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Human Action As An Ultimate Given: Ludwig Von Mises' Praxeology As Seen From A Business Ethics Angle

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Abstract:
Ludwig von Mises (1881-1973) was one of the two parallel followers of the Espinas', a French scholar, human action theory; the other was Tadeusz Kotarbiński (1886-1981). The former was the founder of the Austrian *praxeology* considered as the aprioristic logic of action, and the latter originated the Polish *praxiology* considered as *general methodology*, i.e. epistemology of practice or grammar of action. This paper is intended to characterize the Mises' approach, closely related to his experience; therefore a number of important facts from the life of the Austrian praxeologist, economist and economics philosopher is summarized in the first part of the essay. According to Mises praxeological laws apply to the regularity of phenomena due to the correlations between means and ends which restricts people's freedom of choice and action. Other restrictions of action have their source in physical laws, to which humans must adjust their behavior if they want to live, and physiological laws, i.e. a set of constitutive qualities characteristic of each individual, defining that individual's disposition and susceptibility to environmental. Mises presented his theory in the book *Human Action: A Treatise on Economics*, over nine hundred pages long opus magnum that comprises forty chapters. The present essay is concentrated on praxeology and its relation to economics with special emphasis on the ethical dimension presented in contemporary literature. For praxeology is a part of practical philosophy, or ethics in the broad sense, it is therefore proper to discuss the issue in the ethical context, especially the business ethics angle is relevant for the Misesian praxeology, and 'its hitherto best-developed branch – economics'. Economic knowledge, based on praxeology – says Mises – being an essential element in the structure of human civilization; is 'the foundation upon which modern industrialism and all the moral, intellectual, technological, and therapeutical achievements of the last centuries have been built'.

1. Introduction

It is remarkable that the city of Lvov is related to the origin of two human action theories: *praxiology* and *praxeology*. The former was suggested by a young Polish philosopher of Lvov University, Tadeusz Kotarbiński, who delivered his very first paper *The Goal of an Act and the Task of the Agent* in 1910 at the Philosophical Society seminar in Lvov. The latter was suggested by an Austrian scholar, Ludwig von Mises, born in Lvov, after he had completed his education in Vienna. Both referred to a treatise by Alfred Victor Espinas, a French social scientist: *Les origines de la technologie* (1897). The former scholar named his theory *praxiology*, the latter – *praxeology*. The former considered praxiology to be *general methodology*, i.e. sui generis epistemology of practice or grammar of action [10], while the latter considered praxeology to be the aprioristic logic of action, therefore the foundation of economics [19].

Tadeusz Kotarbiński and Mario Bunge places praxiology within practical philosophy[2], or ethics in the broad sense of the word within which the first philosopher identifies: felicitology (the study of a happy life), praxiology (the study of the practical dimension of actions) and ethics in the narrow sense (moral deontology) [17], while the second philosopher identifies: axiology (theory of values), ethics (theory of morals) and praxiology (theory of action) [6]. It is therefore proper to

discuss praxiology in the ethical context[3], especially the business ethics angle is relevant for the Mises' praxeology, with which economics is closely related according to the very scholar.

Mises' contribution to the development of praxeology cannot be overestimated; some even think he deserved the Nobel Prize for his lifetime achievement. This is mentioned by his biographer Eamonn Butler, director of the Adam Smith Institute in London, in his book carrying the characteristic title *Ludwig von Mises: Fountainhead of the Modern Microeconomics Revolution*[4]. The information provided by this book has enabled the present essay to include a number of important facts from the life of the Austrian praxiologist, economist and economics philosopher.

The works of Mises were known to very few Polish readers. As a critic of totalitarian systems, socialism in particular, Mises was the subject of criticism in the times of real socialism in Poland. Though available in the original at the library of the Polish Academy of Sciences' Praxiology Unit, his praxiological work *Human Action: A Treatise on Economics* was not considered in any extensive review throughout the unit's existence, neither was it the subject of any treatises written by Polish praxiologists. The obstacle was the politics of those times, censorship and – it also needs saying – self-censorship. It was not until the first harbingers of political change appeared on the Polish horizon that Polish praxiologists and continuators of the Austrian school, which had developed chiefly in the United States, could meet for the first time in the discipline's history at the conference *Praxiologies and the Philosophy of Economics*, held in Warsaw in 1988[5]. The conference could take place thanks to support from the U.S. Sabre Foundation and the Institute of Austrian Culture in Warsaw. The institute also provided financial support enabling excerpts from Mises' treatise to be translated and a special issue of the periodical *Prakseologia* to be published, the very first publication of passages from his *Treatise* that discussed his praxeology.

Mises' *Human Action: A Treatise on Economics*, 907 pages long, comprises 40 chapters (including the introductory section). These chapters are grouped into the following parts: Introduction, (1) Human Action, (2) Action Within the Framework of Society, (3) Economic Calculation, (4) Catallatics or Economics of the Market Society, (5) Social Cooperation Without a Market, (6) The Hampered Market Economy, (7) The Place of Economics in Society.

2. Biography

Mises grew up mainly in Vienna, where he enrolled at university in 1900 and graduated with the title of doctor of law in 1906. He published two works on economic history during his student years.[6] In the latter part of his studies he attended the lectures of Carl Menger, founder of the Austrian school of economics. After graduation, in 1908 Mises started working at the Central Association for Housing Reform where he analyzed tax issues. A year later he transferred to the Kammer für Handel, Gewerke, und Industrie where he worked as a senior analyst until 1934.

In 1912 Mises published his first book, *Theorie des Geldes und der Umlaufsmittel*, which was not unrelated to the discussions he had with Eugen von Böhm-Bawerk. As of 1913, he taught economics at the University of Vienna as a *Privatdozent*. During World War I Mises served in the artillery as a captain and then worked at the general staff, and in 1918-20 was the director of Abrechnungs Amt, an office established to settle administrative matters connected with the Treaty of St. Germain. This was where young economist Friedrich A. von Hayek visited him, sent to him by Friedrich von Wieser, Menger's successor.

In 1920 Mises founded a private seminar that consolidated his reputation as a researcher and a leading theoretician of the Austrian school of economics and liberalism. The seminar was attended by F. A. Hayek, G. Haberler, F. Machlup, O. Morgenstern. That same year Mises published the paper *Die Wirtschaftsrechnung im socialistischen Gemeinwesen*[7] which he later included in the volume *Die Gemeinwirtschaft: Untersuchungen über den Sozialismus.*[8] This work was the subject of numerous debates and polemics for several decades, including those carried on by Oskar Lange. Mises did not neglect his interest in monetary problems, publishing many papers on these topics. In 1927 he founded the Austrian Institute for Business Cycle Research, where

Hayek continued to collaborate with him. In the same year, Mises published his next book, *Liberalismus,*[9] in which he outlined the principles of a free society. A few years later he published a work on the epistemological problems of economics, *Grundprobleme der Nationalökonomie.*[10]

In the latter half of the 1930s Mises was offered the position of professor of international economic relations at the Institute for International Studies in Geneva. Working in Geneva enabled Mises to avoid the consequences of the Anschluss, although he was forced to go into exile, something that turned out to be difficult for the Swiss authorities as well. Therefore he left Switzerland in 1940 and, after a complicated journey, ended up in the United States, obtaining his citizenship in 1946. Before all this, he married Margit Sereny-Herzfeld in Geneva in 1938 and published the book *Nationalökonomie: Theorie des Handelns und Wirtschafttens*[11] which provided the foundation for his subsequent praxeological-economic treatise.

Mises' liberal views did not win him supporters in Europe, nor even in America. They were unfashionable and did nothing to facilitate his academic career. In 1940-1944 Mises was a guest employee of the National Bureau of Economic Research in New York, and between 1945 and 1969 taught as a visiting professor at the Graduate School of Business Administration at New York University. This was an unpaid position; Mises lived off a William Volker Fund allowance and his writer's royalties. The first decade of Mises' activity as a professor was very fruitful. His seminars attracted students and academics just like they had in Austria. His books garnered a lot of interest; he published several, including *Bureaucracy*[12], *Omnipotent Government: The Rise of the Total State and Total War*[13], *The Anti-Capitalist Mentality*[14], *Theory and History: An Interpretation of Social and Economic Evolution*[15]. The first edition of Mises' opus magnum *Human Action: A Treatise on Economics*[16] was published in 1949. The treatise – a synthesis of the author's praxiological, methodological and economic studies – was reissued many times[17]. The book *The Ultimate Foundation of Economic Science: An Essay on Method*[18], a systematic exposition of subjectivist economics, brought Mises his first award, followed by further prizes and titles some years later. He received honorary degrees from the universities of New York and Freiburg, and Hayek edited a special volume marking the great scholar's 90th birthday[19]. Ludwig von Mises lived to be 92, he died on October 10, 1973.

3. Praxiology and...

> Mises wrote:
> Traditional logic and epistemology have produced, by and large, merely disquisitions on mathematics and the methods of the natural sciences. The philosophers considered physics as the paragon of science and blithely assumed that all knowledge is to be fashioned on its model. … This essay proposes to stress the fact that there is in the universe something for the description and analysis of which the natural sciences cannot contribute anything. There are events beyond the range of those events that the procedures of the natural sciences are fit to observe and to describe. There is human action [21, xv-xvi].

Contemporary Polish praxiology defines 'action' as human behavior undertaken intentionally and willingly with the aim of bringing about a state desired by a given person and called the 'goal' (of the action). The acting person is named the agent or actor, and in general terms – the subject of the action. Actions in a praxiological sense are actions performed individually, i.e. they are single-subject actions. For praxiology, multiple-subject behaviors and behaviors of collective subjects (e.g. bodies corporate) are systems of single-subject actions whose structure stems from praxiological laws[20].

> Let us compare this with Mises' approach outlined as follows in a glossary entry:
> Human action: Purposeful behavior, an attempt to substitute a more satisfactory state of affairs for a less satisfactory one; a conscious endeavor to remove as far as possible a felt uneasiness. Man acts to exchange what he considers will be a less desirable

> future condition for what he considers will be a more desirable future condition. Thinking and remaining motionless are actions in this sense. Human action is always rational, presupposes causality and takes place over a period of time [13, p. 62].

Praxeological laws apply to the regularity of phenomena due to the correlations between means and ends. According to Mises, praxeological laws restrict people's freedom of choice and action. These are not the only limitations determining the extent of freedom of acting subjects. Other restrictions of action have their source in: (i) physical laws, to the insensitive ruthlessness of which – as Mises wrote – humans must adjust their behavior if they want to live, and (ii) physiological laws, i.e. a set of constitutive qualities characteristic of each individual, defining that individual's disposition and susceptibility to environmental factors[21].

Action is the fundamental quality of an active person. To put it vividly, it is not a disguise worn by an acting subject, but the actual conduct of the subject regardless of the current behavior costume that the subject is wearing for one reason or another. When such a disguise is involved, making use of it constitutes action *par excellence*. This is the case when the subject's activity is noticed by an observer (e.g. a stockbroker's activity on the stock exchange) and also when the subject's activity is not externally manifested (e.g. the unemotional activity of an observer of the stock exchange), and even when the subject intentionally abstains from any kind of activity (e.g. lack of reaction to someone's calls for help). 'Human action,' claims Mises, 'is one of the agencies bringing about change. It is an element of cosmic activity and becoming. Therefore it is a legitimate object of scientific investigation. As at least under present conditions it cannot be traced back to its causes, it must be considered as an ultimate given and must be studied as such' [21].

Excellent confirmation of Mises' idea can be found in the discovery of James McGill Buchanan, one that brought its author the Nobel Prize in economics. This economist proved that when making public choices, politicians do not act out of a sense of duty toward society but are driven by their own interests[22]. By creating a 'regime of continuing budget deficits,' politicians create 'decision capital' that requires appropriate management. Who by? By them, of course, by those very politicians, this makes them become indispensable. That sounds familiar, one might say feeling scandalized. Meanwhile, irrespective of whether someone is a politician or an ordinary man in the street, that person acts due to the practical situations of which he or she is the subject, as I once pointed out in a work on humanist design[23]. Every practical situation is a niche (*oikos*) of its subject, and the set of these niches is a kind of ecology (*oikos* and *logos*) of practical situations. If we have a certain kind of action, i.e. actions consisting in exchange carried out by acting subjects, where the measuring tool is a monetary unit, then what we have is economics (*oikos* and *nomos*).

The practical situation of any subject is determined by the facts that this subject distinguishes among other facts due to the subject's professed *values*. Values give facts meaning and on this basis the subject considers some facts to be satisfactory and others not so. If the practical situation does not satisfy the subject, the subject strives to change the facts in such a way as to turn the situation into a satisfactory one from the point of view of the professed values. However, even when the subject considers the situation to be satisfactory, change is still necessary. In this case, it is not the kind of therapeutic change outlined above, but preventive change serving to avert a disturbance of the satisfactory situation by processes that are either natural or artificial (in the sense of being caused by humans). The former type of change concerns the inner aspect of a practical situation whereas the latter type concerns the situation's context, namely 'the reminder of the world.' Modern praxiology as practiced by myself considers the 'being of action,' i.e. the reality related to action, in terms of what we might call the ontology of practical situations. The acting subject's attitude to facts depends on the structure of values professed by that subject, and in a reistic approach – on the order defined by the results of the judgments the subject makes about those facts. Some values shape the action environment within which the action programs determined by other values are realized. If – subjectively speaking, i.e. from the point of view of a given subject – the action environment for that subject is defined by praxiological values, i.e. effectiveness and efficiency, then these values create the framework within which the subject acts.

Even when the subject implements ethical (moral) values, he or she does so under the governance of the praxiological values. Instances of doing others an ill turn are an extreme example of the actions of such acting subjects. They are the ones who invented the saying 'the end justifies the means.' This is exactly what is feared by the moral reformers of the market mentioned by Mises. If, on the other hand, we have a subject for whom ethical values define the action environment, that subject will say after Kotarbiński that 'the end filthifies the means.' In extreme cases the subject might even feel an irrational abhorrence of praxiological values, which could hinder or even prevent that person from successfully accomplishing whatever they truly set great store by, even including moral values. This is what Mises was afraid of when he criticized market reformers. Such an acting subject was also criticized by Professor Henryk Hiż, who believes that what counts in ethics is the result of human action and not intentions or the agents' personal qualities. He remarked that pragmatism requires not only compassion but also efficacious putting it into practice[24].

To use a computer metaphor, one could say there is a certain order in action programs treated seriously. The primary program is the praxeological one, in accordance with Mises' laws of regularity concerning the relations between means and ends. Mises gives a succinct outline of this program when he writes that, contrary to ethical doctrines which are concerned with determining scales of values according to which people should act though they do not always do so, praxeology and economics are fully aware that

> … the ultimate ends of human action are not open to examination from any absolute standard. Ultimate ends are ultimately given, they are purely subjective, they differ with various people and with the same people at various moments in their lives. Praxeology and economics deal with the means for the attainment of ends chosen by the acting individuals. … Value is the importance that acting man attaches to ultimate ends. Only to ultimate ends is primary and original value assigned. Means are valued derivatively according to their serviceableness in contributing to the attainment of ultimate ends. Their valuation is derived from the valuation of the respective ends. They are important for man only as far as they make it possible for him to attain some ends. … Action is an attempt to substitute a more satisfactory state of affairs for a less satisfactory one. We call such a willfully induced alteration an exchange. … That which is abandoned is called the price paid for the attainment of the end sought. The value of the price paid is called costs. Costs are equal to the value attached to the satisfaction which one must forego in order to attain the end aimed at. The difference between the value of the price paid (the costs incurred) and that of the goal attained is called gain or profit or net yield. Profit in this primary sense is purely subjective, it is an increase in the acting man's happiness, it is a psychical phenomenon that can be neither measured nor weighed [21, pp. 95-97].

The importance of Mises' work not just for economics but for the social sciences in general is best highlighted by the following remarks from Hayek in his discussion of the problem of subjectivism in social science data:

> It has often been suggested that… economics and the other theoretical sciences of society should be described as 'teleological' sciences. This term is, however, misleading as it is apt to suggest that not only the actions of individual men but also the social structures which they produce are deliberately designed by somebody for a purpose. It leads thus either to an 'explanation' of social phenomena in terms of ends fixed by some superior power or to the opposite and no less fatal mistake of regarding all social phenomena as the product of conscious human design, to a 'pragmatic' interpretation which is a bar to all real understanding of these phenomena. Some authors, particularly O. Spann, have used the term *teleological* to justify the most abstruse metaphysical speculations. Others, like K. Englis, have used it in an unobjectionable manner and sharply distinguished between teleological and normative sciences. (See particularly the illuminating discussions of the problem in Karel Englis,

> *Teleologische Theorie der Wirtschaft* [Brün, 1930].) But the term remains nevertheless misleading. If a name is needed, the term *praxeological* sciences, deriving from A. Espinas, adopted by T. Kotarbiński and E. Slutsky, and now clearly defined and extensively used by Ludwig von Mises (*Nationaloekonomie* [Geneva, 1940]), would appear to be the most appropriate[25].

It is time now to move to the other side of the suspension points in order to outline something that Mises founded on praxeology in his understanding of it as the aprioristic logic of action. That 'something' is economics or, as Mises wrote, the most developed branch of praxeology.

4. ...and Economics

> Mises stresses that:
> He who seriously wants to grasp the purport of economic theory ought to familiarize himself first with what economics teaches and only then, having again and again reflected upon these theorems, turn to the study of the epistemological aspects concerned. Without a most careful examination of at least some of the great issues of praxiological thinking – as, e.g., the law of returns (mostly called the law of diminishing returns), the Ricardian law of association (better known as the law of comparative costs), the problem of economic calculation, and so on – nobody can expect to comprehend what praxiology means and what its specific epistemological problems involve [21, xvii-xviii].

Mises was critical of the possibility to transform the market economy in such a way that it would function better if business people not only strove for profit but also followed their conscience. Supporters of such a view, Mises said, believe this would make it unnecessary to have government pressure or any enforcement of economic life practiced to the satisfaction of all those interested. What would be needed – according to the proponents of this stance – is not a reform of government and law but the moral reform of people, a return to the ten commandments and to compliance with the moral code, rejection of the sin of desire and egotism. Then, it might be possible to reconcile private ownership of means of production with justice, righteousness and diligence. Capitalism would lose its inhuman face without detriment to individual freedom and initiative. Thus, supporters of this option, Mises wrote, want to create a social system based on a dual foundation: private property and moral principles restricting the use of that property. This is a noble idea but, as Mises pointed out, the market economy is based on freedom of operation within the framework of private ownership and the market. What the acting subject chooses is ultimate. For the subject's partners, the subject's actions are data that other actors of the economic stage should – or even must, due to the existence of risk – take into account when undertaking their own actions. Coordination of the autonomous actions of all individuals is performed by the market, which makes it unnecessary to tell people what they should and shouldn't do, according to Mises. There is no need to force cooperation from people by issuing special directives or prohibitions.

