world of economics the force of competition, which is also invisible, plays the role of the gravitation. This analogy explains Smith's phrase "invisible hand". Similar to the equilibrium in closed system of mathematical relations which describe the Newton world, in the economic system, the equilibrium of prices is achieved through demand and supply forces.

In practice, the world of classical economics experienced many restraints and irregularities.

During 19th century these irregularities were considered to be the deviation from the existing paradigm, and their analysts were trying to improve existing paradigm in order to explain some phenomena from experience. This leads to the development of neoclassical economics, well represented through Alfred Marshal's "Principles of Economics" (1890), the book which provided new and convincing interpretation of Adam Smith's Bible.

At the same time, mechanistic paradigm served as the base to develop many other social institutions. The development of national state is of extreme importance for the development of economics as science: economics and national state grew together and we will feel the influence of this union on economics as science – economics as theory and practice in long-term including the decades ahead us.

5) Marx and Keynes – The Rise of Constructivism

The culmination of mechanistic paradigm in economics and, more generally speaking, in the area of organizing social life, was reached in the works of Carl Marx and John Maynard Keynes, whose brilliant mind redirected the history of mankind from the path it took in 18th and 19th century. Their work was related to national state, as the framework for the organization of society. Both of them opposed the concept of national state and supported concept of so-called "world state" in different forms. The importance of what they wrote comes from the fact that it is the culmination of the development of national state in 20th century from the perspective of two criteria: the number of national states according to the Wilson's right of national self-determination; and the level in which the state capture the society, no matter whether we speak about totalitarian socialistic regimes, or different forms

⁷ IBID, str.86

⁸ See more: Pejovich Steve „Why is culture important?“, Entrepreneurial Economics Journal, Vol.II, Postgraduate Studies „Entrepreneurial Economics“, Podgorica, 2003;

⁹ Boorstin, Daniel J. „Svijet otkrića (translation of *The Discoverers*)“, Geopolitika, Beograd, 2003, pp.666-699.

of the welfare state (“the nanny state”). In both cases, nation-state is the base of social organization.

This paper doesn't get into analysis and explanation of the nation-state. Two starting points are important for the main idea of paper. First, the science of economics and the nation-state grew together. Political and economic activities were taking place in the nation-state framework. That is the reason that the science of economics, a hundred years after it was created, turned into political economics. Kenichi Ohmae claims that the nation-state and economics seemed indivisible, although they were not related one to another in biological and scientific sense. He even says that they had bad influence one to another.

Second, many people, politicians, and intellectuals think that the nation state is an old institution. They forgot the fact that the nation-state, in the form it exists today, was born in mid-16th century, when French lawyer, J.Bodin, came to an idea to revive the idea of Roman empire and unite many small political entities. If any of the existing rulers had promoted some sort of “unifying ideology”, it could have prevented permanent conflicts and wars... The historical context evolutionary created “the national” as the factor of unity. Nationalism, as the principle of organizing society, pushed individualism into the background.¹⁰

However, one of the first operative problems of Bodin's idea is the lack of bureaucracy – people who would implement the agreements on uniting many smaller political entities. Without bureaucracy, the nation-state was just a “tiger on the paper”. The nation-states needed people who'll work for it, represent it, protect it and defend it – it needed police, courts, army, and, of course, money, as all of these could operate. Collecting taxes became the most efficient way to generate the money for the state, but it required tax administration, custom officers. The demand for police officers, soldiers, judges increased. At the very beginning, it was clear that the nation-state is an expensive ideal. The time has shown that, the larger the government is, the more expensive it is.

Such organization of society needs special organization of economy. The first form of economic policy implemented in the nation-state is mercantilism – economic practice important for the development of nationalism: abolishment of all barriers to free trade inside the borders of the national state, but strict control of the import-export flows (international trade). This was the initial step in the development of **protectionism**, one of the most destructive concepts of economic policy ever. How can we protect from the outside world? The outside world was dangerous for the nation-state.

Adam Smith criticizes mercantilism and protectionism and develops the base of economics as the science. The foundations of economics consist of free international trade, free market and labor division. The end of 18th and 19th century are the age of free market and fast development of Western economies. The role of state should be very limited – to protect property rights and contracts! Sudden development of population and social differences that occurred encouraged the idea of state interventionism aimed to fix the failures of market. Lenin in Russia and, a decade after him, Roosevelt in US implement ideas of Marx and Keynes in practice. No matter how much the difference between them was large, they have one thing in common: the state should take important role in economy, but state interference in economy should be temporary.

¹⁰ Hayek, F.A. „Individualizam i ekonomski poredak (translation of *Individualism and Economic Order*“, Faculty of Political Sciences, Zagreb, 2002

Interventionism gave a birth to the social norm: **the state is the God on the Earth!**¹¹ Constructivism is on scene in the “age of masses”, as we often call the 20th century.¹² It will be remembered by two world wars and the cold war.¹³ The fall of Berlin Wall 1989 and the crash of The Twin Towers in New York on September 11th 2001 reflected the need to look for new economic paradigm.

6. Planck and Gates – Revoking Borders

The nation state, as a great human „discovery“, becomes the victim of new human discovery – of the technology! While the steam engine was the technological base of nation-state, it flourished.