Anything that is not part of the domain of private ownership and the market is an area of enforcement and directives, and this is where we find the dam that an organized society builds to protect private property and the market from violence, ill will and fraud. This is where rules are formulated to define what is legal and what is illegal, what is allowed and what is forbidden. This area contains an entire arsenal of means for dealing with those who do not obey the laws.

Meanwhile, the reformers whose position Mises outlined suggest that next to norms designed to protect private property, ethical norms should be introduced as well. They fail to see the role that the springs of action they criticize actually play in the market economy's functioning. However, if the value of private ownership – which the reformers discredit as being egotistical – is eliminated, the market economy will become a chaotic jumble. Encouraging people to listen to their own conscience and replace private profit with public prosperity does not build a hard-working society and a satisfactory social order. It is not enough to tell someone not to buy on the cheapest

market and not to sell on the most expensive market. It is not enough to tell people not to strive for profit and not to avoid losses. What is needed are unequivocal rules of conduct for every specific situation, because if you want a river to take a different course than its natural one you have to build dams.

The reformer replies: entrepreneurs are ruthless and selfish when, exploiting their advantage, they show little regard for less effective rivals, forcing them to withdraw from a transaction. The reformer continues: entrepreneurs are ruthless and selfish also when they take advantage of the current market situation and demand prices so high that poor people cannot buy the goods on offer. How, then, should "altruistic' entrepreneurs behave? Should they sell goods for prices lower than their rivals'? Or, are there certain conditions for prices to be considered fair? What should "good' entrepreneurs do? Should they give away their goods for free? If they demand any very low price there will always be someone who will not be able to afford the goods, or not in the amount they could buy if the price were lower still. Thus, which group of prospective buyers may entrepreneurs ignore when setting the sales price for their goods?

Critics of economic freedom address their demands to business people, whereas the market economy is a system dominated by consumers, Mises points out, so they are the ones who should be appealed to. Consumers would need to be persuaded to stop choosing better and cheaper products over worse and more expensive ones, to follow their conscience and not harm less accomplished entrepreneurs. They should shop less so that poorer people can buy more, the Mises commented with irony.

Not denying that the intentions of the proponents of moral economic reform are noble, Mises noted that any freedom which people can enjoy within social cooperation depends on their consent to private profit and public prosperity. Within the actions that enable people striving for their own prosperity to contribute to the prosperity of others around them – or at least not to diminish that prosperity – people following their own beliefs pose no danger to society nor to other people. This results in freedom enabling people to choose and act in accordance with their beliefs and stimulates individual initiative.

Those who maintain there is a conflict between the drive for profit in different people or between an individual drive for profit on one hand and general prosperity on the other, cannot avoid restricting people's right to make choices and to act. They would have to replace citizens' freedom with the domination of a centrally managed economy. In their schemes for a good society, there is no room for individual initiative. The authorities issue orders and everyone has to comply, Mises points out [21, pp. 724-730].

Mises questioned the functional capacity of a centrally planned economy, which he identified with socialism in both the German ("national socialism') and Soviet ("real socialism') versions [20], due to its being a kind of *perpetuum mobile* in the light of the aforementioned principle. The author of the *Treatise* wrote the following on this issue:

> The essential mark of socialism is that *one will* alone acts. It is immaterial whose will it is. The director may be an anointed king or a dictator, ruling by virtue of his *charisma*, he may be a Führer or a board of Führers appointed by the vote of the people. The main thing is that the employment of all factors of production is directed by one agency only. *One will* alone choose, decides, directs, acts, gives orders. All the rest simply obey orders and instructions. Organizations and a planned order are substituted for the 'anarchy' of production and for various people's initiative. Social cooperation under the division of labor is safeguarded by a system of hegemonic bonds in which a director peremptorily calls upon the obedience of all his wards.
>
> In terming the director *society* (as the Marxians do), *state* (with a capital S), *government*, or *authority*, people tend to forget that the director is always a human being, not an abstract notion or a mythical collective entity. We may admit that the director or the board of directors are people of superior ability, wise and full of good

intentions. But it would be nothing short of idiocy to assume that they are omniscient and infallible.

In a praxeological analysis of the problems of socialism, we are not concerned with the moral and ethical character of the *director*. Neither do we discuss his value judgments and his choice of ultimate ends. What we are dealing with is merely the question of whether any mortal man, equipped with the logical structure of the human mind, can be equal to the tasks incumbent upon a director of a socialist society.

We assume that the director has at his disposal all the technological knowledge of his age. ... But now he must act. He must choose among an infinite variety of projects in such a way that no want which he himself considers more urgent remains unsatisfied because the factors of production required for its satisfaction are employed for the satisfaction of wants which he considers less urgent. It is important to realize that this problem has nothing at all to do with the valuation of the ultimate ends. It refers only to the means by the employment of which the ultimate ends chosen are to be attained [20, pp. 695-697].

5. ...and Ethics

Three authors, namely Israel M. Kirzner [1989], Murray N. Rothbard [1998] and Hans H. Hoppe [1993] 'present the same criticism of Mises. They criticize him because, in spite of the brilliance of his contribution to the defense of the market economy and private property, his arguments are centered on the acceptance of capitalism because of its monetary consequences. However, he does not deal with the relation between ethics and the market, and the three authors, while considering Mises' arguments insufficient, offer some new praxiological developments which enable them to mount a more effective defense of the market economy than that offered by Mises.' [3, pp. 76-77] Readers interested in more details can turn to the original publications, here I will only present a brief outline, after Aranzadi, of these critics' views. Kirzner points to entrepreneurs' creativity involved in discovering that something can be a means to an end, which has praxiological and ethical value as well as authorizing ownership of that which has been discovered, which is the product of that creativity, according to the principle of *who discovers it, keeps it*. Rothbard criticizes Mises' utilitarianism, saying that we need to move beyond it in order to find arguments in favor of freedom as a value. Freedom is a non-economic value, therefore it is wrong to posit it for economic reasons, since freedom is the ultimate property of a human being. Finally, Hoppe points to the importance of argumentation as a special form of entrepreneurship. 'Hoppe manages very concisely to integrate the contributions of Rothbard and to clarify the complementarity of his axiom of argumentation with the right to obtain profits in Kirzner's entrepreneurship.' [3, p. 85]

To the above, we need to add one more argument for the necessity to take into account the ethical dimension when considering any activity, and economic activity in particular. In her book on the methodology of economics, Sheila Dow [8, pp. 132-133] describes the conduct of those who use the theoretical achievements of economics in their practical activity. Political decision-makers choose a convenient theory and treat it like a convention to be used for justifying their decisions. One aspect of conventions is that they include concealed assumptions in fact uncovered by methodology. One such assumption is thinking in terms of an ideal type, leading to a mistaken belief in exact conclusions, whereas it needs remembering that an ideal agent makes choices based on a complete set of information or known limitations. Meanwhile, writes the cited author, we need to look at things the other way round, since we actually act in situations of incomplete information and inaccurate knowledge of the limitations. This raises the important question of the kind of knowledge that enables decisions to be reached when there is a shortage of information. This is also true for actors of economic life, and for economists as actors of economics, the author concludes. [8, pp. 132-133]

Jonathan Aldred, another British author, highlights three issues causing him to be skeptical: economic imperialism, economists' inclination to bend the world to their theories, and also the ethics of economists concealed in their language and practices. [1] Economic imperialism manifests itself in a tendency toward conquest that sees fundamentalist economists imposing their notions, values and analysis tools on other types of thinking – this is a kind of pan-economism. Economic constructivism creates entities in which idealizing assumptions are fulfilled. The effort to adapt reality to theory is made in two ways: (a) imposing a legal framework for actions desirable to economists, supported by developing incentives for people to act according to the theories; (b) accepting *a priori* that people act according to a given assumption of economic theory, such as the assumption that people are guided solely by their own narrow interests. Performative economics imposes certain conduct: if you make an assumption and build a theory upon it, and then introduce incentives to apply that theory, those incentives being derived from the assumption, this creates a mechanism for shaping people's behavior according to that assumption. The result is a self-fulfilling spiral of explanations and behaviors. We end up interfering with the object of research and subordinating that object to the research results. This way of practicing economics is incompatible with the concept of science in its usual sense.

As for the third problem, the ethics of economists, Aldred asks 'Do economists *want* the world to look more like their theory?' [1, p. 224] His answer is that 'We have seen much evidence suggesting that they do.' [1, p. 224] This evidence is found in the way economists use terminology that gives a negative label to those who think differently or behave differently than what is assumed in economic 'theories' – i.e. theories in name but designs in actuality. Orthodox economists describe the criticized behaviors as 'irrational' only because that is what their doctrine says, whereas in fact this is a judgment that is axiologically laden. Moreover, some economists speak of the autonomy of consumers, who allegedly know best what they need, while on the other hand they criticize consumer choices when they are incompatible with behavior that economic projects/theories consider 'rational.' This is manipulation, pure and simple.

> Often it is far from clear what principle of rationality is at stake, and even when the principle is made explicit, the appeal to it seems arbitrary. … In practice, economists must almost always make some judgments about the content of people's preferences, not just their structure, in order to derive policy recommendations. The problem is that orthodox economic theory lacks the intellectual resources to do so [1, p. 225].

Attempts are made to sidestep the problem, with economists even insinuating that economic theory describes a superior form of rationality, but 'without bothering to develop an ethical argument to justify this claim' [1, p. 225]. Another argument says that economists deal with facts, not values (apart from monetary value), ergo there is no room for ethics in their ruminations. However, economists in fact do make judgments in an axiological sense when they give preference to certain solutions over others, which – being goals of action – require ethical judgment. However, they ignore their own value judgments as being 'inappropriate' for science because they would cause them embarrassment. Aldred adds that

> Much of the tension between economics as 'democracy' and economics as 'science' is more apparent than real. … Economics cannot be a science, at least as traditionally understood, because it has an inevitable ethical dimension. And ethical debate, especially about whether some people's preferences should be partially or wholly ignored, must be recognized as central to democracy – democracy is not just about adding up predetermined preferences in elections [1, pp. 227-228].

If Mises could respond to the criticism of economics coming from ethicists, he would most likely respond in the way I outlined in an earlier paper [12]:

> As far as the ethical aspect of entrepreneurship is concerned, Mises points out that it is not the entrepreneurs' fault that consumers, i.e. ordinary people, prefer alcohol to the Bible, detective novels to classics, and guns to butter. Entrepreneurs gain higher profits not because they sell 'bad' things instead of 'good' things. The higher their

> profit, the better they are able to deliver products consumers want to buy with greater intensiveness. People do not drink poison to make 'alcohol capital' happier, they do not fight wars to increase the 'death merchants'' profits. Military industry is a consequence of people's war spirit, not its cause. It is not the entrepreneur's duty to encourage people to act better, to substitute wrong ideologies with their opposites. This is the duty of philosophers; they should change the ideas and ideals of human beings. An entrepreneur serves consumers such as they are, despite the fact that they are sinners and ignoramuses. We may highly evaluate those who give up making a profit out of producing weapons or alcohol, but their praiseworthy behavior would be no more than an empty gesture if consumers were of the same mind; meanwhile, even if all entrepreneurs followed those who give up such profits, wars and habitual drunkenness would not disappear. As it was done in pre-capitalist times, governments would produce guns in their arsenals, and drinkers would distill alcohol by themselves, says Mises [12, p. 24].

It would be as simple as Mises writes if entrepreneurs were busy only with meeting consumer needs. This is not the case today. Nowadays entrepreneurs are busy with innovations, which even Mises noticed. Making innovations is closely related not only to producing products but also to creating consumers' appetite for new needs [5]. And that is what contemporary marketing is all about. Creating needs is not axiologically neutral with respect to fulfilling already existing needs. It is a way of making consumers addicted to new products, which calls for an assessment broader than thinking in just economic and praxiological terms. Ethical categories are indispensable. Why? It is because entrepreneurs are becoming responsible for goods, for they know better than the consumer, either 'sinner' or 'ignoramus,' what kind of commodity they are offering. [ibid] Certain books [25] and [7] already provide evidence for the great importance of the ethical dimension of economics as an axiological partner of praxiological dimensions of human action.

6. Conclusion

Let me conclude this essay with the message expressed by Mises in the last page of his treatise on human action:

> There is … the regularity of phenomena with regards to the interconnectedness of means and ends, viz., the praxeological law as distinct from the physical and from the physiological law.
>
> The elucidation and the categorical and formal examination of this third class of the laws of the universe is the subject matter of praxeology and its hitherto best-developed branch, economics. The body of economic knowledge is an essential element in the structure of human civilization; it is the foundation upon which modern industrialism and all the moral, intellectual, technological, and therapeutical achievements of the last centuries have been built. It rests with men whether they will make the proper use of the reach treasure with which this knowledge provides them or whether they will leave it unused. But if they fail to take the best advantage of it and disregard its teachings and warnings, they will not annul economics; they will stamp out society and human race [12, p. 885].

Sapienti sat!

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Notes

1. The Centre is a joint unit of Koźmiński University and the Institute of Philosophy and Sociology, Polish Academy of Sciences.
2. *Practical philosophy* (i.e. ethics *sensu largo*) should not be confused with *philosophy of practicality*, i.e. Tadeusz Kotarbiński's philosophical system.
3. The material in this essay is partly a consideration and recasting of parts of my lecture delivered at the 6th Polish Philosophical Convention and of other papers listed in the references.
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21. L. von Mises, *op. cit.*, p. 885.
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Hyperinflation and The Destruction of Human Personality

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Abstract:
The unorthodox monetary policies currently being pursued by the Fed and other central banks raise the distinct possibility of a future hyperinflation. This is not just alarmist fantasizing, because the implicit aim of these policies is to create inflationary expectations in order to induce households and businesses to increase their spending. What has not been considered by mainstream macroeconomists and policymakers who support such policies is that the unhinging of the public's expectations concerning the future value of the monetary unit is the defining feature of the dynamics of hyperinflation. It thus appears to be an opportune time to revisit the effects of hyperinflation. The purely economic destruction wrought by historical episodes of hyperinflation has been adequately dealt with by economists. The disastrous social consequences of hyperinflation have been well documented in the narratives of sociologists, historians, and journalists. It is the aim of this paper to bring an economic perspective to bear on the destructive effects on individual human personality that are caused by the breakdown of monetary calculation that results from hyperinflation. Using the classic case of the German hyperinflation, the deformation of human personality is characterized and its implications for a radical transformation of the relationship between the individual and the State are drawn out.

Keywords: hyperinflation, monetary calculation, private property, National Socialism.

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1. Introduction

More than four years after the Great Recession was declared to have officially ended, the U.S. economy is still stagnating with slow growth and high unemployment. In response, the Fed continues to resort to "unorthodox" monetary policies, such as targeting a zero interest rate and massively expanding the Fed's balance sheet through a program of long- and short-term bond purchases (quantitative easing). Although these policies have thus far not worked, the Fed has indicated that they will be continued indefinitely until the unemployment rate has fallen to the desired level [1]. With the EU economies also mired in recession, Mario Draghi, President of the European Central Bank, has openly discussed setting the ECB's "deposit rate", *below* zero, which means that banks would have to pay for funds on deposit at the central bank [13].

The stated aim of the unorthodox monetary policies adopted by the Fed is to stimulate more consumption and investment on the part of households and businesses through traditional channels.

Thus it was hoped that super-low interest rates would jump start investment spending, while re-inflation of asset prices on housing and financial markets stimulated consumption spending by pumping up household net worth. Yet, despite the abysmal failure of these policies to revive the stagnant U.S economy, the Fed has vowed to continue them indefinitely, and possibly to ratchet them up, e.g., by driving interest rates into negative territory.[1] But if these traditional channels of monetary stimulus remain stopped up the Fed has one more weapon at its disposal which it would resort to and which would be facilitated by the unorthodox policies that it is already using. This is the deliberate promotion of expectations of rapid inflation among the public, igniting panic spending by households and businesses eager to rid themselves of the depreciating dollar. Such spending would expand aggregate demand and presumably lead to a revival of real economic activity.

In thus targeting inflationary expectations, the Fed would be pursuing a monetary policy that has been advocated by prominent macroeconomists in the U.S. since the late 1990s. The discussion began during the Japanese Great Recession of the 1990s and continued during the initial episode of deflation-phobia triggered by Alan Greenspan's remarks in 2003.[2] It then flared up again after the financial crisis of 2008.

One of the first economists to call for monetary policy deliberately aimed at promoting inflationary expectations was Paul Krugman.[3] In 1998, Krugman diagnosed the Japanese economy as stuck in a Keynesian "liquidity trap," meaning that even with interest rates at zero, consumers and businesses were hoarding money and refusing to borrow and spend. So Krugman [15, pp. 3, 46] advised the Japanese government to adopt a policy in which the central bank would "credibly promise to be irresponsible" by committing "itself to pursue inflation where possible, and ratify inflation when it comes." Once people were convinced by this policy that "the real value of money" would "melt away over time," they would stop hoarding and begin spending money immediately, thereby lifting the economy out of the liquidity trap. Explained Krugman [17, p. 75]: "Once you take the idea of the liquidity trap seriously it's impossible to escape the conclusion that expected inflation can be a good thing, because it helps you get out of the trap."

An early endorsement of the Krugmanian strategy of fostering inflationary expectations as a cure for deflation was offered by none other than Fed Chairman Bernanke. In November 2002, then Fed Governor Bernanke [2] delivered a now famous speech that attracted very little attention at the time. In it he vigorously promoted the view that the Fed could and should create expectations of a permanently rising price level among the public as a means of combating an imminent deflation. The crux of his view was expressed in the following passage:

> The conclusion that deflation is always reversible under a fiat money system follows from basic economic reasoning. A little parable may prove useful: Today an ounce of gold sells for $300, more or less. Now suppose that a modern alchemist solves his subject's oldest problem by finding a way to produce unlimited amounts of new gold at essentially no cost. Moreover his invention is widely publicized and scientifically verified, and he announces his intention to begin massive production of gold within days. What would happen to the price of gold? Presumably, the potentially unlimited supply of cheap gold would cause the market price of gold to plummet. Indeed, if the market for gold is to any degree efficient, the price of gold would collapse immediately after the announcement of the invention, before the alchemist had produced and marketed a single ounce of yellow metal.
>
> What has this got to do with monetary policy? Like gold, U.S. dollars have value only to the extent that they are strictly limited in supply. But the U.S. government has a technology, called a printing press (or, today, its electronic equivalent), that allows it to produce as many U.S. dollars as it wishes at essentially no cost. By increasing the number of U.S. dollars in circulation, or even credibly threatening to do so, the U.S. government can also reduce the value

> of a dollar in terms of goods and services, which is equivalent to raising the prices in dollars of those goods and services. We conclude then that, under a paper-money system, a determined government can always generate higher spending and hence positive inflation.

N. Gregory Mankiw [20, p. 446], a former Chairman of the Council of Economic Advisers under George W. Bush, the author of a top-selling textbook on economics principles, once famously dismissed Keynes's *General Theory* as "an outdated book." In 2008, however, Mankiw [21] jumped on the Krugmanian bandwagon, arguing that the Fed "needs to convince people that we are going back to the normal inflation rate of 2 to 3 percent." In order to ignite the necessary inflationary expectations and stimulate spending, he suggested the following wording for a Fed press release:

> The [Federal Open Market] Committee recognizes that moderate inflation would be desirable under the present circumstances. In particular, the overall level of prices a decade hence should be about 30 percent higher than the price level today. The committee anticipates keeping the stance of monetary policy sufficiently accommodative to achieve that degree of inflation over the coming decade.

In other words Mankiw was recommending that the Fed announce to the public that it was going to deliberately inflate away approximately 25 percent of the dollar's value over the subsequent ten years. He extolled this "abandonment of 'price stability'" as "the modern equivalent of Roosevelt's abandonment of the gold standard" [21]. Of all the things that Roosevelt did to get the economy out of the Depression, according to Mankiw, jettisoning the gold standard was the most successful. Today, opined Mankiw, monetary policy is no longer fettered by gold but by fear of inflation.

Mankiw even went as far as endorsing, at least in principle, a proposal for driving the nominal interest rate below zero that is a modern equivalent of the scheme for a "carrying tax" on money proposed by 19th-century monetary crank, Silvio Gesell. In order to suppress the hoarding of money and stimulate spending, Gesell advocated a date-stamped paper currency that would lose 0.1 percent of its face value per week. Interest was also to be abolished under Gesell's plan.[4]

In the intellectual exercise formulated by Mankiw [22], the Fed would announce that a year from that date, it intended to pick a numeral from 0 to 9 out of a hat. All currency with a serial number ending in that numeral would instantly lose its status as legal tender, causing the expected return on holding currency to plummet to minus 10 percent. This would allow the Fed to reduce interest rates below zero for a year because people would happily loan money for, say negative 2 percent when faced with the prospect of losing 10 percent. At negative interest rates many people would now have a strong incentive to spend the money immediately on consumer goods, which was the Fed's aim.

Mankiw's proposal was certainly in the spirit of Gesell's work, whose stated goal was to subject money to deterioration over time in order to neutralize its advantage over commodities in terms of durability and thereby discourage its hoarding.[5] To be fair to Mankiw, this scheme was dreamed up by one of his graduate students, although Mankiw maintains that the plan "does address a fundamental problem facing the economy right now: Given the fall in wealth, increases in risk premiums, and problems in the banking system, the interest rate consistent with full employment might well be negative." This is a return to brute 1950s Keynesianism with a vengeance by one of the founders of the New Keynesian movement.

Another influential economist, Kenneth Rogoff (quoted in [24]), former chief economist at the International Monetary Fund and now a Harvard professor stated bluntly: "I'm advocating 6 percent inflation for at least a couple of years. It would ameliorate the debt bomb and help us work through the deleveraging process."

In the view of these macroeconomists and the policymakers under their sway, the calculated loosing of inflationary expectations on the economy would be a relatively costless way of spurring panic spending thus breaking the "liquidity trap" and getting the real economy moving. After all, there

does not have to be much of an actual inflation if the boobs in the private sector can be tricked by Fed pronouncements into foreseeing inflation in their future. Unfortunately what has not been considered by supporters of this policy of manipulating inflationary expectations is that it is very difficult to put the genie back in the bottle once it has been loosed. For the unhinging of the public's expectations about the future value of the money is the defining feature of the dynamics of hyperinflation. Indeed, history has shown time and again that confidence in a paper fiat currency is a very precarious thing and once lost propels the economy down the road to hyperinflation. Once the explicit threat of the destruction of the dollar's purchasing power becomes viewed as a legitimate tool of monetary policy, the actual destruction of the U.S. fiat dollar becomes a distinct possibility. Accordingly, a re-examination of the effects of hyperinflation from a new perspective is in order.

In what follows, I do not dwell on the narrowly economic effects of hyperinflation which have been thoroughly investigated in numerous studies (e.g., [3], [5], [7]). Instead, I proceed to examine the devastating consequences of hyperinflation for the closely related phenomena of private property and human personality, as they jointly evolved under a functioning social division of labor. A consideration of the German hyperinflation of 1923 clearly illustrates these consequences. It also sheds light on how Adolf Hitler and his National Socialist movement exploited these conditions by explicitly promoting the State as the new basis upon which a collectivized human personality could be reconstructed and made to flourish.

2. The Link between Economic Calculation and Human Personality

It has been well documented by economic theorists and historians that hyperinflation, in destroying the value and function of money, makes economic calculation impossible and leads to economic and social disintegration and widespread poverty. What is not so clearly understood is that during periods of rapid inflation, the inability to calculate undermines the very nature of property and causes a withering of the human personality, which is inextricably bound up with property ownership. By eliminating the means of appraising and comprehending one's property, hyperinflation eliminates the very basis of independent human existence and personality under the social division of labor. In some cases, as we shall see, this may result in the dissolution of the society of voluntary contract and its eventual replacement by a hegemonic order in which property and personality is collectivized.

The central role of money and property in the formation of the individual human personality under the social division of labor has yet to be investigated in any depth and will not be attempted here. However I note that in speaking of human personality, I am referring to what has been called, sometimes derisively, the "bourgeois personality."[6] This is the common state of thinking and being that characterizes the modern individual embedded in a private-property social order. This individual is goal-oriented, self-interested (but not necessarily, or even mainly, selfish), thrifty, wealth-accumulating, and uses time as a scarce resource in improving his productivity and planning for his future welfare and those of his descendents living and yet to be conceived.[7] In pursuing his own interests, he must consciously and repeatedly take recourse to social action, producing for and exchanging with known and unknown others, thereby integrating himself into the social division of labor. Social action, which is necessarily guided by market prices, involves purposeful choice of concrete means and ends and the monetary calculation of costs and benefits. "Human personality" as the term is used here, therefore, does not denote a cluster of psychological attributes and qualities; rather it is a mode of being and becoming based on economic calculation and the ownership of property.

3. Money, Inflation, and Property

As the general medium of exchange money is the tool of economic calculation and the pre-eminent store of value. Once the future value of money becomes impossible to reliably forecast, ordinary people lose the ability to preserve their accumulated savings and thus become incapable of planning for the future. They cease to actively employ time as a device for planning improvements in future welfare by exploiting lengthier and more fruitful production processes. Instead they are compelled to passively experience time like beasts do, as mere duration. This leaves them little recourse but to dissipate their wealth and energy in seeking after immediate gratification. This rise in time preference – that is, in the premium on present satisfaction relative to satisfactions in the more remote future – undermines the values of productive work, thrift and sober investment and brings about a social revolution in which the middle classes and the productive rich, that is, the entrepreneurs, capitalists and inventors are destroyed and replaced by gamblers, con artists and swindlers at the top of the social structure.

Inflation does not just wipe out the savings of the productive classes and divert their energies into sterile and corrupt pursuits, however; it also deforms and attenuates their personalities. Whether we like it or not, men and women exist in a world where they cannot live and flourish either physically or spiritually without property. As the founder of the Austrian school, Carl Menger [23, p. 76] pointed out, "property is not an arbitrarily combined quantity of goods but a direct reflection of [a person's] needs, an integrated whole, no essential part of which can be diminished or increased without affecting realization of the end it serves." Thus property is the foundation of human personality – no meaningful motion, activity, or external expression of inner being (thought) is possible without it. For human personality is not the spontaneous projection into the outer world of random inner urges that characterizes the unreflective behavior of a human infant. Personality is the external projection of a deliberately planned mode of individual being and becoming. As such, it involves a self-conscious arrangement of activities whose pursuit requires a carefully chosen structure of means, i.e., property. Property is therefore not a haphazard collection of things that can be completely described in physical terms but rather the coherent, objective embodiment of the yearnings and aspirations of the human spirit.

In a real sense, then, property defines and delimits an individual's personality. One cannot be whatever he wants to be; he is rigidly limited by the means at his disposal. One is not truly a "physician," "software engineer," or "restaurateur," unless he can acquire the requisite "complementary goods" for producing the product or service. Nor can one even consistently pursue leisure or vocational activities without possessing specific concrete means. Thus one is not a "fisherman" without fishing tackle and access to a boat and body of water; and one is not a "golfer" or "gardener" without the possession of – or the means of acquiring – the needed complementary golfing equipment or gardening tools.

Furthermore, in an exchange economy, it is economic calculation based on money prices that gives meaning to a collection of different kinds of concrete goods and enables the actor to transform these goods into an integrated structure of property suited to his system of ends. Without money prices and future price appraisements to guide him in his calculations, a person is unable to specialize in a particular profession or business, because he can never know whether these activities will help sustain his existence.[8] Furthermore, one does not know the degree of his success or his position in the social structure unless he can calculate the monetary value of his possessions. Has he achieved eminence or suffered crushing disappointment? Is he prince or pauper?

People do not even know what or who they will become in the future without knowing the monetary value of their accumulated savings and assets and the ability to assess the prospects of future accumulation. All their plans for themselves and their children are shaped by this knowledge and the possibility of this assessment. Will an individual be comfortably ensconced in a retirement community

on a golf course in North Carolina at the age of 60, or will he be greeting customers at the local Home Depot as a septuagenarian? Without economic calculation there is no way for him to develop a meaningful plan to influence this eventuality.[9] In other words, if one does not know what his real income will be from day to day or what his financial and real assets, that is his "property," will be worth in a week, his range of planning and action narrows sharply and external events appear to him as random and beyond his control.[10]

Money and property are thus essential elements in the socio-economic process conditioning what an individual human being is and can become. Without economic calculation based on sound money, not only is it impossible for entrepreneurs and businesses to reasonably calculate the outcome of alternative production decisions, it also becomes problematic for a person to even know who he is or to reasonably assess the possibilities of what he can become. During the German hyperinflation, for example, University professors and high-ranking civil servants on relatively fixed salaries could no longer support themselves and their families and, overnight, "became" taxi drivers and waiters, with all that implies for their professional and personal relationships, future prospects, and social position.

For an empirical illustration of the effect on human personality of the destruction of calculation and property we now turn to the episode of the German hyperinflation of 1921-1923 and its aftermath.

4. The Destruction of Property and Personality during Hyperinflation

In the extreme case of hyperinflation, as the value of money hurtles toward zero, property loses its meaning, human personality withers and society disintegrates. This all-important connection between money and property on the one hand and human personality on the other was dramatically and poignantly expressed by the German historian and sociologist, Konrad Heiden, a shrewd observer of the great German hyperinflation that culminated in 1923. Wrote Heiden [11, p. 172]:

> [T]he German people was one of the first to witness the decay of those material values which a whole century had taken as the highest of all values. The German nation was one of the first to experience the death of the unlimited free property which had lent such a royal pride to modern humanity; Money had lost its value – what, then, could have any value? Of course, many were accustomed to having no money; but that even *with* money you had nothing – that was a twilight of the gods, as horrible as anything Wagner could have foreseen. A cynical frivolity penetrated men's souls; no one knew what he really possessed and some men wondered what they really were.[11]

Heiden's insights are illustrated in the recollections of a woman who lived through the German hyperinflation, Erna von Pustau, a middle-class resident of Hamburg who was interviewed by the eminent American writer Pearl S. Buck. Pustau's reminiscences reveal how the German people lost their intellectual and spiritual moorings amid the calculational chaos of hyperinflation. The inability to perform simple arithmetic calculations with money that were a matter of routine in the past sowed confusion of thought and wreaked havoc with language. As Pustau recalled to Buck [4, p. 122]:

> But, you see, we could hardly say that our mark was falling, since, in figures, it was constantly going up and up and up, and so did the prices, and this was much more visible than the realization that the value of our money was going down. It sounds confusing, doesn't it? But this confusion belongs to inflation, is inseparably connected with it, and was one of the reasons why the people gave up thinking things out. It all seemed just madness and it made the people mad.

Referring to a popular song of the day, Pustau (quoted in [4, p. 139]) quoted the following line: "We are drinking up our grandma's little hut and the first and second mortgage, too."[12] She then remarked, "Saving is the very source of wealth and health of a sound nation. But, we have no longer a sound nation. We are on our way to become a crazy, a neurotic, a mad nation." Pustau (quoted in [4, p. 140])

also lamented the spiritual trauma inflicted by the sudden collapse of the social structure: “It was a sad world, a world in which none was better than the other and all was a matter of chance and degree. A sad world, and a sad conception for a girl who still remembered the good old times of Grandmother! Our times made us cynical.”

The “madness” and “cynicism” Pustau speaks of manifested itself in bizarre incidents. For example, the Prime Minister of Bavaria submitted a bill to the Bavarian legislature that would have outlawed “gluttony.” According to the bill (as quoted in [5, p. 61]), a glutton was defined as “one who habitually devotes himself to the pleasure of the table to such a degree that he might arouse discontent in view of the distressful condition of the population.” Such a person “may be arrested on suspicion, and punished by imprisonment and/or a fine of up to 100,000 marks for a first offense.” A second offense would entail the convicted glutton to serve a prison sentence of up to five years, pay a fine of up to 200,000 marks, and be deprived of his civil rights. There was also a provision in the bill for punishing caterers who aided and abetted the crime. The bill never passed.

But such events in the political arena were merely a reflection of daily social interactions, especially those involving monetary exchange, whose cumulative effect was to drive individuals “mad.” Pustau, a music lover, recounted such an ordeal. She and her suddenly impoverished middle class friends were forced to wait for hours in line to purchase standing room tickets to see Wagner’s “The Twilight of the Gods.” Most of the seats in the theater had been bought by dilettantes who chose to attend not because they were genuine music lovers but because they had gained a windfall from the inflation. This incident impressed on Pustau that the malfunctioning of money penetrated to the very core of one’s self-identity and radically reshaped her most cherished goals and beliefs about the world. Thus she stated (quoted in [4, p. 128]):

> [Wagner’s gods] set fire to the entire world, yet they did it for great things, for heroic deeds, for love – for this beautiful thing love. And how is it with us? We fight for tickets, we fight for pennies. It is these ugly little things that break us down. It was all so mixed up with money. We used to consider money as nothing and we said, ‘Money is dirty,’ and ‘One doesn’t speak about money.’ And here everything was mixed up with money and with small sums only and small things.

Pustau’s observations here point up a paradoxical situation. As money rapidly lost its value disrupting and falsifying routine economic calculation, it began to intrude into and absorb much of people’s conscious thought. Indeed during the final stage of the collapse of the German mark, when money had lost its *function* even as a medium of exchange – e.g., German farmers refused to sell their produce in the cities and towns for paper money – there appears to have developed a morbid and all consuming fixation on the empty *form* of money as represented by the worthless paper mark. In a letter written to the British Foreign Office in early November1923, British businessman J. C. Vaughn (quoted in [5, p. 200]) starkly illustrated this strange phenomenon:

> I happened to pass through the Arcade between the Friedrichstrasse and Unter den Linden, and in that small space I saw three almost moribund women. They were either in the last stages of decline or starvation, and I have no doubt it was the latter. They were beyond asking for alms, and when I gave them a bunch of worthless German notes, it shocked me to see the eager way in which they seized upon them – like a ravenous dog at a bone.

It is not surprising, then, that Pustau (quoted in [4, p. 146]) summed up her recollections of the hyperinflation by comparing the cultural and moral effects of hyperinflation to those of war:

> For a battle it was this inflation, fought out with financial means. The cities were still there, the houses not yet bombed and in ruins, but the victims were millions of people. They had lost their fortunes their savings; they were dazed and inflation-shocked and did not understand how it had happened to them and who the foe was who had defeated them. Yet they had lost their self

> assurance; their feeling that they themselves could be the masters of their own lives if only they worked hard enough; and lost, too, were the old values of morals, of ethics, of decency.

Heiden [11, pp. 172-73] poignantly summarized the general lesson of the experiences of the millions of Germans like Erna Pustau who were caught up in the hyperinflation:

> Man had measured himself by money; his worth had been measured by money; through money he was someone or at least hoped to become someone. Men had come and gone, risen and fallen, but money had been permanent and immortal. Now the State had managed to kill this immortal thing. The State was the conqueror and successor of money. And thus the State was everything. Man looked down at himself and saw that he was nothing.

Thus, as Heiden keenly perceived, in Germany the abolition of money through hyperinflation rendered property meaningless and thereby obliterated the ontological basis for the formation of individual human personality. Social and economic institutions long taken for granted disintegrated and disappeared, and the social structure itself began to dissolve causing human existence to become atomized and aimless. Thought, language, values, culture – all were deformed, as the interior life of the individual was inexorably drained of meaning and purpose and, in large measure, extinguished.

Heiden [11, p. 167] concisely summed it up:

> The state wiped out property, livelihood, personality, squeezed and pared down the individual, destroyed his faith in himself by destroying his property – or worse, his faith and hope in property. Minds were ripe for the great destruction. The state broke the economic man beginning with the weakest.[13]

5. The State as the Molder of Personality

There was nothing definite left but the State to fill the economic and spiritual void created by the German hyperinflation. Now, a shrewd and cunning German politician, Adolf Hitler, understood the nature of inflation as a gigantic material *and spiritual* swindle and recognized the deforming of German souls and personalities and the corresponding disintegration of German society. Hitler both taunted the German people for acquiescing in the swindle and at the same time promised them material relief and spiritual regeneration in the State, the successor of money.

Heiden [11, p. 165] reported that Hitler told the following story at a meeting in the summer of 1923:

> We have just had a big gymnastic festival in Munich. Three hundred thousand athletes from all over the country assembled here. That must have brought our city lots of business, you think. There was an old woman who sold picture postcards. She was glad because the festival would bring her plenty of customers. She was beside herself with joy when sales far exceeded her expectations. Business had really been good – or so she thought. But now the old woman is sitting in front of an empty shop, crying her eyes out. For with the miserable paper money she took in for her cards, she can't buy a hundredth of her old stock. Her business is ruined, her livelihood absolutely destroyed. She can go begging. And the same despair is seizing the whole people. We are facing a revolution...