The technology develops permanently. Max Planck moved away borders in the atomic world and broke it into smaller elements. Gagarin moved away the borders in the universe. Bill Gates started the revolution in informatics and thus revoked national borders.

Information, or better to say the speed of transmitting information, is changing the world. Globalization, understood as revoking borders and growing interdependence in the world, is taking place.

Many people don't admit the existence of globalization, despite the fact that four important “C's” are globalized: Capital, Communication, Consumers, and Corporations. Aren't these the crucial elements of the national market? The cracks, the ideological ones and the construction ones, on the weakened building of traditional “nation-state” are becoming visible.¹⁴ Can the traditional nation-state survive in contemporary world? Can the protectionist economy be maintained today? These questions should be answered by understanding the essence of processes, through processed thinking, and dynamic changes that already started.

National economies are developing into the global economy! What is the global economy? What kind of impact does it have on economic policies of national states? Does the global economy require the change of economic theory?

7) Global Economy – Invisible uniting into one

Global economy is our reality today. Nobody invented it! Nobody planned it, nor construct it! It was created spontaneously and with no intention. It is the result of the processes driven by

¹¹ There are many variants of modern collectivism (Nazism, communism, nationalism...) which strive for keeping religious-altruistic ethics, but instead of “God” a man should sacrifice for the “Society”... Instead of “the will of God” we have “the will of the *Society*” (Ayn Rand, preface to the book „Veličanstveni izvor (translation of *The Fountainhead*“, Stylos, 2000.godine)

¹² Le Bon, Gustave „Psihologija gomila (translation of *The Psychologies of Crowds*“, Globus, Zagreb, 1989.

¹³ „The opinion that all institutions were created by the man, with intention and plan, was created on the spiritual platform of the century of masses. It is a small step from the belief that things, created without plan, unconsciously cannot be useful, to the belief that, as all institutions were created by the man, we have to have totalitarian power to shape them in the way we want.“ (Hayek, F.A. „Kontrarevolucija nauke (translation of *The Counter-Revolution of Science*“, CID, Podgorica, str.79.

¹⁴ Giddens, Anthony „Odbjegli svijet (translation of *Runaway World*)“, Stubovi kulture, Beograd, 2005.

human acts and human mind. Increase of living standard on this planet gave bigger importance for the labor division in global terms. If we go into deeper analysis, the essence of globalization can be found in Smith's **idea of labor division**, on one side; and Hayek's **idea of catallaxy** (cosmos, global market), on the other.

On practical level, global economy is brought down to the question, prosaic at first site: how should we treat the rest of the world – should we close economic system and fear from foreigners, or should we just care how we can use the rest of the world for our own development (capital, market, knowledge). The other side of the same question is how we can look at ourselves from the world market and can we do it with the eyes of global development megatrends.

In philosophical sense, the globalization is founded on the idea of belief in progress, belief in improvements. “Progress is inevitable – as death and taxes. “ (Kenichi Ohmae). However, this thesis on progress is being questioned and reexamined. For example, old Greeks thought the world is going into “self-destruction”!¹⁵ Does this civilization go into disaster or not – that is not the question I'll answer in the paper, although the question is no senseless. Indisputably, the global economy is a phase in civilization development? What will be at the end of this phase – that is out of reach of my vision.¹⁶ The goal of science is not to foresee or to give final solutions for the future. Our goal, as scientists is to point out possible consequences of some unavoidable process on our reality, our decisions and behavior.

In my opinion the crucial consequences are related to:

- 1) The nation-state and the new role of state;
- 2) The development emphasizes knowledge, individuality and creation.

The nation-state stays without one of its crucial containing elements – without borders.

Borders disappear due to technology development, but also thanks to the international bilateral agreements. The world is becoming borderless. Trade barriers and custom rates disappear because countries all around the world are becoming aware of the fact that they cannot survive, exist and produce one without another – if they are isolated. Borders are the basic tool to control economic flows in national states. Borders were the base of protectionism in the past and they promote nation-state policies – existence of so called strategic industries and national priorities in the development. Weak borders are questioning all of that and many other questions arise. One of such questions is whether it is possible to implement traditional social policy if the development of the nation-state is based on foreign capital.

¹⁵ Hesiod describes human history through 5 stadiums: gold, silver, bronze, heroic and iron. Gold age was the culmination, the age of abundance and fulfillment. According to Hesiod gold age had suddenly interrupted when Pandora opened the cover of the box with all world evils. From that moment, every other age was more difficult and more painful from the previous. The last age, according to the Greek mythology was the Iron Age. Hesiod describes it: „These are the days of the iron human race. Iron Age people cannot rest from the pain and sorrow during the day, neither they can rest from the hands of robbers during the night. The father will not live in harmony with his children, and the children will always come in conflict with older people, the guest will not get along with the host, neither the friend will get along with a friend. Parents will get old and scorned rapidly, fair and honest people, who keep their word won't be esteemed, but the ones who are bad, evil, and arrogant. The justice will be in the hands of powerful people and there will be no longer the truth!“ (According to J.B. „The Idea of Progress: An Inquiry Into His Origin and Growth“, MacMilan, New York, 1932, pp.11-12).