Hitler perceptively noted that once the government had begun to run the printing presses "full time," it was from that moment doomed to continue the "swindle" until the bitter end of a hyperinflationary breakdown. Stopping the monetary expansion would reveal to workers that their real income was substantially less than they realized and much was being siphoned off to pay reparations to foreign powers as mandated by the Treaty of Versailles. This revelation would spell the downfall of the government. In the meantime, people's confidence in the established moral and social order associated with capitalism would be shattered as the vicious would replace the virtuous at the top of the socio-economic structure. Proclaimed Hitler (quoted in [11, p. 170]) in his daily newspaper in 1923:

> The government goes on calmly printing these scraps, because, if it stopped, that would mean the end of the government, because once the printing presses stopped – and that is the prerequisite for the stabilization of the mark – the swindle would at once be brought to light. For then the worker would realize that he is only making a third of what he made in peacetime. Believe me, our misery will increase. The scoundrel will get by. But the decent, solid businessman who doesn't speculate will be utterly crushed; first the little fellow on the bottom, but in the end the big fellow on top too. But the scoundrel and swindler will remain, top and bottom. The reason: because the state itself has become the biggest swindler and crook. A robbers' state.

Now, although Hitler spoke more truly and perceptively about the nature and effects of inflation than our current Fed chairman and establishment macroeconomists, his intent was not to present a program for abolishing the "robbers' state" and restoring sound money, private property and the moral and social order of capitalism. In fact, Hitler was a socialist who hated capitalism and bourgeois morality. His aim was to frighten and shame the property-less, demoralized and atomized German masses into abandoning the venal and short-sighted social-democratic politicians of the Weimar Republic and to seek salvation in a dictatorial state run by his National Socialist movement. Accordingly Hitler accurately prophesied that people who were earning billions of marks would literally starve to death. The farmer will stop selling his products for the worthless billions, "with which he can paper his outhouse on the manure heap." What Hitler (quoted in [11, p. 171]) hoped to bring about was the "revolt of the starving billionaires." According to Hitler (quoted in [11, p. 172]), "If the horrified people can starve on billions, they must arrive at this conclusion; we will no longer submit to a state which is built on the swindling idea of the majority, we want dictatorship!"

Hitler however used more than fear to motivate his listeners. He capitalized on the self-contempt of those who had been swindled out of their property and moral values and whose sense of self had been shattered. He saw that persons such as these had reverted to the unformed state of adolescence and were ready to follow a Leader – to reconstruct their own moral codes and personalities according to the artificial collectivist and nationalist ideal projected in the Leader's twisted vision. Hitler (quoted in [11, p. 173]) addressed and chastised them accordingly:

> The German people [is] made up of children, for only a childish people will accept million-mark bills. True, a third of the German people are heroes, but another third are fools, and the last third are cowards. True strength is a quality of a few men, or else we would not have the word hero. The masses consist of average men, democrats. Cowardly men choose the most cowardly as their leaders, so that they won't have to show courage; and they choose the stupidest among the stupid, so that everyone can have the feeling that he's a little bit better than the leader. A people subjected to the decisions of the majority is on the road to ruin.

Heiden insightfully connected Hitler's aim in his speeches on hyperinflation with the derangement of Hitler's own personality as a product of the same moral, economic and social catastrophe of hyperinflation. Heiden [11, p. 174] characterized the link as follows:

> It was the artificial building of a new national character, an *ersatz* character, an attitude created in accordance with an artificial plan. The people dream and the soothsayer tells them what they are dreaming. This continuous, domineering yet intimate conversation with the people could only be carried on by a man who was people and enemy of the people in one; a torn personality who felt himself a trampled fragment of the people in his own downtrodden miserable nonentity, and rebelled with the people against this destiny; but who at the same time was convinced of the absolute necessity of trampling, coercing and shaking the master's fist.

Hitler not only utilized this theme of the degeneration and reconstruction of personality as a rhetorical device. He developed it into one of the fundamental principles of the National Socialist philosophy. In

a chapter entitled "Personality and the Conception of the Folkish State" in *Mein Kampf*, Hitler [12, p. 443] went on to elaborate his vision of the National Socialist state whose "chief task" he saw as "*educating and preserving the bearer of the state*." Underlying this state would be a philosophy that "*builds not upon the idea of the majority, but upon the idea of personality."* (The emphases are Hitler's.)

For Hitler, personality was born of the inventive ideas and creative actions of especially able individuals, but only reached its full realization in the organized State, and especially the leadership of that State. Individuals do not possess personality but are possessed and molded by it; their being does not emanate from within but penetrates inward from without, from the State and its Leader. Thus Hitler [12, pp. 444, 446] wrote:

> [Man's] first intelligent measures in the struggle with other beasts assuredly originate in the actions of individual, particularly able, subjects. Here, too, the personality was once unquestionably the cause of decisions and acts which later was taken over by all humanity and regarded as perfectly self-evident. The most valuable thing about the invention itself, whether it lie [sic] in the material field or in the world of ideas, is primarily the inventor as a personality. Therefore to employ him in a way benefitting the totality is the first and highest task in the organization of a national community. Indeed the organization itself must be a realization of this principle. Thus, also, it is redeemed from the curse of mechanism and becomes a living thing.

The "living thing" that Hitler refers to above is the "national community" which is infused with personality and being by the State. According to Hitler [12, pp. 446-47] this "selective process" of personality is "the most natural principle." It pervades and organizes all fields of human endeavor including thought, art, and economic life. Indeed, Hitler argued, "the idea of personality is everywhere dominant – its authority downward and its responsibility toward the higher personality." However, it is stifled and incompletely realized because it is barred from entering political life by the antithetical principle of majority. Hence, Hitler [12, pp. 446-47] argued, "*The best state constitution and state form is that which raises the best minds in the national community to leading position and leading influence*." (The emphases are Hitler's.) Within a decade of the publication of these words, Hitler was to have the State that would displace money and private property as the shaper of human personality.

6. Conclusion

The German hyperinflation is a concrete example of how the destruction of property affected human personality formation among a particular people in a given historical epoch. Nonetheless, it illustrates a link between property and personality that is based on the universal principles established by praxeology, the same science of human action that encompasses sound economics. In contrast, the mechanistic, compartmentalized, and hyper-mathematical discipline that is contemporary macroeconomics can never begin to grasp the full moral and social enormity of hyperinflation. Its narrowly specialized practitioners are not even conversant with all the branches of economic science, let alone the closely allied disciplines of history, sociology, psychology and political philosophy. A working knowledge of the main conclusions of the latter disciplines is necessary for an economist who seeks to fully explain the causes and consequences of a complex economic event such as the German hyperinflation of 1923 or the Great Depression of the 1930s. As Friedrich Hayek [10, p. 123] pointed out, "Nobody can be a great economist who is only an economist – and I am even tempted to add that the economist who is only an economist is likely to become a nuisance if not a positive danger."

Certainly, macroeconomists like Bernanke, Krugman, and Mankiw, are "a positive danger," as they casually contemplate the deliberate creation of inflationary expectations to free us from an imaginary liquidity trap or impending deflation. But there is also an important sense in which they are

not really economists at all. From its inception as a systematic science in the eighteenth century, the central concern of economics has always been scarcity. Yet, as Hayek [9, p. 374] perceptively noted many years ago, Keynes's economics, upon which modern macroeconomics is founded, "is a system of economics which is based on the assumption that no real scarcity exists, and the only scarcity with which we need concern ourselves is the artificial scarcity created by the determination of people not to sell their services and products below arbitrarily fixed prices." In Keynes's view, all productive resources, including all kinds of labor and capital, therefore exist in idle superabundance solely because there is a scarcity of money available to set them to work. Hayek [9, p. 373] concluded, "The existence of interest in such a world would be due merely to the scarcity of money, although even money would not be scarce in any absolute sense; it would be scarce only relatively to given prices on which people were assumed to insist."

By promoting a zero or even negative interest rate and contriving policies to destabilize the value of money and induce panic spending, contemporary macroeconomists have returned to Keynes's primitive and contradictory conception of an "economics of abundance." But instead of guiding us into the paradise of full employment and personal fulfillment, these policies will propel us inexorably toward the destruction of the natural private-property order and the individuated human personality it gave rise to.

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Notes

1. As early as 2009, Fed staff economists prepared an internal study suggesting that the Fed Open Market Committee adjust the extent of its "unconventional monetary policies" using an "ideal interest rate," then estimated by the Taylor rule to be minus 5 percent [8].
2. On this episode, see Salerno 2010.

3. Krugman [16] even jealously claimed priority for suggesting this policy.
4. For a short summary of Gesell's ideas and works, see [19, p. 95]. Gesell also favored the abolition of interest. He served as People's Representative for Finances in 1919 in the short-lived Bavarian Soviet Republic, although his term lasted only seven days. Keynes [14, p. 353] mentioned Gesell favorably in the *General Theory*, referring to him as a "strange, unduly neglected prophet" and to his ideas as "profoundly original strivings."
5. Wrote Gesell [6, pp. 17-18]:
   Nobody, not even savers, speculators, or capitalists must find money, as a commodity, preferable to the contents of the markets, shops, and warehouses. If money is not to hold sway over goods, it must deteriorate, as they do. Let it be attacked by moth and rust, let it sicken, let it run away; and when it comes to die let its possessor pay to have its carcass flayed and buried. Then, and not till then, shall we be able to say that money and goods are on an equal footing and perfect equivalents. [W]e must subject money to the loss to which goods are liable through the necessity of storage.
6. I am indebted to David Gordon for this insight.
7. The notion of time as a tool deliberately used by people to enhance their productivity and future welfare is particularly emphasized in Austrian capital theory. See, for example, [26, pp. 476-520] and [28, pp. 367-451, 509-55].
8. On the meaning and importance of future price appraisement to economic activity, see: [26, pp. 328-35]; [29, pp. 42-45]; and [30].
9. This is not to deny that an isolated individual can directly value and act to achieve simple ends that may permit him to subsist from day to day, e.g., foraging for food, drawing water from nearby streams, fashioning simple cooking and hunting implements, etc. Thus, as Mises [26, p. 244] pointed out, "Robinson Crusoe, who may have existed would not have been in a position to plan and to act as people can only when taking recourse to economic calculation." On the limited scope of actions that may be accomplished in the absence of economic calculation, i.e., under the conditions of autarky or barter, see Mises [26, pp. 201-212].
10. I owe this insight to Dr. Karen Palasek of the Palasek Consulting Group, LLC.
11. Heiden [11, p. 164] was the leader of a small democratic organization in 1923 when he came into conflict with Hitler and his movement early in the latter's career by sponsoring anti-Nazi parades, mass protests, and large posters.
12. Pustau is here referring to what Austrian economists call "capital consumption" which results from the overstatement of wealth and profits by inflation and attendant overconsumption by households, investors and entrepreneurs. For a discussion of capital consumption as it related to the housing and financial bubbles of the early 2000s, see [31]. Also see the discussions of this phenomenon by Mises [26, pp. 546-47] and [28, pp. 996-997]. The classic article on capital consumption during hyperinflation is by Fritz Machlup [18].
13. In this passage, it is clear that Heiden is here not referring to the abstract and atomized "economic man" of technical economic theory, but to the bourgeois man, the social being emerging from and rooted in private property and the market order.

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Epistemological Imperfections of Transformational Processes in Transitive Countries

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Abstract:
From the epistemological point of view policymakers in transitional economies operated in the severely distorted information environment. Neither theorists or decision makers paid attention to the problem of economic calculation that was an integral part of a centrally planned economy and its immediate institutional followers in transition. Interventionists (political and government employees) made investment, production and redistribution decisions based on their subjective judgment and preferences trying to perform cyclical or countercyclical policy. Their knowledge of the business cycle as superficial and not based on a solid scientific base. In fact they considerable increased transformation costs and built fragile institutions prone to recurrent crises. Theorists of transition failed to single out the subject of economic actions – *homo agens*. Erroneously *homo oeconomicus* was taken as a doer and he was put in the frameworks of equilibrium models. Aggregate indicators of these models distorted the reality of actual discovery process by acting individuals even further. Macroeconomic approach to the analysis of transitional phenomena could not provide the information and insights that Austrian school of economics based on methodological subjectivism could. Interventionists focused their attention of neutralizing so-called market failures instead of emphasizing government failures and severe economic, social and institutional costs of state intervention. Interventionists created the whole vocabulary to justify their actions and outcomes. Vague concepts like social welfare or well-being, sustainable development, national interests were used to restrain political and economic competition, accountability of all cost and benefit outcomes in the SWOT analysis. The inclusion of theoretical achievements of Austrian school of economics into the analysis of transformation processes considerably broadens and deepens our understanding of both human actions in transformation and their outcomes.

Transformation processes in post-socialist countries of Central, Eastern Europe and Central Asia are the object of scientific analysis in many countries. They are complex and multi-faceted. In this work I will examine the epistemological problems of transfer from centralized planned economy to the system of a free market from the theory of Austrian Economic School. This approach is different from the analysis based on the neoclassical synthesis or econometric modeling as the methodology of humanities is different from the natural sciences methodology. Using the right economic science methodology gives completely different results. They are valid both for policymakers and economic subjects. The results of analysis of system transformations using the approaches of methodological subjectivism are different from analysis of static hypothetically equal statements with the help of aggregate statements and models in which the certain decisionmakers' and economic subjects' actions are not considered and the individual goal-setting is reduced to an average materialistic interpretation of the concepts of "benefit" and "welfare".

The systemic reforms epistemology supposes determining, receiving and using objective scientifically valid information and knowledge for the diagnostic of the state of significant for policymakers and decisionmakers parameters of economic and institutional field. First of all it is

necessary to diagnose correctly the old system, which found itself in the state of deep crisis. The crisis became a reason for searching the paradigms of systemic transformation. We speak about the systemic transformation, because only small, cosmetic corrections of old institutes and mechanisms of interaction and coordination of economic subjects' and policymakers' actions were impossible.

The system transformation should start with the correct diagnosis of the state of an old system, correct definition of its parameters and cause-and-effect relationships, sources of crisis, its net beneficiaries, net payers and incentives of the main economic actors including public administrations.

The necessary element of the complex schedule of system transformation is the determination of the quantity and quality parameters of the target system the policymakers are planning to create. Than the reformers should not only create an action plan for public administrations, but convert it into laws, decrees, regulations, procedural instructions, etc. A special task on this step is to coordinate tens governmental bodies and thousands policymakers. Formation of some kind of hypothetic headquarters aimed to coordinate the reformers' actions can be suggested as an ideal scheme. In this case the expenses of the coordination deficit of numerous organizations and governance structures can be minimized. The complexity and multi-level nature of tasks don't allow us to expect the unambiguous interpretation and consistent decisions from deceisionmakers on the transformation of old institutes, organizations and mechanisms of centralized planned economy to market economy. In this situation we don't speak about subjective qualities and the level of training of politicians, officials and analytics who prepare the decisions. We speak about the theoretical problem of receiving the information, its processing and coordination in conditions of significant epistemological distortion.

1. The Absence of Objective Basis for Formation of Market Prices

One of the objective parameters of informational environment was the absence of private ownership on all factors of production. This state meant that in the centralized planned economy the prices as a market phenomenon could not objectively exist. The quantitative indicators the rate of which was established by the governmental bodies based on factors and parameters which were not connected or indirectly connected to real value and consumer preferences of economic actors. With such an epistemological nature of price in the frameworks of centralized planned economy we can say that instead of the price in the economy were common units and calculations. Its dynamics depended on non-economic or, more correctly, predominantly non-economic factors.

In the market economy based on a private ownership free prices are the informative indicators for economic actors. They represent the results of their actions and choice. They reflect their subjective preferences, which are the manifestations of achieving of the target sets on maximizing the utility of within the frameworks of existing information field and institutes. Free market prices is a must for full-scale market relationships and objective information field. Any interventions of state powers to the prices of factors of production, including money, distort the most valuable thing in the market economy – system of coordination of all market actors. This coordination is implemented through the mechanism of free prices. This is a fundamental difference from the centralized planning system, which deals with not the prices itself but their substitutes, i. e. the quantitative indicators chosen by the economic actors. I call them the managers of borrowed, highlighting, first of all the relation of these managers to assets and property and secondly paying the attention to the incitement of saving and maximizing value both for themselves and for principal, i.e. the citizens.

The managers of foreign are the decisionmakers, politicians and officials, which take political and economic decisions not within the frameworks of their private property, but while distributing and administrating the public finances, state assets and national property. The part of national property in the centralized planned economy was up to 100%. In such systems all prices

are distorted and this leads to huge distortions while allocating the resources, i. e. making investment, consumer and other decisions.

At any given time the prices are the numeric expression of real consumer's and producer's preferences, i. e. supply and demand. We should note, that this choice is a result of analysis of the data of the past. It is dotted and is connected only to a particular moment of the past.

The price is definitely a fact of the economic history. After a certain choice the economic actor continues making other choices many of which are of non-economic character. He analyses the information ex ante (before the action) and takes into consideration his expectations. After a choice the information ex post is also included in this volume. This information is an aggregate estimation of a number of parameters and phenomena. They include the subjective estimation of a goal, chosen means, personal satisfaction of achievement/failure in reaching the goals and reviewing the goals and the means for near and distant future.

The methodology of Austrian School of Economy[1] explains the formation of the market price through the actions of an individual within the framework of his private property. This approach is in the fundament of methodological individualism. According to this methodology prices and other market phenomena are the result of values, preferences and subjective estimations of individuals. The price of a loaf of bread, a computer or a haircut does not depend on 1) "utility" of these categories of goods, 2) value of stock balance (the interpretation of the classical economical school) – it depends on the satisfaction which a man hopes to get from a definite amount of goods or services at a certain time. So, the market price depends on an expected marginal utility for a certain man. K. Menger said that: "The value of every amount of goods is equal to it simportance in satisfaction of different human wishes" [9]. Later in the book *The Money and Credit Theory* [12] L. fon Mises integrated the theory of a marginal utility and the money theory. The necessary condition of a free price is the absence of a price control and the private nature of money based on ametal standard. Only in this case the price of money is an objective informational indicator, which fulfills its coordinating function. In the case of monopoly of money production and the refusal from their commodity (golden, silver) base of a price of money are established by the managers of foreign (politicians and officials) and reflect not the balance of preferences, values and tastes of homo agens (an acting human), but the values and interests of only a few people.

2. A Methodological Mistake: the Substitution of Homo Agens with Homo Oeconomicus

A principal difference between the neoclassical and Austrian schools of economy is the attitude to the actor, i. e. a person who commits an act. Classics and neoclassic describe the actor as a homo oeconomicus. It is a person, who is lead by only economical, financial motives, i.e. the maximization of a benefit in money terms. For Austrian school of economy the main actor of the economic theory is a homo agens, i.e. an acting man. He acts for the purpose of satisfaction of his different needs, not only financial needs. Such person acts in the unique informational field, possesses the unique hierarchy of values and prices. The choice of means for achieving his subjective goals is also unique. As long as the concept of a "marginal utility" of goods or services for a certain man objectively has not got a numerical unit and a person acts in the same way both reaching his financial (expressed in monetary units) and non-financial (those, which can't be expressed in monetary units) needs (friendship, reputation, love, self-respect, joy, etc.), the homo agens is a natural, objectively existing object. And homo oeconomicus is only an artificial object, which does not exist in real life.

The fundamental mistake of the German school of economy, American institutionalism and the varieties of Keynesianism – and these very theories were chosen as a basis for developing of systemic transformation programs – was an interpretation of the economy on the assumption of an ideal human (homo oeconomicus) behaviour. These doctrines deal with not a real person but with some kind of hypothetical, ideal subject. He is led by exceptionally "economic" motivations, i.e. a wish to "maximize" the benefit. Such phantom does not exist in real life. History deals with unique,

one-of a kind events. A historic event cannot be described without mentioning people, places and dates. The fact that a professor conducted a chemical experiment in his laboratory on May 31, 2012 is a certification of a historic event. Any chemist can check the data of the experiment. He takes only the data connected with his experiment. He transforms a historic event to an empiric fact of natural science. In spite of their unique character all historical events have one in common – they all are the examples of human activity.

Austrian school of economy makes a clear distinction between Economic history and Economics. This school of economic research believes that economic statistics are the reflection of people's action at a definite moment of the past. In their opinion Economics is a universal science, which use logic, sense and methodological individualism for analysis of any human action at any place and any time.

The substitution of homo agens with homo oeconomicus leads to glaring mistakes both in theoretical analysis and economic policy. Economics aimed at describing our real life, searching for objective cause-and-effect relationships, cleaned from subjective estimations and statements. If the object of Economics is homo oeconomicus, which is only an artificial creature, the description of will be fragmentary and incorrect. All mistakes of this approach are particularly evident when we speak about such concepts as "optimization", "efficiency", "social balance" or "improving the welfare of the country".

The definition of an "optimum" or establishment of an optimal way of economic resources definition in the situation when the science describes a really acting man homo agens is possible in the system, when every actor can (if he is not forbidden to do it by law or there is no additional costs for his subjective goals) set his goals, choose the means to achieve them and estimate the result by himself. Moreover, the concept of an "optimum", "effective distribution" refers only to an acting man (homo agens), not to the group of people, companies, sectors or the economic system on the whole. This conclusion is based on subjective, marginal nature of a value. Only a man and only ex post can estimate whether he has achieved his goal and were the chosen means effective or not. But even having such information he cannot say whether he has achieved an optimum or the expected balance. To answer this question he needs to compare the achieved result with the alternative usage of means and resources to achieve another goal. But such experiment is not possible in real life. The experimental method can be used only in natural sciences. Life cannot be reversed. While in Physics and Mathematics we use impersonal, inanimate symbols, here we know real cause-and-effect relations. And the reason of changes is homo agens. His substitution with homo oeconomicus is a major violation of laws of economic science methodology, such as the substitution of methodological individualism with the natural sciences methodology.

While estimating the state of economy at the very beginning of systemic transformation and the development of systemic reforms program economists and policymakers considered the man homo oeconomicus, not homo agens. They wanted to optimize the distribution of national economy, carrying out the substitution of goals, individual statements and preferences. The representatives of neo-classic school carried out the substitution of the goal-setting subject, that, in the context of huge distortions of all forms of capital (land, money, goods, labor force) and the absence of objective price indicators (in view of an absence of private property) increased rapidly not only the additional costs of systemic transformations, but also the number of mistakes.

3. Epistemological Imperfections of Aggregate Indexes

Finances is a special topic in transformation processes. For the analysis of finances phenomena the Austrian school followers use the principles of methodological subjectivism and individualism.[2] The value of money as all other goods is determined by their marginal utility for acting subjects (homo agens).The state monopoly on money, severe regulation of the price of money and active interventionism on the money and financial markets is a huge source of price information distortion for making decisions in economy on the whole by the economic operators.

Without the reconstruction of market mechanisms on the money market, without returning to the goods standard money remains the factor of permanent informational asymmetry. One of the reason of high additional costs of the transformation processes in emerging economies was an almost total absence of theoretical discussion on a monetary theory and nature of business-cycles.

The followers of Keynesian and Monetary schools discuss the money from the position of aggregate indexes, which are the derivatives of theories not connected with the money marginal utility theory. In such analysis the main indexes are "general level of prices", "nominal wages" and "the Central Bank discount rate". J. Keynes and his contemporary followers do not pay attention to relative prices. F. von Hayek estimated the aggregate approach form money analysis:

> If… the monetary theory still tries to reveal a causal relationship between the aggregate indexes and general averaged indexes, it means, that the monetary theory hangs behind the development of the economy in general. Aggregate indexes and averaged amounts do not influence each other. To reveal their cause-and-effect relationship is impossible, but such relations can be between individual phenomena, individual prices, etc. [4].

The microeconomic approach of Mises – Hayek, which reflects the essence of their methodological individualism, is totally different from J. Keynes' point of view. This fundamental difference became a source of discussions about the utility of statistical analysis in social sciences on the whole. The problem of validity of the initial data, which is included into difficult calculation formulae has an epistemological nature. People, who often use such calculations, put forward different theories and do not refuse of them even if their opponents provide empirical evidence of their falsity. Such situation was, for example with the revealing of cause-and-effect relationships in so-called Phillips curve.

Austrian school followers are critical to econometric models and predictions based on them. Their main imperfection has an epistemological nature. Performing mathematical operations with the data, which does not reflect real life is equal to the alchemists' actions on the production of gold or the philosophers' stone.

Modern econometric models assume some static structure of individual actions or some kind of a given, from the analysts' point of view, paradigm of changes. If the nature of individual relations and the essence of preferences change, the predictions based on such models automatically become false. It is definite, that in real life, which should be studied and described by Economics only changes are permanent. Preferences and tastes of homo ages change. And they are the reasons of changes in the economy on the whole. This causality is absent or simplified in formulae and econometric models. F. Von Hayek doubted the validity of macro economical analysis on the whole [2].

In 1950th there was an intensive methodological argument between the representatives of Austrian and Keynesian schools. The followers of macro economical analysis, i.e. the active usage of aggregate values and natural sciences tools, were for the active usage of statistical analysis on purpose of building a more faithful world, where the principles of equality and humanism realize successfully. They thought that with the help of econometrics humanities would become more exact. The result of such pseudoscientific methodological mix of Keynesianism and Mathematics was the updated theory of state interventionism. Extensive centralized planning based on the conclusions and recommendations of econometric models led to misallocation of resources and, accordingly, to investment mistakes. Other negative consequences were the following: the capture of administration bodies by beneficiary lobbyists of budget programs, corruption, expansion of the non-market monopolistic relations and loss of human rights and freedoms. F. von Hayek said that "the peculiarity of social sciences phenomena is in that the empiric testing is almost impossible, because the characteristics of all individuals, which generate an economic order are too difficult and cannot be described with the help of statistics" [15]. This conclusion is equally related to mainstream macroeconomic indexes (GDP, aggregate demand, national savings) and to the index of welfare estimation, suggested by the UN and OECD. Sociological studies, expert assessments

and indexes or rates based on them do not have anything in common with the estimation of value of the acting man.

Austrian school analyses social aggregates (national economy) as a product, a result of human activity. K. Menger described such approach to social phenomena: a “national economy” phenomenon is not a direct indication to life of the nation or a direct result of the “economic nation” activity. It is a result of a great amount of economic actions of certain people in a nation, that is why they cannot be studied within the frameworks of economic theory from the point of view of the indicated fiction. The “national economy” phenomenon should be theoretically studied and interpreted as a result of individual economic efforts” [9].

After the Soviet Union collapse and elimination of socialist totalitarian system in Europe and Central Asia in the scientific mainstream discourse there was not the only epistemological topic dominated in scientific disputes of Austrian and neoclassical schools. We speak about the problem of economic calculation , i.e. the presence of the objective epistemological foundations for prices as valid market indicators, which coordinate the homo agens. The attempts of modification of the aggregate estimative indicators of the economic policy results, which ignore this fundamental problem, are not a development of the economics, they are only the modifications of pseudoscientific accounting. Only return to methodological individualism in economic theory allows us to get valid epistemological data, necessary for economic policy development in a transitive country.

With the point of view of methodological subjectivism social scientific explanations should start from the analysis of subjective mental states of studied homo agens. The explanation of human activity out of context of human perception and plans is incorrect.

The objectives of the opponents from Keynesian or other economic schools against using the Austrian methodology were amounted to false thesis that people live as atoms - separately from each other. L. von Mises denies this accusation, insisting on methodological individualism validity for the economic analysis:

> The main part of human daily actions is routine… A person does many things, because he was taught to do them in childhood, or because other people do them and it is accepted among his friends. A person getting used to do different things, developing automatic reactions. But he forms his habits, because he likes the results of them. As soon as he detects that usual work can stop him in achieving his goals, or that there is another more desirable goal, he changes his attitude… Praxeology does not deal with changing content of an action, it deals with his clear form and its category structure. The studying of social context, the environment and different human actions is a task for history [10].

The supporters of the state interventionism theory for the achieving of the social optimum and effective resource distribution on purpose to correct the “market failures” makes a lot of mistakes. First of all, they ignore the human factor and the peculiarities of objective pricing process as a market indicator. It means, they do not account many human activity axioms, such as how people respond to incentives, every man is a unique, informational and axiological system, people make choices in the conditions of incomplete, asymmetric information.

Secondly, they overestimate the harm of the so-called market failures (without monetary calculations, basing on statistics ex post and value judgments of economic actors and the managers of foreign), underestimation of informal institutes and idealization of administrative and legal state actions. Neoclassical economic schools do not account in their optimization models of enhancing the effectiveness of national public resources the risks of corruption, bribery, monopolistic practices and the capture of administration bodies by corporative lobbyists.

Thirdly, the opponents of Austrian school of economy artificially divide human activity to economic and non-economic. Using of simplified calculation methodology by taking “all things being equal questioned the validity all such calculations on the whole. The epistemological context of human actions, expressed in numbers, formulas or graphs, which claim the predictive function, is

distorting the reality and enhancing the risks of misallocation of the resources by the acting subjects.

4. The Epistemology of the Economic Calculations Issues

A special field of methodological subjectivism is an economic calculation. This topic was described in details by L. von Mises in his book *The Socialism* [11], but neither policymakers, nor scientists paid any attention to this problem of organization and functioning of planned economy and interventionism at beginning of systemic transformations in Europe and Central Asia. As long as the interventionism (mixed economy, a socially oriented market economy), came to substitute the centralized planned economy in most of the countries, ignoring the problem of economic calculation became the source of many mistakes on allocation both public and private resources.

Neoclassicals and Marxists, which operated the aggregate values, said, that without private property and free prices of all factors of production they can define equal prices, i.e. change the market mechanisms and distribute the resources even more effectively in administrative regulation regime by liquidation, from the point of view of policymakers and interventionism theoreticians the so-called market failures.

This argument is based on the fact that the the public authority of central planning will have full and timely information from the market for making decisions. In real life, which should be described by the science, it is impossible. The generation, sending and processing of the information takes a lot of time. People is not a complex of software for a computer, which get a command and make a work in a second. Time and resource costs of receiving, verification and processing the information are objective and the informational asymmetry is objective too. This is a state, when every acting man (homo agens) possesses the unique information, methods and peculiarities of its processing. Informational field of every person only partly connected with other people. That is why any operation of economic exchange supposes the asymmetry. Keynesians and the representatives of other schools of economy ignore this factor together with the factor of time, necessary for information receiving and processing and making a decision based on its analysis. Such transaction costs are inherent to every catallactic exchange.[3] That is why the neoclassical theory of perfect competition is incorrect. It ignores the epistemological component of catallactic exchange of homo agens and imposes the subjective understanding of normal in distributing public resources or even in the world economy both to researches and policymakers. The concept of a “norm” in relation to the way, volume, character and continuity of economic activity and the choice is contrary to economics, because it colors the objective, sustainable regularities with subjective axiological statements and estimations.

From the point of view of the Austrian school of economy such approach does not reflect the nature of information and knowledge. Neoclassical economists operates the concept of “the current” clearing it from the unimportant from their point of view parametres. But such method of determination of important and significant is based not on the analysis of subjective preferences and the preferences of homo agens, but on the subjective assessments of analysts and policymakers. It is a rough methodological substitution, which destroys the scientific basis of economic analysis “The Current” is only an affirmation of subjectivism. Economists should start studying the economic processes with the acceptance of homo agens. It does not mean that the economist knows everything the acting subjects know, that is a norm in the neoclassical theory. The Austrian school followers confirm with apodictic certainty that such knowledge is not only unknown to the economist. They cannot be known. “When we admit the fact, that the main part of knowledge connected to economic coordination is subjective knowledge of definite circumstances of time and place it becomes clear, that this knowledge cannot be put into one head or in the heads of a group of people” [11], says L. von Mises.

The essence of market from the point of view of the “Austrians” is in using the subjective knowledge of homo agens through intersubjective signals in the forms of prices and “profit – loss”

mechanism. They are the unintended results of acting subjects' interaction, which form the supply and demand. Neoclassicals fail to understand the essence of the market process because of misunderstanding and distortion of the methodological subjectivism essence. V. von Hayek thinks that "the market is a process of creation and using the knowledge, which is formed from subjective mental statements of the individuals" [3]. And the expectations in economy are also subjective. This fact was described in details by another representative of Austrian school of economy, German economist Ludwig Lachmann [8].

Austrian school of economy asserts that using of natural sciences methodology is incorrect and inadequate. In the equation of utility maximization of general equilibrium theory there is no place for homo agens with his subjective knowledge, expectations and values, i.e. the cause-and-effect relation is distorted. In econometric models and equations acting subjects do not make any real choice. The subjective estimations and expectations are beyond them, they are considered irrelevant or insignificant. As a result we have mental constructs separated from real life, the authors of which pretend on high quality of their conclusions and recommendations, which are the results of their application.

The method of economy studying through a general equilibrium in economy was also adopted in the models of economy school of rational expectations. They repeat the mistakes of other neoclassicals, which use aggregate values and natural sciences methods of processing and analyzing the information.

The rational expectation school followers suppose that the acting man would use all relevant information for forming his expectations. Such approach repeats the mistakes of the "perfect competition" context, this hypothetic, unreal situation of equilibrium, in which there is an unlimited amount of sellers and customer of one goods are free to make deals and cannot influence on price level and volume of deals. A freedom of free entering and leaving the market is provided together with this. The researchers are mistaken, when they assert, that the same full information is available to all acting subject in the model of equilibrium and effective resource distribution. From the point of view of Austrian methodological subjectivism the main problem, which requires an explanation is a problem of coordination of acting subjects in conditions of real informational asymmetry and transaction costs of receiving and processing of information and making decisions. The moving process from the individualized knowledge of homo agens to market coordination is excluded in neoclassical models, including the rational expectations school models.

Austrian school of economy followers assert that using free market prices of all factors of production as an objective unit of economic calculation is an only way to neutralize the epistemological distortions and imperfections for homo agens. First of all, free market prices are formed under the influence of axiological statements of all market participants. Secondly, free market prices give an opportunity to estimate the effectiveness of resource using by all market participants. Thirdly, as long as the market provides the interchangeability of goods, there is an opportunity of choice of a universal value – the money. L. Von Mises thinks that:

> in conditions of private property the scale of values is a result of every independent society member's action. Every person plays a double role in its formation – as a consumer and a producer. As a consumer he elaborates the estimation of final consumer's goods. As a producer he uses these goods so that they give the best value. So, all the high rated goods are rated according to existing production conditions and social requirements. The interaction of these two processes guarantees the observance of principle of effectiveness both in production and consuming. The result of this is a systemof exact prices, which gives a possibility to everybody to form the demand taking into account the economic reality [11].

It is obvious, that while using the financial calculations it is impossible to take into account all external effects. We cannot express beauty, honor, health and self-respect in USD or Euro, but these factors affect the nature of monetary calculation during the exchange operations. This factor make

corrections in behavior of homo agens. The ignorance of them in aggregate models make epistemological distortions on the market stronger.

For making exact financial calculations two conditions are necessary. First of all it necessary to have a free market not only of final goods and services, but also of the factors of production market, including capital. Or it is impossible to make a choice among the unlimited amount of alternative ways of using goods and services. Secondly, the money, which fulfill the function of exchange means is necessary. A free market is a necessary condition for generation of objective information about the state of catallactic exchange on the market and cleaning the epistemologically valid information from the subjective statements of policymakers and the managers of foreign (politicians and officials, which are not the owners of public resources, assets and money). In case of saving the state monopoly on money (all 29 transitive countries of Asia and Central Europe acted in the same way), homo ages receive the distorted information about the most important factor of production and cannot make exact calculations in distributing their resources. As a result homo agens make many investment, production and consumer mistakes. A rather high concentration of them explains recurring recessions and economic crises. The greater amount of prices are distorted by the state, the greater volume of resources and assets are excluded from free market exchange in the system of division of labor, the higher is the probability of mistakes for homo agens in choosing the means for their subjective goals.

The attempts to solve the problem of economic calculation in the system of interventionism are justified neither theoretically nor practically. V. Pareto, E. Barone and O. Lange tried to theoretically justify the possibility of economic calculation in the market socialism model, i.e. the system without private ownership of capital goods and money. They assert that the market prices formation is possible, when the managers of foreign, first of all know the scale of preferences, that guides individual consumers, secondly, have the data on different alternatives exchange conditions and thirdl, they have the information on presence of capital goods.

Only within the frameworks of ideal, utopian model, which ignores the factor of time and transaction costs of collecting, sending and processing of information it is possible to fulfill the first condition. Without it it is impossible to receive the information on very important second factor. That's why the actions of the centralized planning body on word of mouth would be aimed at market equilibrium on different capital goods markets, but really they would help to achieve the subjective goals of homo agens, who have the access to state resources, assets and money. O. Lange thinks that by trial and error the centralised planning body would achieve more material and social success that within the frameworks of private market economy model. Results of the activity of the countries that have worked within this theoretical paradigm, together with the results of those, which have chosen the capitalistic model, i.e private property, political, civil and economic freedom, unimpeded action of "profit – loss" mechanism prove that the theorems of supporters of different interventionism forms were false. Market path of resources, goods and services "producer – consumer" was superior to the way "producer – centralized planning body – consumer", proposed by most of interventionists.

5. The Costs of Goal-Setting

The methodology of Austrian school of economics rejects not only the holistic methodology to the classical school of economics, but also the historical method of German historical school. While conducting the systemic reforms in post-socialist countries of Europe and Central Asia, the methodological mix of classical methodology and German historical school was used. Decisionmakers put holistic goal of efficient distribution of resources, optimization of social welfare and sustainable economic growth, etc. In the very wording of the purpose it was assumed that the state should use the broad economic policy tools to achieve these goals. Common tools of state intervention are fixing maximum and minimum prices, credit expansion, the selection of so-called strategic enterprises, "growth points" and the delivery of budget loans on favorable terms,

exchange rate manipulation, tariff and non-tariff regulation of foreign trade, licensing procedures and the exclusion of certain economic activities and resources from the market relations of exchange, i.e. the establishment of a state monopoly. Here we speak about the so-called natural monopolies, land, production of alcohol, tobacco, drugs, weapons, as well as certain sectors of the financial market.