¹⁶ Attali, Jacques „Kratka povijest budućnosti (translation of *The Short History of Future*)“, Zagreb, 2008; Kaplan, James „Ekstremna budućnost (the translation of *The Extreme Future*)“, Clio, Beograd, 2006.

Global economy is invisible. All processes of global economy are taking place, not in national parliaments, or special licensing bodies, but in computer terminals. For example, use of credit cards enables us to make fast transfer of money, although we don't see the money we spent.

Global economy is cyber-connected. The truth is that the global economy would not exist without modern technology, or internet, which can virtual transfer, from one end of the world to another, not only numbers, but photos, moving pictures, voice, music, video-materials.

Money has great importance in global economy. The belief that money is moving the world is one of the founding stones of global economy. The relation between the price (investment) and profits is the crucial criterion for capital investment. This logic drives capital to jump over borders.

All previously said, processes of uniting into one, which were happening when the nation-state was created (abolishment of all barriers to economic flows inside the nation-state), are happening now on global level.

These processes have no ended. Quite opposite, these processes are still in very early phase. But, they cannot be stopped! Do we go toward, as Keynes said, „**the world state**“, or toward Hayek's „**catallaxy**“?

The answer to this question needs more researching and more time. But, at this point it is very important to conclude that traditional role of the nation-state is reduced, and new function that arises require the transformation of current form of nation-state. In addition to this, the costs of sovereignty are growing, as Jacques Attali noticed.

Survival on global market implies the need for permanent education, training and many more **new ideas**. Global competition is based on new products and services; new, innovative ideas. Ideas are becoming more important for the competitiveness growth and lead us to the increasing importance of knowledge and research for the development. As the consequence, the democracy is being replaced by meritocracy – the decision making based on knowledge and authority of knowledge, not on authority of majority (as in democracy). This means that contemporary form of democracy is in the phase of necessary changes.¹⁷

The knowledge is individual. As the importance of knowledge is growing, the importance of an individual in the society is growing too. The consequence is the rising role of „tall trees“ for the development. That is the reason why authorities and public opinion must focus on the promotion of the role of an individual in the society. The history shows that individuals, and individual discoveries and achievements moved the world ahead. In addition to that, as Hayek said, the knowledge is dispersed. That's why free market is the most efficient mechanism which gathers the dispersed knowledge and provides its synergy to come in effect.¹⁸

Global economy drives two invisible processes – reduction and change of the role of the

¹⁷ Does the globalization reveal the conflict between the capitalism and democracy? The capitalism is based on the freedom – individual freedom first of all. Marx wrote that the freedom of an individual is the prerequisite of the freedom in general. „But, the freedom is, as Kant said, blind, when it turns into the terror of majority over minority, and it becomes worthless when doesn't guarantee equality and fair treatment in redistribution of spiritual and material goods “ (Paic, Zarko, Interview to the daily newspaper *Pobjeda*, May 1st-2nd 2010)

¹⁸ Hayek, F.A. „The Use of Knowledge in the Society“, from the book „O slobodnom tržištu (*The Essays on Free Market*)“, MATE, Zagreb, 1998.

nation state; and shift of the focus to an individual and the authority of knowledge. These processes strongly influence our everyday's life, but also organization of economic life and entrepreneurship. There are no doubts that old things disappear, and the new ones are being created. It is the time of the "the rising light", the time of dawn, when the weather is the coldest!

8) Global economy – the need for new economic theory

Financial crisis has shown that contemporary main-stream theory is not adequate for practical life. The economic crisis made the problems visible and easier to understand, and these problems are treated as extremes, irregularities within the existing economic paradigm. Should we wonder whether these are the couriers of some new economic paradigm? Or is it just an expression of the need for one completely new view on the world and the new view on economic dimension of that world? In my opinion, the new economic paradigm is being born, through scientific revolution, as Kuhn explains it, in economics and not only economics.

Is the old economic paradigm dying? In other words, does the change of conditions which brought to the development of global economy, endanger contemporary economic theory created in completely different environment?

From the perspective of dominant economic theory, what is endangered by the global economy? What new elements global economy is bringing into existing paradigm? There are two new elements: **the chance (as the probability of occurrence)** i **uncertainty**.

If we go back to mechanistic paradigm, we can make analogy with Newton mechanics of celestial bodies. Thus, consumers can represent planets and Sun; self-interest can be considered as the gravity; and general equilibrium of economic forces, i.e. prices, consumers, and quantity can be compared to planets' movements within the Solar system. Mechanistic approach became the base of economic theory.¹⁹

According to mechanistic paradigm, economics of general equilibrium is one of the basic pillars of classical economics. The notion of equilibrium in economics implies that all economic actors, on the production and on the consumption markets, are in completely balanced position. It is the state of general fairness, where all actors are getting what belong to them according to the "invisible hand" principle. It is the state of the market when supply equals demand; all goods are sold on time, as Marx said; salaries are harmonized with the income of other production factors; labor supply and labor demand are equal; working hours are adjusted, etc. Theoretical model of general equilibrium can be identified with the dominant goal of economic policy today – macroeconomic stability. As general equilibrium is the dreaming ideal of all economists, even the famous ones as Smith, Ricardo, Keynes, Marx, etc, macroeconomic stability is the goal of economic policy of each government in contemporary world.