Holistic approach to goal setting, ignoring the nature of human activity and nature of price as an indicator of basic information for economic actors became the reasons for transformation problems in the transition economies, and institutional defects that were the result of the reforms. Austrian school of economics is based on the fact that to only human can act, i.e. can make choices in order to achieve his subjective goals, in his unique value-axiological field. The animation of the concepts of aggregate values and simple verbal metaphors of the "national economy", "industry", "people", "economy", "real economy" is a huge methodological error. They cannot set goals and to choose the means to achieve them by definition.

Decisionmakers or managers of foreign commit massive interventions to the economy under the guise of abstract goals, which they call public or governmental interests. In this case, by definition they pursue their personal goals, which are often not verbalized. Their targets include getting material resources (salaries with taxpayers' money, social benefits, pension payments, the possibility of rolling back the distribution of property, assets and money) and nonmaterial (administrative, human resources for campaigning, social status, prestige, the ability to provide a range of services, etc.).

In the centralized planned economy, there was a seizure of a formal goal-setting, on behalf of the state and society by the Communist Party. At beginning of systemic transformations this function goes to democratically elected governmental bodies (the president, the government, the parliament) or by pressure groups, who carried out a full or partial state capture. Anyway, the decisionmakers declare the most common, usually nonquantitative goals for the sake of "public welfare", "overcoming the systemic crisis", "economic balance" or "creation a new economic and social institutions." Neither in the programs of political parties and movements, nor governmental programs there is no clear description of the target or guidance or instructions on using the state property, resources and assets, which are formally owned by the state. This allowed decision makers to focus on achieving their personal goals.

In condition of limited political competition, restriction of access to relevant information on the using of state property, assets and budget, transformation of power structures and vessels in the independent economic actors, who market their services, complete imbalance of pricing mechanism of economic activity coordination and significant restrictions on the action of "profit – loss" mechanism there was a redistribution and concentration of resources, assets, and money in the hands of those who were real, not formally named a beneficiary. Their rapid enrichment, creating regulatory development process and economic decision-making by these beneficiaries, widespread discriminatory practices of monopoly, corruption, poor governance, the protection of selected sectors and economic agents from the competition and responsibility (bankruptcy) is hardly synonymous to the achievement of such formal goals as "public welfare" or "balanced development of the economy," even if at that time GDP annually increased by 5 – 10%.

The problem of formulating economic policy objectives and transformation processes is clearly underestimated by scientists and analysts. If there is no clearly defined, preferably expressed in some quantitative indicators target, it is impossible to assess whether it is achieved or not, it is impossible to assess the adequacy of application, using and selection of resources and assets with the alternative. The aggregated, holistic goal creates an unsolvable epistemological problem, not only for evaluating the effectiveness of various methods, mechanisms and tools of resource allocation, but also for the decisionmakers itself or the applicants to perform their functions.

6. The Difficulties in Defining the Concepts of "Prosperity", "Wealth", and "Points of Growth"

The attempt to clearly define the value of a certain aggregate, metaphoric value faces the inevitable difficulties arising from the very nature of such concepts. The vague goal, varieties of its interpretation creates a broad manipulative field for policymakers. Aggregate targets have significant epistemological defect neutralization of which is not possible even in conditions of an open political competition and free civil society.

What does the words “public welfare” or “public prosperity” actually mean? By what criteria, parameters and estimates can their fulfillment be judged? How adequate was the means chosen for them? Who and how much became the beneficiary of implementation of certain economic policy measures? The answers to these questions are interpreted by policymakers themselves. The variety of answers creates conditions in which the common semantic, methodological and psychological manipulation that go beyond economics, and even economic policy.

One approach to aggregate goal-setting involves the formulation and implementation of the quantified targets: GDP growth, the level of wages and pensions, the number of people living below the poverty line, unemployment, investment (exports) per capita, etc. Each of these indicators is not able to clearly indicate the performance of, for example, the goal of public prosperity. Even an increase of common indicators such as gross domestic product (GDP) growth is not equal to public welfare growth.

The second approach is the assess of target indicator of “public prosperity growth” with the Gallup Poll and expertise. This approach is even more susceptible to manipulation. The composition of the questionnaire, the sample of experts for the survey, interpretation of results – all this do not let us to speak about the scientific validity evaluation method of achieving an aggregate goal.

In recent years a number of international organizations have attempted to introduce an indicator instead of GDP, which would reflect, in their view, the other aspects of wellfare. The systemic is the report of the Organization for Economic Cooperation and Development (OECD), “How are you? Measuring the well-being” [5]. The authors try to introduce a new aggregate indicator based on research of Nobel-winning economists Joseph Stiglitz, A. Sen and J. Fitusi on economic development and social progress. If in the latter the indicators are aggregated, but quantitative, the well-being index OECD brings together the opinions, judgments, estimates and numerical targets.

The citizens’ income generated abroad is not included in the indicator of “gross domestic product”, but the income earned by foreigners in the country is included there. It does not include the value of intermediate goods used in production. GDP overestimates the amount of possible consumption of manufactured goods at a fixed capital stock. Another claim to this indicator is that it does not show how the income is distributed among people. GDP does not include a variety of services that people produce at the household level (such as caring for children and parents, child-upbringing and household work). Certain types of activities that are included in the GDP on the contrary reduce human welfare, for example, an increasing of the transport services cost: more time is needed to get to work, to offset the costs of air pollution). In GDP there is no estimation of health, personal safety and quality of social relations. They are all important for a human and affect his well-being. In this case, all these factors cannot be expressed in some monetary units.

OECD experts are aiming to bring a digital indicator by which one would rank all countries of the world to highlight the best practices and modernize the economic policy of developing countries. Thus the desire of economists and experts who carry out the substitution of the object of economic policy (homo oeconomicus instead homo agens), the target of a specific person with subjective goals of policy-makers who ignore the objective asymmetry in the information field is reflected in the simulation even more inaccurate, unscientific and manipulative indicator than GDP. They go beyond economics when trying to present the man with his values, goals and preferences as a digital value from "0" to "1".

In recent years, the attempts to present some aggregated indicator of well-being were taken by different organizations. So, the Legatum Institute in 2009 presented its LPI (Legatum prosperity index [14]). It consists of eight parameters, each of which is divided into separate 89 factors. The economy, entrepreneurship, governance, education, health, safety, personal freedom and social capital should be evaluated. OECD proposes that the well-being should be determined by 11 parameters, which are divided into 46 factors. The total index combines the indicators, the results of opinion polls and expert assessments. The authors use the tools and techniques of higher mathematics and econometric modeling are trying to identify those institutional features and mechanisms that contribute to welfare. In their view, people's answers to the question, whether they like their work and the local environment, if they have health, if they spend enough time with their children and friends, whether they trust their neighbors and whether they are satisfied with their lives and all this in a digital indicator are a better way to determine the level of well-being and, consequently, the quality of economic policy than the GDP.

OECD experts are experiment in the same vein. They have brought together all the indicators of well-being to three groups: the material conditions of life, quality of life and sustainability. The index should measure welfare today and tomorrow, to focus on households and individuals, not on aggregate economic conditions in general, focus on the results of well-being and not on its stimulants and point to the distribution of income, and not on its volume. In other words, the Index of well-being must include objective measures and subjective evaluations. Objective indicators of the OECD are income, employment, housing. Subjective indicators are health, balance between work and leisure, education and social connections, civil engagement and the quality of public administration, environmental quality, and assess of people's own well-being.

This kind of juggling with different in nature, content, and methods of obtaining data has nothing to do with economics, but it is a senseless epistemological mix, based on which it is very problematic to make scientifically substantiated corrections in economic policy. It further extends the field of policymakers' manipulation and does not provide valuable information for homo agens.

Thus, the goal-setting of policymakers during systemic transformations, expressed in multiple aggregate values, or the composite index does not allow to neutralize the epistemological imperfections in the development of content, tools and techniques of economic policy, in building a system of incentives for policymakers in assessing the performance of managers of other people's property, assets and resources (politicians and officials).

7. Real Market Process Against Idealistic Non-Market Equilibrium

Another epistemological problem of transformation processes is the assessment and determination of cause-and-effect relationships in the market process on the one hand and the so-called market equilibrium on the other. The supporters of neoclassical school adhere to the concept of perfect competition and information symmetry for all market participants. L. Von Mises describes the participants of market process in a state of permanent ignorance. Such state is different from the state of ignorance by choice. The first condition implies the complete lack of knowledge of some aspects of activities that define a person's choice. You can, for example, say that someone, who did not read the L.von Mises' *Human Action*, but know about this book, its value and the time it takes to read it. A person chooses not to read, because the costs of reading outweigh the gained value (benefit) ex ante. This is a state of ignorance by choice.

Another situation is when a man does not know about the existence of this book. Accordingly, he does not imagine the benefits that he would receive if invested time and consideration in reading it. This is an example of radical ignorance. If a person discovers the "human activity", it is not the result of his conscious purposeful action. He does not know about such choice, as reading the book.

To avoid the infinite regress it is necessary to interpret the perception of costs and benefits as an act of knowing the world and obtaining the information that homo agens did not know before.

The market exchange may not occur because of the high costs of obtaining the information or because the homo agens knows nothing about the existence of such an option of choice.

The “profit-loss” mechanism is a central element of the market process. The unknown and undiscovered market opportunities generate losses and detected and corrected errors create the profit. I. Kirzner uses the term “entrepreneurship” to describe the aspects of human activity, which is aimed at making a profit and loss prevention [7].

In the context of market process the essence of entrepreneurship is to identify the situations in which, due to radical ignorance, the resources in the broadest sense are undervalued or overvalued relatively to other ways of using them. Social institutions are used to identify and promote the economic behavior that is aimed to obtain benefits in the broad (not only the material and monetary) sense. These institutions include legislation protecting the rights of ownership, determining the procedure of dispute settlement, mechanisms of implementation of the decisions of government agencies, etc. The institution of money and credit, the price system, banking, insurance and the company are important. All these institutions together form the market. The market process is a spontaneous order, supported by the institutional infrastructure, in which the private property and free exchange dominate. It arises out of independent targets of actors, who plan and choose the the means to achieve their goals in conditions of an incomplete, asymmetric informational field. The managers of foreign cannot perform a unique function of businessmen, because the aggregation of goal-setting will inevitably lead to distortions in the choice of economic agents and, as a consequence, in the structure of the economy.

From the point of view of the market process theory, the utility of a regulatory structure, based on the balance, such as Pareto optimality, is severely limited. The problem of knowledge in the theory of market process is that decisionmakers are in radical ignorance of the relevant information, “scattered” among the various actors. The impossibility of complete knowledge of homo agens about current and future state of the world makes the Pareto’s assertion that the current change produces an improvement doubtful.

The criteria based on the equilibrium states use the final states in which all the corrections made on purpose to reach the equilibrium were committed and the entrepreneurial activity stopped. While for normative criterion that focuses on the process (process-based normative criterion) is not as important as the actual state differs from the ideal. It focuses on the existence of institutions that facilitate the detection of market errors. In the fundament of this criterion there are preferences of consumers and current distribution of resources in itself has no value.

In the market process theory the necessary and sufficient condition for the competition is free entry the market, the only requirement for which is absence of monopoly on those factors that are necessary for the production of goods and services. As long as the market systematically rewards the entrepreneurial perception errors, we cannot say that a certain segment of the market reaches a state of equilibrium or is close to it. If the coordination has some normative value, the best thing to do is to build such social institutions that help to detect errors and recover them with minimal costs.

In countries with developed, stable institutions the error detection is much easier, because the actors have a high degree of confidence to the institutions. They provide a predictable result, the same for all people. The standardization of concepts, the adoption of the same rules of accounting, regulatory standards of product and financial markets help homo agens quickly detect the errors. The wide spread of information technologies, the opportunity to acquire various information and check it using a variety of sources under the conditions of freedom of speech and the strict rules of the transparency of state and of the financial market make the process of correcting the error fast and efficient.

A completely different situation is in a transition economy. It does not have sustainable institutions that provide predictable results and reduce the number of areas of uncertainty and potentially high risk. In the absence of institute of a free price to all factors of production, including money, the natural structure of production and employment, with significant distortion of the

financial market (inflation, subsidies, cross-subsidies, barter, tax and investment privileges, etc.), the risk of incorrect assessment the epistemological essence of institutional combinations by the economic actors increases dramatically.

National governments in the process of systemic transformations often used their own special methods for calculating different indicators different from the standard methodology for calculation of quantitative indicators in the market economy. When copying a form of Western institutions their content differed significantly, preventing economic agents form stable expectations in connection to the institutions and rules of the game in the market. An extensive state interventionism (cyclical and counter-cyclical monetary policy, government funding of so-called "points of growth", debt relief, including in public procurement, tax incentives, protection against competition from foreign producers (import) and domestic competitors (the system of licenses and permits) makes institutional field the source of information distortions, which creates a dangerous epistemological noise for decision-making. In these conditions, the probability of investment, production and consumption of errors increases rapidly. The unpredictability at the macro level adds to the uncertainty and destruction of the exchange mechanisms in micro-level. The managers of foreign within the frameworks of neoclassical models pursued a policy of replacing a unique, market function of the entrepreneur.

The nature and character of epistemological problems were not taken into account by governments of transition countries. And from here goes the high costs of transformation processes, including the costs of lost revenue. Nature of theoretical discussions among economic elites of post-socialist countries shows the misunderstanding of the knowledge issues, the role of the entrepreneur, the "profit – loss" mechanism and other institutions and mechanisms of the market economy.

In the absence of deep analysis of the value system, the incentives and preferences of the actors, using the aggregate indicators, econometric models to determine the trajectory of the future development and for economic policy development is an example of a chaotic, non-systemic selection of economic policy parameters. The emphasis on a hypothetical equilibrium in economic policy leads to an underestimation of constant costs, incremental changes in the intermediate states, which may have a significant impact on the achievement of the declared objectives of policy-makers.

Mainstream economic science has turned into a closed self-reproducing system that describes not real life and not acting man. In real life the process is constant and the equilibrium state is a hypothetical scholastic tool for studying the "action" phenomenon. The attempts to find effective and optimal behaviors with the help of science methodology demonstrate knowledge in mathematics, cybernetics or econometrics, but they ignore the theory of value and the market process.

The supporters of Austrian school of economics understand the market process broader than the neoclassical school representatives. The main differences are shown in Table 1.

The market equilibrium theory	The market process theory
1. There is a full coordination (reinforcing expectations) of the plans of the individual agents, when the plans are in line with the underlying preferences, technology and resources.	1. Plans, at least of some of the actors are in conflict and are not compatible with the information of the market, although a partial coordination retains a degree of continuity of the market.
2. Behavior is "rational" when all else being equal (ceteris paribus) and all information is relevant, the actors maximize utility by choosing the least-cost means of achieving their goals.	2. The action is the "purposeful" when actors seek to improve the perceived state of the world, though they are not aware of all the possible means to achieve this goal.
3. All changes are predictable, which eliminates the possibility of original error, surprise or regret.	3. Actors do not have full knowledge of the relevant information, they make mistakes, make unexpected changes, regret and wonder.
4. Economic gains and losses, being incompatible with a state of equilibrium does not exist or are very transient.	4. Persistent and recurrent economic results in the form of profit and loss are the main elements of the market process.
5. The equilibrium price dominates, which ensures the consistency of the actors' plans and the information underlying the activity.	5. There are non-equilibrium prices that reflect a lack of coordination or discoordination. They serve as a signal for the plan of generating the revenues and market corrections.
6. When these transaction costs the market allocates the resources to achieve the most important goals.	6. The presence of error is the cause of an inefficient allocation of resources, which the market tends to correct.

Table 1. The discrepancies between the market equilibrium theory and the market process theory

8. Epistemological Imperfections of Neoclassical Theory of Business Cycles

The discrepancy between Austrian and neoclassical economics is in choosing the tools, the methodology and logic on the one hand and policy advice on the other are very evidently seen in relation to business cycles. The representatives of Austrian School of Economics, first of all, Ludwig von Mises and Friedrich von Hayek had the unique theory of business or trade cycle. They establish a clear cause-and-effect relationships between the state interventionism and fluctuations in economic activity. Ludwig von Mises in a popular manner outlined the essence of the business cycle theory. The architect has many subordinated workers. There are a lot of materials on building: bricks, roofing, glass, beams, blocks, etc. The worker who is responsible for counting the bricks increases their number by 10% in the documents. The architect does not know and makes the house plan, mistakenly believing that he has more bricks than it actually is. And because of this error he launches a plan that cannot be realized until the end for the simple reason that there is not enough bricks for completing the construction. The faster the architect will detect an error, the better. If he does so immediately after the excavator dug a hole for the foundation, the loss will be only in the form of additional labor and fuel to reduce the foundation area and adapt it to the actual number of existing bricks.

The correction of an error is more expensive if it is discovered after the production of foundation or frame home. And he may not be able to buy the materials on the market – he has to make a difficult choice. He may choose not to change the foundation, despite the fact that it is bigger than it was planned. He needs to alter the plan to reduce the size of the house on the same foundation. He needs to change the plan to reduce the size of the house on the same foundation. A certain amount of wood can be used again and something you should be just thrown it away or burnt down. Of course, the quality of the finished house will not be so high as it was originally

conceived by the architect not knowing the real number of bricks and other building materials. Let us consider the following situation. The workers realize that they have made a mistake, but the architect of this still does not know about it. They decide to keep him in the dark as long as possible, using a tarp to cover the holes in the underlying stock bricks. They comfort themselves with the fact that all are happy at the construction site, everyone wants to come to work every morning and build a house. Since the architect learns about the lack of bricks, optimism is much less. At this stage of construction, for example, only three workers are necessary to build the third floor, but on the basis of the actual number of bricks, this third floor may not be built at all. The workers therefore prefer to hide the truth as long as possible, to do nothing and wait for better times.

In this example, the error of the architect – is an example of not overinvestment, but the bad malinvestment of the resources. The problem is the number of bricks, that is necessary to build a house. The mistake is that the builder has spent too many bricks to build the first floor. With each brick in the wall of the house there are less options for saving the project. In the worst case the architect learns about the lack of bricks at the very moment the last brick is used. Facing with such terrible situation, the architect can only make an inventory of the remaining materials in the hope that he can probably find enough things to close the construction site from rain or to conserve it.

This is a graphic description of the Austrian business cycle theory. In the real economy the central bank and commercial bank money is misleading economic actors in the same way as the workers have misled the architect. The correction of errors at early stages of the project allows to perform the fast reallocation of resources, including labor, and to avoid loss of those goods and resources that can be used only for the project, which should be closed or liquidated.

The principal difference between Austrian and neoclassical schools is in that the neo-classical and, above all, Keynesians do rough assumption of capital homogeneity. Capital can appear in various forms in real life. Part of it can not only be “frozen” for an indefinite period, but turned into a “dead” capital recycling or destruction of which requires additional resources. The reason of an economic boom (the first part of business cycle) is the active cyclic policy of the central bank and the government on increasing the access of economic agents to certain types of capital (money, land, real estate, etc.). The managers of foreign try to guess the structure of the economy and future demand and take measures on correcting the so-called market failures. One of them is a very high price of debt capital. And from here goes the most popular tool of cyclical policy – reducing the value of money and artificial reducing of credit.

At the stage of falling which is characterized by stagnation and recession the managers of foreign use countercyclical measures. They activate the tools that allow economic agents to get out of the liquidity trap, service current debt obligations as well as to restore the production level. Selecting the areas of investment, the beneficiaries of budgetary resources and various state programs are implemented according to subjective assessments of managers of foreign. It is a paradox, but the action of cyclical and countercyclical policies are very similar. This is exactly the case when the same instruments of state interventionism are used first of all to create a problem during the boom (distortion of capital structure, employment, business and consumer preferences), and during the fall – to address it through the redistribution of resources in favor to the designated “point of growth”.

Neoclassical economists underestimate the costs and the negative impact of central banks activity in the cyclical and counter-cyclical policy. The representative of monetarist school Milton Friedman believed that the cause of financial instability is a reactive policy of central banks, i.e., their counter-cyclical policy. In his view, to eliminate fluctuations it is enough for the central bank to increase the money supply at a fixed amount. In 1968, he said:

> I would choose the following policy. It is necessary to pass a law that gives clear guidance to the monetary authorities to increase the amount of money for a certain amount. For this purpose I would define money as currency in circulation, including the money out of commercial banks plus all deposits of commercial banks. I would clearly give the instructions to the Federal Reserve, that the amount of money should

> be increased every month, if possible, every day, with the annual growth rate of X percent, within 3 – 5 percent. A clear definition of money and precise definition of growth are much less important than the final choice of defining and determining the rate of growth [1].

This approach to monetary policy for smoothing the business cycle shows that the monetarists have no solutions to the problem of distortion of capital within the business cycle. Their simplifications in considering the markets of goods and money distort the real heterogeneous nature of money and goods.

Another representative of neoclassicals Paul Krugman also shows the misunderstanding of the Austrian business cycle theory. He describes the paradox of savings while overcoming the crisis:

> One of the most interesting moments of the semester is when the teacher of economy explains how an individual virtue can become a public vice, how the attempts of consumers to make the right additional savings can spoil everything. The fact is that if the consumers cut their expenses and nothing replaces their place, the economy plunge into a recession, reducing the income of everyone. In fact consumers' income may be reduced more than their expenses. Their attempt to save more money turns to such situation. This feature is called the paradox of savings [6].

The paradox of savings, the Phillips curve, the paradox of value – all these are theoretical errors arising from the using of non-scientific methodology for economic analysis. Following the recommendations of P. Krugman and other Keynesians does not neutralize the distortion of the structure of capital, production and employment, but just generate new distortions. During the financial crisis, demand for countercyclical monetary and fiscal policy increases rapidly. The expert Martin Wolf, who declares his commitment to the free market wrote in the Financial Times: "In current situation, the monetary policy measures are not enough. This Keynesian situation requires Keynesian medicine. Budget deficits will rise to not previously imaginable levels. Let it be so" [13]. This kind of approach to economic policy dominates in the mainstream of both developed and developing countries, despite the obvious crisis of the Keynesian policy of the last decades.

At his time, K. Marx offered a centralized credit in the state banks by providing monopoly to the national bank. Later the theoreticians of market socialism, Oscar Lange, Abba Lerner, H.D. Dickinson proposed the governmental control of credit and financial capital. In their theory the market trade and the using of money for the purchase of consumer goods was assumed. However, they offered to drive the market of capital goods, and completely replace the financial capital markets with the mechanisms of central planning.

The market socialist theoreticians believed that the investment in fixed assets should be determined by the state officials and not competing with each other with the help of structures in financial market. The public officials need to determine the rate of capital accumulation and other investment activity options, including the investment sphere. Thus, they proposed to neutralize the greed for profit-oriented capitalists and entrepreneurs.

The convincing proof of the fact, that even in the United States today there is lack of not only a laissez faire capitalism, but even the undistorted capital market is the following fact:

> There are 15 federal agencies in America. Nine of them intervene in the housing market, transport, health, education, energy, mining, agriculture, labor and trade. All of them in their usual manner invade in different aspects of human economic freedom. In the system of laissez-faire capitalism, eleven of the fifteen ministries would be disbanded. Only the Department of Justice, Defense, Interior and Finance would remain. Moreover, a further reduction of the state officials would also be possible, for example, the elimination of the Tax Service in the Ministry of Finance and the Antimonopoly Committee of the Ministry of Justice [17].

The representatives of Austrian School of Economics, do not share the views of neo-classical school, that the business cycle is an integral feature of capitalism. They assert that the business

cycle is an unintended consequence of government interventionism to monetary policy and banking. At the beginning of the century viewpoint was presented by the Ukrainian economist M. Tugan-Baranovsky: He believes that the main reason of the crisis is

> the distribution of production is disproportionate: the society requires less machines, tools, iron, brick and wood than before due to the fact that there are fewer new enterprises. But as manufacturers of capital goods can not extract capital from their businesses and also the awkwardness of that capital itself in the form of buildings, machinery, etc., requires the continuation of production (otherwise entrepreneurs would lose percent on the standing capital) therefore the overproduction of capital goods is imminent [16].

There are strong structural distortions at the market and changes in the capital structure in such situation. The supporters of the state interventionism theory believe that the state will be able to neutralize these distortions and ensure sustainable economic growth using tools of monetary, fiscal and administrative policies. However, they do not explain the nature of mechanisms, methods and tools for the diagnosis of distortions in the markets of all forms of capital, determining the degree of distortion, defining specific "portions" of impact on all sorts of distortions. There is also no analysis of the costs of lost profits, the effects of crowding out private entities from the market because of discriminatory practices. Without completing the clearing operations it is impossible to determine how much capital in which sectors requires the elimination of which can be put into circulation after some modification, and which can simply be directed to other projects. There is no clearly defined timing of countercyclical measures, the execution test, and evaluation system of effectiveness of different instruments.

In real life the adaptation to crisis, i.e. the step of business cycle fall is uneven for different economic actors in different sectors. The duration of an adaptation time depends on many endogenous and exogenous factors. The direction of their activity, the content and the intensity can not be expressed in numbers. The policy-makers, who, following the recommendations of neoclassical theoreticians use the tools of monetary and fiscal policy to neutralize their own mistakes cannot have such calculations. Without them the decisionmakers' actions occur in the epistemological chaos. It is characterized not only by the common lack of valid information from the micro level, but also completely distorted signals from the macro level, i.e., from the institutions of a market economy.

Without governmental interventionism cleansing the economy from the effects of boom takes a time depending on the number and depth of distortions. The "profit – loss" mechanism work changes the capital structure, investment and employment. The entrepreneurs form their expectations after analyzing the information ex post taking into account the individual projections of the micro-level data dynamics and institutions. The coordination of homo agens actions ccurs smoothly and gradually, through trials and errors. And its driver is not the governmental body of central planning, but the entrepreneurs who implement the catallactic exchange with each other. When not having any valid information from the market the best behavior for the state is to withdraw their investment, production and consumption projects, to ensure reliable work of the institutions on clearing the errors committed at the boom stage (bankruptcy, the stabilization of prices, the elimination of budget deficit, the projected debt management), as well as forming trust to whole economic policy, i.e., to its transformation into a predictable valid epistemological context.

According to the Austrian theory of the business cycle during artificially induced boom allocation of labor and other forms of capital investment projects that do not meet the level of real savings occurs. At the boom stage the correction of economic plans is inevitable. The implementation of artificially overestimated projects terminates even before their completion or fulfilling the planned targets (payback or return). The entrepreneurs get information about the errors during the boom and take steps to neutralize the negative effects of capital misallocation. The consumption is reducing. The number of the poor is increasing. All these negative effects are the result of not the correcting actions of entrepreneurs, but the cyclical policy of the central bank and

the government during the boom. It produces errors in economic entities' actions. The financial bubble (irrational investment and consumption) has a negative impact on the economy. Sooner or later, the boom ends with slump and recession. It means a painful but necessary adaptation to the reality. In the process of adaptation there is a transformation of production and capital structure, which had been distorted during the boom. If during a recession the managers of foreign use monetary and fiscal measures to keep the old structure of capital, they further increase the amount of "dead" capital and costs of the recession overcoming.

> In this situation,
>
> a key element of economic policy is the liberalization of the economy at all levels, especially in the labor market. It is necessary to accelerate the process of redistribution of production factors, and primarily the labor in the lucrative sectors. At the same time it is necessary to reduce the governmental expenses and taxes in order to increase the income of economic actors struggling with debts, who need to pay loans and percent. An important element of crisis overcoming is a flexible labor market and strict policy of public expenses. The quick restoration of the economy is impossible without it. There is no possibility to quickly find the amount of the incorrectly invested capital and thus begin the process of its liquidation and building a new foundation [18]

says the Professor of Economics, University of Rey Juan Jesús Huerta de Soto, a representative of the third wave of Austrian school of economics. During the inevitable recession the resources are reallocated, the economy is cleared from malinvestments committed during the boom. Therefore, this process certainly has a positive character. The process of finding the entrepreneurs' mistakes committed during the boom starts. For various reasons, including the increasing information distortions caused by the cyclical activity of the state, their limited resources did not go to those projects that would be implemented if not the artificial credit boom.

The first global crisis in the XXI century in 2007 – 2009, as the Great Depression[4], as tens of crises around the world in different periods of the twentieth century [21] is the result of monetary policy, fiscal stimulation of artificially selected "points of growth" and the highlighting of individual economic agents and even sectors in general conditions of the market, which is directly connected to the discrimination against other economic actors. In any transition country the state monopoly on money was not eliminated, which did not allow the economy to eliminate the most dangerous distortion in the money market. If these root causes of the crisis are not eliminated, the national and global economy will periodically fall into recessions and depressions and policymakers within the frameworks of the neoclassical theory will continue using different combinations of cyclical and counter-cyclical measures. From the epistemological point of view, they are the distortion tools of natural structure of capital, production and employment.

For sustainable economic growth, creating opportunities for long periods of prosperity and peace, neutralizing the problems of structural unemployment, depressed areas, creating effective mechanisms of insurance against falling into the trap of poverty in old age require a deep transformation of economic policy. The matrix of the neoclassical economics as the foundation of economic policy should be replaced with the theory of the Austrian school of economics. Changing the theoretical framework of transformation processes will eliminate the epistemological distortions created by policy-makers, modify the institutions established within the framework of state interventionism, and go to the natural structure of capital, production and employment.

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Notes

1. Austrian school of economy is a special systemic look at the economics based on the methodological individualism, subjectivism, the unique epistemological function of the entrepreneur and the market process, not on the equilibrium. Among the main representatives of this school are K. Menger, O. Bem-Baverk, L. von Mises, F. von Hayek, M. Rotbard, etc.
2. The individualism as a principle of philosophical, praxeological and historical analysis of human activity means,that all actions can be referred only to certain people and no scientific method can successfully explain how certain external events which can be described by natural sciences methods create in human brains certain ideas, axiological statements and intentions. The individual in this sense is something that cannot be separated into the elements, it is the beginning and the end of an every attempt of human action analysis.
3. Catallactics is a science about nature, cause sand consequences of an exchange within the framework of the market system, including material and non-material resources. All non-material factors are also objects of catallactics.
4. The Great depression from a point of view of Austrian School is in the work of M. Rotbard "The Great depression in America" http://www.irisen.ru/books/izdannye/myurey-rotbard-velikaya-depressiya-v-amerike.html

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Logical Simulations of Economic Phenomena and Computational Economics

Viktor Winschel is an economist at the University of Mannheim. He has majored in econometrics, international monetary and exchange rate policy and theory and political economics. During his PhD he has worked on optimal currency areas and computational macroeconometrics. After that he has searched the proper mathematical tools to approach his top level problems in the optimal currency area theory namely value, money and institutional theory and the econometric identification of theories about agents with belief formation. The result is a collaboration with computer scientists, logicians and mathematicians in order to develop a global semantic and reflexive approach to economics ultimately with the tools of category theory, algebraic geometry and logic and so far with coalgebras as a functorial interface for games in mathematical economics.

Andrew Schumann: Since the spreading of Keynesian and Neo-Keynesian ideas in economics, many mathematical tools such as game theory, econometrics, probability theory, data mining, etc. have been used in economic researches as wide as possible. Why have some new mathematical theories such as coalgebra and category theory been proposed to be applied in economics recently? Is it insufficient to use the conventional tools accepted within the Neo-Keynesian paradigm?

Viktor Winschel: The global and short answer is that new mathematics can always potentially unite, generalize, organize, proof and program old mathematical economics and provide new formalizations of old questions and solutions to them. We would not consider to program the Internet by machine language or multiply roman numbers. But in mathematical economics as possibly in any applied mathematics we always try that until new mathematics arrives. The language situation in economics looks to me like that: much of interesting economics and sociology takes place in work expressed in natural languages, the common language of mathematical economics is functional analysis, not much of discrete mathematics, hardy any logic as object language, model theory or category theory. The situation is that we use a too low level language for the higher level concepts in economics with the difficulty of a too large and error prone gap between concepts and mathematics. Of course, different fields use higher mathematics but it was not clear to me how to unite different formalisms, automatize and run that within software. There is much methodological work ahead since radically new tools arrive from computer science, logic and mathematics.

The local and longer story goes like that. In my first lecture in economics on household theory I have missed the units and the symbol for the household. This suspicious situation about mathematical economics made me study rather neutral econometrics and economics as much as

possible in natural language form in order to not miss the non formalized parts. In the PhD I wanted to formalize the optimal currency area decision. Soon the question arose how to formalize the economic reasoning itself since we need to model all kind of agents who do reason economically. At the same time economic policy questions are answered by the composition of various economic argumentation lines of different size and form into an answer that applies the composed theoretical construction analogously to the question at hand. So I went on to program a theory discussion software and see whether it can be made into a production function of me as an economist. Compositionality of economic theories occurred to me to be an impossibility with my tools. One core impossibility was how to use logic about differential equations that describe agents who do the same? I run into at that time an unsolvable meta and object language clash. A reusable programming style is considered to write the generalized problem solution with the actual problem being an instantiation, much like Grothendieck tended to characterize his work as “to open a shell is to dissolve it in water” or the functional programming approach to design layers of ever higher domain specific languages until one can express the original problem in a natural form. Is it a surprise that we need very abstract mathematics for the very abstract cost benefit analysis of economic decisions like the optimal currency area question? After all abstract mathematics is used for engineering problems that are much less complex than economics.

So, programming myself as an economist seemed to me as a digital native programmer to be a natural approach and it occurred to me only later, after the PhD, that the underlying topic of reflexivity is probably as old as the human discovery of their own identity and besides in economics also at the core of philosophy, sociology, mathematics and computer science and that I need to descend into rather deep mathematical and philosophical waters. I have reprogrammed meta circular interpreters in Lisp and Prolog where one uses a language that is able to program its own interpreter, which is the source of the need for reflexive figures in computer science, just like the fact that data and code is located in the same memory and that code can be data or input and output of other code. After this insight I knew that it captures as well something very important in economics but I did not know what and why until I understood in what sense lambda calculus and domain theory and the underlying functorial fixed points are similar to an infinite game and other mind boggling structures in economics.

So, after my PhD my tools became insufficient for my economic goal of a formal theory that is given mostly in a natural language form with parts fragmented in different mathematical subfields of all kinds of economics. My tools have been some functional analysis, statistics and Fortran hacking, no logic, model theory or sufficient amounts of topology, differential geometry or software technology. The modelling issues like the Lucas critique, that agents anticipate theory and policy, together with belief, theory and institution formation and the interaction of theory and model are at the core of the modelling issues in optimal currency areas and the underlying value and money theory. All that are rather deep conceptual waters as well and the question is whether and how more abstract mathematics might help. But not only functional analysis became insufficient but set theory itself is not sufficient for the synthetic, relational and reflexive structures in economics that is in need of rather high level theoretical operations. We need units, types, functors, their fixed points in recursive domain equations, solution concepts as first order citizens, global macro entities, aggregation schemes, relational calculi and much more logic and model theory. I am currently trying to interpret the macroeconomic structures as algebraic geometric constructions like homotopy, schemes, sites, coverings, cohomology, colimits, sheafs, glueing conditions, comonad, topoi, local languages or adjoint functors. Many economic concepts have a natural representation therein.

Coalgebras are, compared to the available, and I think urgently needed, machinery, to be seen as a starting point for functorial fixed points and categorical methods in economics. All of that have been so far used only in few economic papers. Category theory was used to my best knowledge for the first time in 1989 in some papers by Vassilakis with functorial fixed points on the category of domains in order to capture various reflexive or infinitely hierarchical phenomena

discussed in economics since long. We see our usage of coalgebras as a first typing of game trees, the computational machinery of current macroeconomic models as in my PhD is still to be typed. To my best knowledge no one has ever proved in computational economics (as opposed to economies) that his code is bug free, instead everybody knows they are buggy and we know that we know that, even so billions of Euros and whole nations depend on the decisions of let's say central banks or other international economic institutions. We may be able to use modern computer scientific technology not only in order to avoid crashing airbuses but also to avoid collapsing exchange rate systems.

Coalgebras unite modal logic, unobservable state transition systems and even calculus to some extent for macroeconomics. Vassilakis categorical Ansatz for some deep economic problems did not take off probably because his handful of papers were not enough for such a shift in the abstraction level of the used mathematics. There must be a bridge to usual mathematical structures and worked out examples that prove new theorems or generalize or simplify old ones. Kalman style system theoretical models are unobservable state transition systems, Kripke structures, automatons, largest fixed points on posets – all that is used in economics and all that are coalgebras. They unite and generalize existing mathematical tools in economics and make the tools of computer science accessible. Many of them are not even known to exist and not all economists know that most of what they do in theoretical discussions is abduction with counter example generation that can be automatized by model generation, model checking and theorem proving assistants. The Curry-Howard isomorphism and even lambda calculus are hardly used in economics and even computational economics.