„The ideas of the economists who died very long ago are managing our practical behavior now” – this thought of John Maynard Keynes well describe the situation we are facing in this crisis.

¹⁹ Pulic, Ante, "Informacijsko društvo i ekonomija (*Information Society and Economics*), Privredni vjesnik, Zagreb, 1990

But, in theoretical context, model of general equilibrium was challenged a while ago.²⁰ There are many reasons that question this model.

The first one is **information!** In economic model (that explains the behavior of economic actors) information are very important element and their importance is growing. Do all market participants have the same information? Or can we say that the information are unevenly (non-linearly) distributed and we get into the problem of information asymmetry? Asymmetric information problem imposes doubts into the concept of equilibrium. Hayek's thesis on uneven and dispersed information – restrained individual knowledge is important here.

Economic behavior depends, not only on capital, but also on **the ideas in economics.** This brings us to an individual – the person and personal qualities of the human being. If this is valid, does it endanger the theory of production based on the assumption of unlimited substitution of production factors? Can we easily replace the human factor of production – individuals, whose ideas are moving forward?

As I already said above, the global economy brings new elements into economic theory – **the chance (as the probability of occurrence) and uncertainty.** Basic conceptual framework of classical economics is founded on determinable results with known parameters. Economic actors reach the equilibrium by following their own interests. However, in the global economy, this interdependence doesn't represent the regularity, which can be described by the rule, but more often is the deviation from the rule.²¹ If reaching the optimum is a matter of pure chance, then the final outcome cannot be known in advance. Pulic says that in the system where the chance (as the probability of occurrence of certain outcome) is one of the parameters in the model which describes the system, the final outcome cannot be determined in advance.

The optimum theory doesn't count for uncertainty. The development of the theory of the second best solution in 1960's was also an attempt to bring economic theory closer to the reality. According to that theory, in the real imperfect world, it is impossible to maintain stable deviation between the existing state of the system and potential optimum (achieved through competition) and to reach the equilibrium. But, approaching the optimum can often mean that you are more distant from it in the real world, because it is very difficult to estimate how the competitors will react to the activities aimed to bring the national economy closer to optimum. All of this makes us conclude that the optimum theory, as one of the contributions of classical economic theory to the science of economics is endangered by Heisenberg "indeterminacy principle". This imposes doubt to the principle of rational behavior.²²

²⁰ In the discussion with Schumpeter Hayek is attacking his quantitative approach „When an economist, such as Professor Schumpeter easily get trapped by ambiguous term “information” cannot be considered as simple mistake... It is the warning that there is something fundamentally wrong in the approach which ignores the essential part of the phenomenon we are discussing – and that is the imperfection of human knowledge.“ (Hayek, F.A. „The Use of Knowledge in the Society“, from the book „O slobodnom tržištu (*Essays on the Free Market*)“, MATE, Zagreb, 1998.

²¹ Frank Knight, the founder of Chicago School of Economics, a man worth of respect, not only by his economic work, but for the ideological foundation of Chicago School from the early 1920s, attempted to introduce uncertainty and risk into microeconomic models. He thought that risk can be expressed through probability of occurrence and it can be measured by the amount of money needed for insurance from that risk. The rest of the risk is beard by entrepreneurs and that's why they have right to earn the profit (Knight, Frank „Risk, Uncertainty and Profit“, Boston, 1921)

²² „The view of contemporary economic theory, within the framework of current economic research, is no longer based on the predictable solutions, which would be the result of rational behavior. The probability of occurrence

There are many more examples in favor of the need to leave old mechanistic paradigm and change dominant approach in economics. Analysis of Smith's work shows that he didn't write about the market too much – it is mentioned in just two titles of his most famous book. Smith writes about local markets and economics at the time when “people were born, raised and died at the same place”. Smith also wrote: “The man is the most complicated “cargo” for transport”. At that time the world was filled with obstacles – economic, political and physical, Smith didn't paid attention to trade unions and their influence in the economy.

David Ricardo based his theory of competitive advantages on the idea of marriage between national state and national economy. Keynes did the similar thing, with one difference – in his work the state interferes into economy, and thus endangers the “invisible hand” principle. Keynes “visible hand of state” is the strong theoretical basis for economic policies of many governments today. Keynes theory is in accordance with the interests of bureaucracy, which also have political power (the power of making important decisions that influence economy).

But, Keynes was thinking within the boundaries of closed economy; his work doesn't go beyond the model of closed economy. He doesn't speak about the model in which the economy is closely related to the outside's world (open-economy model). Many facts and features of contemporary reality deny Keynes work. Thus, opposite to his claim that any positive economic trend is followed by the growth of employment, experience of several last decades show that when the employment is going up, the capital markets is going down. Today, the investors are aware that the high level of employment may be the sign of low productivity level, and as such, it can influence lower profitability. The fact that must not be forgotten is that profit is the crucial motive for trading securities. Keynes made an attack to classical and neoclassical school of economics, claiming that the supply and the demand (the market) cannot reach long-term equilibrium. In order to reach the equilibrium, the state (the government) should index the consumption, in order to compensate for the shortage of consumption in closed system of national economy. That was the starting point of Keynes theory: the demand is creating the supply, which was opposite from Say's theory (Say was French economist, known as the French Adam Smith). Say was claiming that the supply is creating the demand, i.e. that any good produced, will find someone to buy it.