Coalgebras are a kind of lower upper bound of the mathematics we have compared to the one we can get. It is an interface for mathematical economics. Final coalgebras as semantic domains of all behaviour of the functorial structures are functorial fixed points on the set category rather than on domains simplifying Vassilakis approach while they still allow for infinite, observational, reflexive, dynamic structures like sets that contain themselves and that arise for example in belief formation in economics. Corecursion is amazingly practical for programming potentially infinite structures in Haskell like natural numbers **N**=[1,2,3...] which makes nasty nested loops in software into elegant guarded co/recursions with the categorical compilers doing the mechanical work of translating into loops. **N** is definable for example as the largest fixed point of $n = 1 : \text{map } (+1)\ n$. Corecursion allows for an ordinary differential equation solver programmed directly as the fundamental theorem of calculus in two lines of Haskell that compiles into a coefficient matcher on power series which is a mess to imperatively program that by hands as loops. Economic dynamics is likewise so far formulated only recursively and not corecursively and only at the function and not domain level for hierarchical systems like belief or institution formation. The coalgebraic formulation of simple games might look like an overkill but it is invariant over existing game theory and it can be integrated (I think for the first time) with macroeconomics via algebraic geometry and topology. A computational side effect of our coalgebraic framework is a running software engine that is more or less a directly written down version of the mathematics of the framework itself. Corecursion is the proper structure for infinite data types like hierarchies of belief, times or interest rates or repeated games but also real numbers, approximation and convergence arguments. In short, functorial dynamics on structured domains is meant to unify, simplify and generalize mathematical and computational economics.

Aren't sets that contain themselves an intuitive starting point for the fact that modelling in social sciences takes place in and changes the modelled system? So the question is what mathematics supports these kind of circularities and how to factorize directed economic production functions into causalities, epimorphisms, monomorphisms, relations, networks, rings, fields, global solutions of equations, graphs, axioms or code and finally in policy and institutions? In what language? What could be a categorical dual accounting? The best lesson of my first economic lectures is that household theory is dual and dualities are one of the strengths of category theory. I hope to see soon in the Edgeworth box of the interaction of two economic agents the algebraic

geometric information of the global solution of the contract curve. I think we can discover many new approaches and solutions in a categorified economics. There are many functorial and global structures in economics and sociology beyond sets that contain themselves like in languages that create new ones. We can start to rethink the type of a coconut that produces a coconut just as money that merges apples and oranges into dollars, validated by functional analytical arguments and (why not global) welfare theorems, creative accounting, bursting bubbles and black holes for central banker's and finance minister's moneys – these seem to be strange local languages and type translations.

Andrew Schumann: The new mathematics such as coalgebras, stream calculi, process calculi, labelled transition systems and so on with their applications in economics is called non-well-founded, because the set-theoretic axiom of foundation is violated there and, as a result, we cannot build inductive sets which have been traditionally used for mathematical simulations in physics, economics, etc. This new mathematics is unconventional. What advantages does this mathematics have with respect to conventional mathematical tools in economics?

Viktor Winschel: Coalgebras generalize and unify rather usual mathematics in economics and by that switch in theory and software from awkward and implicit coalgebraic constructions to their explicit formulation with available proper higher order tools. My goal is to capture, starting with non-well-founded tools, mathematically more naturally the open, infinite and self-generating processes of social systems. These problems are treated ever since in economics and related disciplines but for sure in some cases not with the proper since new mathematical tools. An important goal of abstracting from the economic application is to arrive at a mathematics that may connect to the available ones in mathematics itself and to avoid as much as possible the possibly unavoidable production of inferior local solution processes to economic structures where the economic semantics is given in natural language stories that loosely translate between axioms, results of formal methods and hardly between economists and non economists, including mathematicians. It might be some bug in the incentive system of economics to be uncontrollable by secretly deciding on undecidable problems but this then is a case for economists bashing in the political economics of economics and for theoretical, institutional, constitutional and existential reform of economics possibly including the diagnosis that a reflexive approach to economics is worthless or too costly.

What we need is a better division of labor with all other sciences, we need to type natural language economics and we need ontologies and databases of theories, practically available and composable in software tools. After all modelling is also a process of agreeing on the communication protocol with others trying to solve the same problem. Here is where economists need to work on. In fact my work can be headed as a search for a language of economics that connects us to the rest of the non economics world. The overemphasize in economics of “applications” is self-defeating since without foundations there are no applications in a changing world and without syntax and application independent structure identification there is no economics, and no division of labor, of economics as in any science. But yes, my application is still missing just as the Euro is still not doing well as there seem to be some holes where the money is pouring into and it seems that we do not know why and where these holes might be. They might be detectable by Betty numbers as an exchange rate between the hyperplanes of a relational picture of an economy versus a usual one, who knows? To what do the holes connect to? To the banking system? Does it extract the rent of double accounting?

The extraction of formal meaning from natural languages and retranslations will ever prevail in economics and economies, this is about condensing learned lessons into reusable, generalizable mathematics, business plans, arbitrage opportunities and rent extraction and generation activities. I hope that category theory, as a way to translate in between different mathematical formalisms, as a

semantics for mathematics itself, can help to import powerful tools into economics and relate it to its local, existing syntax, semantics and pragmatics.

We can find in categories many economic stories and economics at its core is a rather universal cost benefit analysis similar to complexity and semantics in computer science. Categories are very suited for social science by allowing to define local languages and infinitely many truth values as approximation. Allowing for properties only by embedding objects into their environment is very but so far not valuable. The ability to define properties without introspection into their carrier is useful for theories of introspection, reflexively enough this sounds rather strange. I think about the categorical self-participating universals and adjoints as universal or golden social rules just like Kant's categorical imperative or Ellerman's helping people to help themselves. By switching from content to pure form, I guess we can better discuss modularization and decentralization, private versus state run production, why there are firms and markets, representative democracy or whether a common currency is to be used. Can in times of IPhones the question of currencies be reduced to an algorithmic problem? This is the question of rules versus discretionary based monetary policy. The economics and sociology not yet formalized but already in natural language form is full of challenges to mathematics and often in need of rather abstract structures, think of constitutions of how to find good constitutions or how to price cohomologies in economies? What is the profit from teaching a mathematician natural language economics and vice versa?

Andrew Schumann: George Soros was one of the first experts in finance who proposed to apply the notion of reflexivity in economics. On the one hand, in German (transcendental) philosophy there is a long tradition of logical, philosophical, sociological studies of reflexivity. On the other hand, this notion is formalized within unconventional mathematics. Whether this means that new mathematical tools in economics might combine continental philosophy with the paradigm of non-well-founded mathematics? What is reflexive economics?

Viktor Winschel: Soros represents the math of his approach as participating and observing functions $y=p(x)$, $x=o(y)$, in one of the *Alchemy of Finance* editions. They are like the two corecursive equations that we use with Samson Abramsky or as Pierre Lescanne to define infinitely alternating moves of strategically interacting agents. Soros writes that they solve into never ending sequences of change and not equilibria. This captures in fact the duality of participating as algebra and construction versus observing as the coalgebra of the infinite. I have called it the do-see duality of econometrics of non experimental macroeconomic data where contexts cannot be held fixed in order to easily infer causalities from observations. His remark on equilibria depends on what it might be. I think of an equilibrium as a solution to an interactive problem. I agree if he means that equilibria in economics do often smell static rather than dynamic and interactive. There is a sever mathematical problem in functional and not domain recursive economic dynamics. Solow proposed to Soros to recap his knowledge about solutions of systems of equations. But Soros is right in that content and context interact in economics and this gives a never ending change, as a kind of dialectics (and remember there is synthesis after thesis and antithesis), if one thinks about largest fixed points and not as, presumably Solow did, about Brouwer typed ones. In usual economics we arrive at an equilibrium and the question is what happens then. We usually need some exogenous shocks and adjustments to it in order to generate dynamics, which is obviously rather strange as a picture of societies that generate shocks from within. We can always ask what is an equilibrium of equilibria and then we are in a world of many possible equilibria and some process to select one in theory that we actually observe. However, the word equilibrium is a highly unlucky one for the concept of coordination that we have in mind and it is still the heritage from mathematical physic analogies of around 1870.

Besides that, mathematics is always unconventional and according to von Neumann never understood, we only become used to it, I guess by retranslations and generalizations to and from the

old habits as a form of understanding. Morgenstern has written about self-fulfilling prophecies and the interaction of the theory and the modelled system in the 1920s. And I guess, yes, non-well-founded mathematics and categories in general provide ideas to answers to challenging parts of the continental philosophy. The closest connection to my thinking that I have found in sociology and philosophy is Luhmann's system theoretical sociology that is very much related to coalgebras, non-well-founded structures and in fact topos theory. He translated many results of computer science, system theory, cybernetics and explicitly builds on Spencer-Brown's (rather isolated and idiosyncratic) mathematics of the Russell paradox. There must be a coalgebraic formulation of much of Luhmann's work since Spencer-Brown's complex truth value *v* is an infinite sequence of True and False, *v* = True : map not *v*. Moreover, there is a new logic of David Ellerman built on the partition dual of the usual logic by subsets. This looks like a logic for the observing of observers where the unit of observing is to make a difference. Johannes Heinrich's philosophy is similarly a modern account of taking reflexivity as the foundational figure of societies. His notion of mutual thinking about each other's thinking is similar to the belief hierarchies of Harsanyi which is definitely a coalgebraic construction just like the Brandenburger-Keissler paradox of Alice's beliefs about Bob's assumption is a first *n*-players Russell paradox, hence sets that contain themselves – again a coalgebra. In short, we need to endogeneize theories into the system they are about and see how different theories aggregate into the dynamics of the system itself. I call that quantum physics to the power of quantum physics. If the observed system is changing the physicist then together they form a social system.

Reflexive economics has to provide a model theory for social science, where theory, syntax, content, form drives the model, semantics, content, function. In logics itself this interaction of logic as a description language and as a structure in its own right is not often discussed. This might be a new challenge that social science can approach together with the help from logic, computer science and mathematics. Maybe we proceed to dynamically varying sets, vibrating strings but for sure to some existing or new mathematics of unseen economic form. Any help is welcome from anyone who asks for the well being of our top level resources for life on earth as the ancient goal of housekeeping in times where the house becomes the whole earth.

In what ways for example could topos theory, that has recently been proposed for the physics of endogenous space and the rest (including economics?) be useful for the endogeneization of truth values, domains, languages, rules, dogmas and institutions in social systems as windows into a reality where it is never obvious whether it is the window itself.

In my economic problem the language of the economy is money. But reflexivity is only the first step of two observing agents who observe each other. The next question is a global one namely how do they observe themselves together or why, how and what society is emerging from these mutual observers and how to evaluate their exchange of work and money from all three perspectives and in different languages and truth values. I would like to combine micro economics in coalgebras and logic with the algebraic geometry of macroeconomics where the local to global transition is mathematically taking place and which is what category theory was developed for. After all money makes the world go around and it is an improbable geo meter. Macroeconomics is heading towards algebraic geometry in applications of homotopy theory for the global solutions of polynomials in general equilibrium theory. Cohomology gives us the calculations and I think we can also find around these structures the proper homes for the wholenesses, globalities, syntax and semantics of theories and models, solutions, entities, identities, persons, agents, households and values that we are talking about in economics and social sciences all the time – in short we need a synthesis from "I" and "you" to "we" as the embedding of "I" and "you" into the "we" and vice versa. People communicate by taking alternative points of view in all over the common space and they try and succeed or not to understand the different truth values arising from that.

Andrew Schumann: Is it possible to construct in the future computational economics, where all economic phenomena will be simulated, programmed, and predicted? How will it look like?

Viktor Winschel: Economic and social theory is about predictions which might change the predicted and about changing the rules as the best way to predict the future and to interpret the history. If we find out something about the informational structures that govern societies as their nervous systems we extend them into a new form. Economics is a “organize yourself and your household” theory with predicting the future as one of its tasks. For the finance minister this includes changing the rules and even changing the constitution which is about rules to find good operational rules or laws. My mental image is a software that runs mathematics or theorem proving as type transformations, for a kind of self-organized SAP system for national states and communities, the finance minister's workflow rethought, decentralized and integrated, if you want. We have that kind of software in the economy in chip design and verification of security critical software. Similarly, the research called Social Software mainly in computer science and logic looks at societies by means of algorithmic and semantic tools. So the boundaries between theory, software, model, economics and computer science are blurred and traditional economic concepts are about to be re-examined.

As our first code is up a running my goal for the next steps of a computational economic system are logical specification languages for theory and system specification and verification with model checking and generation and econometrics as code and automaton generation for an automatized production or synthesis of economic theories and the analysis of their theoretical behaviour and the same for the agents in my theories which are in fact my principals and I am their agent. So the content and the context interact in my own type of work and even change their roles, just like in our corecursive or Soros functions, where it is not clear what is the context and what is the content, both are both, depending on the point of view. They are both, alternatively changing their roles, infinitely, just like Spencer-Brown's complex truth value or -1, +1 if plugged in $x = -1 / x$.

Software can visualize economic theories as theatre plays, synthesized movies and all kind of various media and data and theory builder may even interact with sensors within virtual worlds like SimCity. The theatre play, graphical and symbolic format is what I have often used to teach myself mathematical and informal economic argumentation lines, figures and patterns. My motto right now is that the theory is the code and formal methods of computer science are used to analyse their properties. Our coalgebraic framework in the, almost finished, paper with Achim Blumensath explicitly uses this metaphor, where, as in formal bialgebraic language semantics, we care about the behaviour of the whole code arising from the behaviour of the individual operators. We use natural transformations of functorial games and strategies for compositionality and hence aggregation as the first step to macrostructures and their identities, it seems as colimits. However, since we need micro and meso and macro structures the bialgebraic semantics turned into a sub modular one with two instead of one natural transformation. Syntax and algebras can be taken as network structures that are strategically constructed within the system, by that it organizes itself. The need for meso structures makes econophysics based on statistical mechanics useless. Complex systems are like that because they have intermediate structures that moreover reason about the aggregated structures. In complex systems there are neither case based singularities at work nor laws of large numbers. It points into a fractal repetition of the same structures at varying levels just like category theory reveals the fractal organization of mathematics.

A related general problem is the prevailing usage of only extensively interpreted functions as input output boxes in computational and general economics. Non intensionally, without looking at the rule or algorithmic content of functions, it becomes complicated in not impossible to build a theory of the composition of production and utility functions and to see how synergies and added value evolve and are distributed in economies. At the same time, we need to model behavioural phenomena at the interfaces to unobservable spaces and hence a clear notion of automatons and unobservable state based systems for epistemic and ontological states. This is what the coalgebraic framework provides, unobservable state space systems and automatons, together with the implementation and the access to formal verification systems and much more. Lambda calculus for example tells us how the evaluation of function arguments relates to function composition.

Extensionally we cannot distinguish between $f(g(x))$ and $(f.g)(x)$ but economically we have to since intensionally both expressions are possibly subject to very different costs or complexities and that depend on the order of argument evaluation and function composition. In the end more general notions of morphisms than functions are needed to construct the category where the invisible hand arises is a colimit. The question of economic value seems to be strangely outside of economic theory as rather arbitrary cost functions that accompany production functions. The units of the operations are not specified and accordingly much of economic semantics evaluates natural language concepts ultimately to real numbers. So we neglect the computational and algorithmic content of production and most of all the compositional effects. We simply do not use the proper algorithmic tools for the compositionality and the processes of economies. This is what our coalgebraic framework is about. We aim at compositionality by natural transformations of games and strategies into aggregated ones.

Take any Internet company which is about producing software or management that is about producing similarly algorithms or rules of transformations of some types. What is the type of an economist, who is producing consultants who are taking production functions and produce better ones? We can speculate whether an economist without an algorithmic interpretation of functions would succeed as a manager of Adam Smith's nail factory, where one needs to detect sub modular opportunities for the division of labor that preserves the whole product but at lower costs, coverings and normalizations. This can be taken as a coalgebraic form of graph minimization under bisimulation as behaviour preserving equivalence relations or as a normalization on a wholeness. In turn, reflexively, due to a lack of understanding of the division of labor or value theory, we have a fundamental problem of composing economic theories efficiently. The division of labor situation in economics and with the rest of the sciences is not Pareto efficient. Compositionality is a field where much work was devoted on in computer science and mathematics and from where we can learn very much for some of the core questions of economics. A related question is why have these tools not been developed in economics? How do we need to educate our students in order to do so?

I think computer science and economics share some similar and foundational concepts and problems like the need for introspection or reflexivity, explicit syntax and semantics or value theory, encapsulation and global solutions or centralization and parallelization. Moreover computer science moves more and more into traditional social science domains implementing our societies and human-computer interfaces. However, computer scientific and logical results are about to improve the economic reasoning process itself independent of the entertained theory. But we need to discuss how that connects to existing economics.

Andrew Schumann: Many experts claim that the financial crisis of 2008 was caused by the insufficiency of conventional economic paradigm including Neo-Keynesian mathematics. Can we assume that the new mathematics in economics allows us to solve much more problems in the future?

Viktor Winschel: The economic problem of the current and other financial crisis is most likely the result of an insufficient understanding of relational structures in economies and economics. Take double accounting and Walras' Law, my colleagues tell me hand wavingly that this is simple, at the same time it is unclear whether dynamics in macroeconomics is consistent with national double accounting, implemented by the banking sector. More technically it is unclear whether the postulated or real dynamics takes place at some hyperplanes that cannot be reached without some creative accounting, invention of nonexistent types in economic theory or securities in financial markets. I am not even sure whether we know the truth value types for these kind of questions. Where does cheating starts – already in the syntax? Are there social structures where cheating is a way to do anything? For sure it is easier to cheat and err in a theory if there are no units of kg or dollars of resources. What units do the indices of consumer prices have? And what is the type of a financial contract that is written in 100 pages of a juristic language talking about prices composed

from various assets priced by nonlinear stochastic differential Black-Scholes equations? It may not be a standard contract to be traded over the counter, would you buy it?

The old stock-flow problem in monetary economics as far as I know is still not resolved which is about constraints propagation in hierarchical knowledge based systems and amounts to a proper treatment of time points and spans. Process logic, embeddable into our coalgebraic framework, might be a language for economic theory to ask how to approach the measurement and control of decentralized structures. It is one of the most complex problems in computer science, engineering, economics, banking and management. Most of all control is either dictatorial or emergent or composed from the control of subparts. For sure emergence is not discussable in the mathematics we have in economics and we need global and geometric methods.

My own understanding is that money theory and economic theory in general is about generalized double accounting thus a relational system with adjoints that give us universal values. Accordingly, my inner problem of economics are endogenous, sub modular hierarchies or meso network structures that create and distribute value. The mathematics we were talking about is the result of my modelling problems that I had within optimal currency areas. It needs by subject much of economics and from my point of view some latest, local and global mathematics.

We will see where the new mathematics, logic, computer science and programming languages which drive the internet and the economy can be of use in economics. The work ahead is to type the theory of optimal currency areas to arrive at the value of a common decision about the constitution of a central bank written on some pages in the language designed by the mathematics we were talking about and interpreted by a proof engine and model generator for a scenario and counter example exploration that evaluates the contract on available data. This is the general problem solving and contract generation machinery of economics if one takes optimal currency areas and central bank as variables of the type of global game and strategy, respectively.