Ricardo's world, as well as the world in the time of Keynes or any other economist in 18th, 19th and 20th century was the world of the nation-state. The time of imperialism (big empires) was gone, and the era of nationalism has come, with the protectionism as the keystone of economic policy. How to protect domestic economy from the outsiders' world – that is the crucial question of economic policies today?

Does the global economy change something in the approach used by national governments in last three centuries?

Does the experience practically validate the philosophy of the dominant economic model, founded on the linear, smooth and one-way directed economic relations? Closed economy implies the linearity of economic relations. This can be compared to the fact that we cannot expect big waves on the lake – big waves as the metaphor for the non-linear economic relation.

if the most important element of economic environment, which bring us to the high level of uncertainty no matter whether economic actors behave rationally or not. “ (Fausteld, D. „Economic behavior“, Journal of Economic Issues, Vol.XIV, 3/1980.

What about the ocean waves? What about the open sea waves? Aren't the waves the association for the global economy? Can we understand these big waves the chaos and non-linearity, as the development in leaps?

9) Quantum Economics – Theoretical Foundation of the Global Economy?

From theoretical point of view, the global economy has all characteristics important to understand the need to change dominant approach in economics and economic policies today.

If the mechanistic paradigm was the base for the model of national economy developed in last three centuries, can we use it to answer many challenges of global economy today? Did the global economic crisis open this and many similar questions? Is it possible to solve the problem of the crisis on the national economy level? Why have G-7 turned into, first, G-8, and now G-20? Where does the need to change the role of IMF come from?

The discoveries in physics, which brought to the change of the dominant paradigm, cannot stay without influence on economics, both as theory and practice.

It is extremely important to point out the impact of the discoveries in the quantum physics on economic theory. Before the quantum theory, the physicists believed that the analysis of atoms will show rigid, solid, non-divisible particles; rigid and static substance. Something similar to the substance we see around us, but now projected inside the atom. The atom is the copy of the outside world, the world we feel by our senses, projected into the micro-world. However, it happened to be the false assumption! The atom is the divisible particle – the space within which smaller particles, the electrons are spinning around the nucleus, consisted of protons and neutrons. The later discoveries showed that sub-atomic particles appear in two forms – as a particle and as a wave.²³

This means that the substance is not tied to one place, to one location. The substance is in motion. The place that the substance will take in space is not apriori defined. Every position in space can be achieved with certain probability. The cause-consequence principle, i.e. the philosophy of determinism is not applicable. It is possible to estimate the probability of occurrence of certain position. In order to explain this I'll quote Fritjof Capra: "on sub-atomic level, solid bodies, which are in the focus of analysis of classical physics, are dissolved in the probability patterns". For the first time in history, the science faces the fact that sub-atomic particles are not really the objects, but the **relations** between the objects, the connection between objects.

All of the above change the picture of an atom, analog to the Solar system and planets. That's why Niels Bohr said that the quantum theory is not related to certainty (determinism) but to possibilities, potentials.

²³ In order to understand this bilateralism Niels Bohr introduced the notion of **complementarities** according to which there are pair of values, which are necessary to completely describe the atom (the wave and the particle). The notions of the wave and the particle are two complementary descriptions of the same reality. It is very difficult to understand many notions from the quantum physics not only to non-physicists. On the language problems see more in the Heisenberg's article „The knowledge and the reality in modern physics“ contained in his book *Physics and Philosophy*: „The notion of complementarities introduced into the science of physics by Niels Bohr encouraged physicians to rather use the terms in bilateral sense than in single, précised meaning, which means that they use traditional phrases with not such a clear meaning..“ (pp.145)

The next step in the development of the quantum theory was made by Werner Heisenberg, who claims that science is subjective, meaning that the result of every experiment depends on the relation between the scientist and the experiment. Introduction of this subjectivity element creates famous Heisenberg's "indeterminacy relation".²⁴ The indeterminacy principle is completely opposite from the principle of causality (determinism). On the other side, the Heisenberg's shift from the objects to the relations had significant influence on the way of thinking. For the first time in the history of science, the quantum theory has established the unity between the subject and the object (the experiment and the scientist), people and nature.²⁵

In addition to this, the quantum theory has shown that sub-atomic particles are not the substance in solid form – they are not micro-grains of the substance, but they are the **probability patterns**, „expected tendencies“, possibilities, potentials, as Aristotle used to say. That's why the substance is not considered as something stationary, but as something mobile, dynamic, perpetually in movement. This means that there are no static structures in the nature, but only stable dynamic equilibriums. Einstein's discovery that the mass is the form of energy and that the energy is the mass, interrupted attempts of scientist, which dated from the ancient time of Epicure, to discover basic structural elements of particles, as these are now considered to be the rays of energy. The particle is the ray of energy, not the dead grain of substance! "The particles are the dynamic patterns, which unites the time and the space dimensions. Their space dimension appears through the existence of the body mass, while the time dimension is expressed through processes. The substance and the forms of its appearance cannot be divided, they are just the different forms of the same space-time reality!"²⁶

Due to the development of the quantum theory, the science of physics establishes the new concept, which starts from the organic, systematic, or, now popularly named, holistic approach. As I already said, in this concept, the world is not understood as machine, composed from many different parts, but as the dynamic unity. Similarly, the principle of linearity, followed in economics, is abandoned (the totality is the composition which can be divided into the containing parts, that have the characteristics of the totality). The principle of non-linearity is introduced. The starting point of this principle is that the totality is exceeding the sum of the containing parts. That's why the features of the quantum theory, unlike the traditional concepts based on the causality and simplicity, are: self-organization, complexity, synergy and chaotic structure!

All of the above indicate the need to change the economic paradigm, which should rely on several principles: (a) openness (free flow of information); (b) the existence of disequilibrium (the form of organization which resists entropy); (c) self-confirmation (the possibility to reproduce the elements of system). This paper has no intention to discuss the new economic

²⁴ „In Copenhagen at the beginning of 1927 Heisenberg established the foundation of his indeterminacy principle according to which there is no chance that we can precisely determine the position and the speed of a particle or a ray of energy and the exact moment of occurrence of an event “ (Radvani, Pierre „Istorija atoma“, translation of the *The History of Atom*)“, Klub NT, Beograd, 1997, str.98)

²⁵ This is one of the unions between the physics and Eastern mysticism, which is in focus of Fritjof Capra's book "The Tao of Physics". „The most important feature of Eastern mysticism is the thought on unity and mutual interdependence of everything, which occurs as the different form of essential unity. All things are seen as interdependent and non-divisible part of the unity of Universe, as the different manifestation of the same final reality.“ (pp.113)

²⁶ Pulic, IBID, pp. 48

paradigm, but just to point out that changes in the theoretical science, especially physics, necessarily bring changes in economic paradigm.

Is the global economic crisis and global economy just the proof that we need new, different understanding of economics? Can we explain some facts from the real life with the existing theoretical approach to economics? Can we look at those phenomena from practice as on the current deviation from the prevailing economic paradigm, or as on the announcement of the new paradigm?

I accept the facts of the life: global economy is the reality, not some kind of theoretical dream. Many economic theories were created in completely different conditions in the past. They were created in the framework of the nation-state. Today, an economy is not bounded inside national borders; the world is not just the composition of completely separated and independent nation-states, although this model still prevails. Unlike it, the world is the complexity of interdependent individuals, nations and religions.

The second element of the old paradigm is the belief in causality principle and cause-consequence mechanism. If interest rates go down, it will enhance the economy, as the employers can borrow more money to invest in new projects. When the Central bank increases money supply, interest rates are falling down and stimulate the economy. This causality is the foundation of many economic policies, and the justification of political interference into economic activities. What is going on when the borders are abolished, as in the global economy today?

For example, if you increase the interest rates, will it attract the capital from “the rest of the world”? (Kenichi Ohmae said this has happened in US after Greenspan increased interest rates at the time of Clinton Presidency) This migration of money into areas with higher interest rates is influenced by the fact that globally population is getting old and that pension funds are “full” of money, which don’t want to invest in high-risk instruments. In the borderless world the surplus of money supply if issued by Central bank can leave the country, if there are no “attractive investment points” (Slavoj Zizek).

Well developed information systems and fast transfer of information change the importance of stocks in business policy of the company. The claim that the increase of the interest rates will influence companies to accumulate the stocks is not longer being confirmed in practice. It is realized that money i.e. cash is the best form of keeping stocks.

This is also related to new financial instruments, which strengthen the relations between the world’s financial markets. Can we say that in these conditions national governments are free to make decision on financial policy? Not only domestic, but first of all foreign subject are potential buyers of government bonds and other public debt instruments.

National governments also don’t have complete freedom to make fiscal policy decisions. The effects of government measures depend on the measures of other governments, companies, and consumers all around the world. In such interdependent world the money is moving from one part of the world to another, depending on the level of return – earnings yield. In this moment it is very complicated to think about some kind of supervision, which would control global super-liquidity and the influence of political parameters in certain countries on global super-liquidity.

The dominant approach in economic theory and practice today still rely on the closed model of the nation-state. Keynes is the father of this paradigm. Many think that the global crisis re-discovered Keynes and we should clean the dust from his books. However, it must not be forgotten that the “general” economic theory of Keynes is the response on the crisis from 1929. The key difference is that Keynes is looking the solution within the closed model, not within the model closely related to outside’s world, as today’s world. Keynes wrote about the development based on the internal market of the nation state, i.e. he tries to define the rules of development on the internal market.²⁷

Keynes work continues the tradition of economic theories that emphasize the importance of labor and employment. Smith was the one who introduced the wealth in economics as something positive, optimistic, while Keynes focused on the unemployment as the most negative phenomenon from the real life. The importance of unemployment in economics is indisputable. But, the practice of global economy shows that in some areas the employment grows, while the securities market is falling. As I already stated the investors may conclude that high employment implies low productivity level that can reduce their potential profits.

Many other relations change if the country bases its economic development on the **world’s market**, not on the internal market. In the internal market model, money flows can be controlled and predicted less or more certainly. But, when the economy develops in the global environment with mutual international relations, money can get in or out the country easily and you cannot control or predict it. **Uncertainty is much higher than predictability.** Technology changed the world and thus it changed the economy. For example, in time of Ricardo, the carrier pigeon was very important mean to transfer information. Can the same economic technology be used to explain economic behavior of individuals and companies at the time of internet?

Technology has changed the world and the perception of the world. Sometimes US was very far away, it was the “end of the world”. Different form of communication existed back then – but it was slow. The speed of communication technologies is changing everything. Ohmae says that the technology is changing the geopolitical reality by turning the old nation-states into anachronisms. Don’t we take the information as one of the crucial reasons for the crush of Soviet Empire? Due to modern technologies information has found different ways to get through the walls of control in Soviet Union. Under the attack of information the closed system is forced to open and disappear.

Technology made the world **complex and chaotic**. The features of the substance discovered through quantum physics can be recognized as the practical manifestation of the global economy. There are many parallels between the world of complexity and the world of the global economy. The global economy has many variables that influence one another. It is the system which is naturally dynamic, but not always predictable. Small change in one variable can cause large and unexplainable changes on some other place (the butterfly effect). This interdependence and hardly visible influence endanger and destroy the myth of equilibrium (balance). The prevailing approach in current economic theory says that economic systems are going toward equilibriums, while the theory of complex system proves that classical “equilibrium” is just one of the “points of attraction”. This theory makes difference between many other forms of attractions, which are very complicated to be understood.

²⁷ It is interesting that the same logic is underlying the measures recommended by IMF today: strengthening so called internal development, which is interpreted as the confirmation of protectionism by many.

As the science of physics before Heisenberg and Bohr didn't understand complex systems, the complex systems, as the practical manifestation of the global economy are not understood in economics. This non-understanding of the new phenomenon of the global economy requires the new economic theory, the new view on the economics, the new economic paradigm. Can the science of physics be of any help there? Can the experience of physics can be helpful?

The discoveries of the quantum physics did not ignore Isaac Newton and his mechanistic paradigm. In conditions in which it was created, Newton's theory is still valid. However, the conditions have changed. Newton's physics can only explain the fragments of the real world. This means that the traditional classical economics, created and married to the nation-state, is valid today in areas where the nation-state still functions. But the global economy is overwhelming the national economies and it requires the new economic theory, adapted to it.

The global economy has to be considered as the totality, as the whole. It is not just the simple sum of all 200 economies, joined in a pile. It is the unity with the interdependencies within it. The truth is that the model that can describe it still non-existing. But it is expected that the further development of global economy will influence the development of that new economic theory.

If we use the experience of physics, the analogy would be quantum economics²⁸ – where the based on openness, complexity, chaotic structure, indeterminacies, uncertainty, and unpredictability?

10. Economic Quantum – how can we understand it?²⁹

If the nation-state is not longer the framework for economic regulation, does it mean that the role of politics in the economy is reduced? This is very true if we speak about the classical politics! That's how region-states are created (the states where political power is understood differently). The development is closer to an individual, individual knowledge and abilities. The transfer to an individual brings us closer to the **economic quantum!**

How do I understand the economic quantum? This phrase and the way I understand it comes from my associations on the atom in physics. Does the ray of energy or the bundle of energy rays, move the economy, and enhance economic growth and development? Where is that energy? Where is the energy of economic development? Is it the state? Is it a political party? Is it a company? Is it some collective entity?

²⁸ This phrase is taken from Kenichi Ohmae, who used it in his discussion on global economy. Kenichi Ohmae is a physicist.

²⁹ Why have I chosen the phrase economic quantum? If we want to change practice in certain area, we must change our understanding of that practice (reality), and new understanding needs new terms (new phrases will originate from the new approach). The biggest mistake is indeed using the same words to explain or describe different circumstances, different environment, and different activities. For example the term inflation explains completely different reality if we use it to describe the situation in the country which has its own currency as opposite from the "dollarized" country.

Economic quantum should express the unity of the rays of energy emitted by an individual when creating and implementing economic ideas. Economic quantum should be association for the process, the flow, the dynamics – it is the essence of economic quantum. Economic quantum is not a particle, a grain of substance; it is the potential, the possibility, the objective tendency.

On the importance of rhetoric for economics see more: McCloskey, Deirdre „Measurement and Meaning in Economics“, Edward Edgar, 2001.

The economic quantum, as I understand it, is the man of “action, search and creation”. It is an individual, which is expressed “as a particle and as a wave”. This means it is “the particle in motion”, the person who is “trembling creatively”. As we cannot determine the position of atom, we cannot determine the power of the energy rays emitted by an individual who is in creative tremble. It is not equally distributed energy, but the energy in leaps (unequally distributed energy). I understand the variability (leaps, quantum) in the power of energy rays as a metaphor to the ups and downs in a person’s mood during the day.

The economic quantum is the synonym for the energy of an individual, but energy oriented to the innovation and creation. In other words, the economic quantum is made of energy rays of an individual which enable him to produce an idea. **The economic quantum is energy of producing ideas. The idea is energy, as well as the energy is the idea.**

Crucial sources of the growth are moving from capital and labor, as material production factors, to ideas, non-material factors. The truth is that capital and labor are still very important. But, at present time progress and the raise of the ideas on a higher level needs the energy of ideas! The modern product is the idea realized and expressed in material form, and exist as such in space and time. The modern service is the idea realized and expressed in non-material form, which exist only in time (that’s why services cannot be put in stocks). They are provided in the real time, in the moment of their delivery. The idea is the substance of modern products and services. That is the essence and the central point of economic activities in modern time. This way of understanding economic quantum provides the close relation between economic activities and the globalism. The domination of non-material form enables the globalization of activities, which was not possible in traditional industrial production (where the “aggregates” of labor and capital were dominating, instead of the economic quantum). Traditional industrial production has national borders, and contemporary economic activities are becoming global.

The economic quantum is the source of the value added. The idea is the expression of the ability to create. But, the economic quantum includes emitting energy (producing ideas) as well as emitting energy to implement those ideas.

As it was stated above, the discovery that the mass is the form of energy deeply influenced the change of scientific view on the substance. In the quantum physics the mass is no longer being related to material substratum. According to that, the particles are not considered to be the composition with the particular basic structure, but the bundle of energy rays. The energy is being related to action, to processes and all of that implies dynamic. But, if we make an analogy to the economics, the conclusion is that the economists are still looking for that “basic structure”; that we look for elementary particles, basic elements. For example, Smith thought that the price is that basic element (economics is brought down to determination of price); Marx thought that the goods are the basic elements, the elementary particle of the economics, while Keynes was writing about the savings and investments.

If, instead of this deductive approach – to reduce the economics on one element, we use the inductive approach – **we will understand that all elements are important and interdependent and that they only can function in its totality and interdependence.** Why do we look for the crucial element, then? Is that the result of indirect inheritance of Newton physics which implies understanding of that element (an atom) as the particle in material form? If we should consider all elements and their functional unity – will it be important to

look for that crucial relation? Instead of looking for the basic element, should we analyze processes or relations in economics? The interdependence of processes is creating the energy. The interdependence is the network of mutually related processes in the head of an individual. **The economic quantum is that network of mutually related processes in the head of the individual.** These processes are our activities, discovering the new world around us, looking for new spaces, searching for the invisible processes in natural and social world, the process of creation through the energy of new ideas and the energy of their implementation.

In more practical terms, I see the economic quantum in an individual, through his/her::

- a) Self-confidence, the belief in the idea;
- b) Tendency to economic adventure;
- c) Power to implement the ideas;
- d) Enormous energy (hard work asks for emotional, spiritual and physical energy);
- e) Readiness to accept risk – calculated risks;
- f) Tendency to learn by thinking.

What conditions are needed in order to create and realize the economic quantum? What institutional framework we need in order to fully express the energy of economic quantum?

In my opinion, these conditions are as follow:

- a) The environment favorable for economic freedom – because economic freedom environment enables the freedom of competition in an economy. Thus, we can understand the index of economic freedom as the indicator of conscious (political) restriction of the competition in a society. Having in mind that the economic quantum doesn't need external stimulus and the stimulus from the state, i.e. government measures, but the internal stimulus, which comes from the power of network processes and the network organization, the principle of self-organization becomes very important;
- b) The different role of the state – current organization of the state, as previously said, is not the efficient form of power. The state is, as Pulic said, too big to solve the local problems, and too small to solve the global problems. The number of these problems, both local and global, is growing. The national state level is slowly vanishing and moves into history. The central national state doesn't have significant impact on local and global thinking any more; neither can it solve local and global problems.

The **education** becomes the main problem on individual level. How can we invest in our own knowledge? The knowledge is the assumption of any entrepreneurially oriented individual. The economic quantum is nothing but the permanent growth of the energy bundles, through the connecting processes, the unity and permanent learning; through understanding the practice as the best theory, and the theory as the best practice. This is coming from the previous statements that the contemporary products and services (the practice) are the practical, real, tangible expression of the idea (theory) in material or non-material form, i.e. that every idea (theory) is materialized through the product or the service (in practice).

11. Theory of Economic Quantum and Economic Crisis

The economic crises pointed out the need to develop new economic theory – the theory which can be used to explain the behavior in the global economy. In practical terms, it is one completely new question: how can we use the global market for our development? How can

we be the part of that global network, whose behavior is still far from our understanding? This crisis has shown that there are always some creative individuals in the world who easily and fast adapt to the new conditions and adapt those conditions to themselves. On the other side, there are so called “practitioners”, who are stubborn and look for the way to solve the crisis by thinking within the framework which brought the world into the crisis. This is the proof that “practitioners” are just “the slaves of economic theoreticians who survived”.

Has this crisis been the warning that we have to be more creative, and less practical? That creativity should be the result of energy bundles emitted by the economic quantum – the head of the creative individual! Of course, the time is needed in order to shape the theory of economic quantum in the complete quantum economic theory!

This paper has no intentions to contribute to the development of that theory. The goal of the paper was to point out the importance of some elements of economic reality, revealed by the economic crisis, whose explanation requires the development of new economic paradigm. The starting point of this paradigm will also be the markets, i.e. the Hayek’s catallaxy.

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