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THE NANOLEVEL OF ECONOMIC HIERARCHY

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The range of issues related to an individual is crucial for modern economics. It is possible to talk about appearance of nanoeconomics as a new branch along with the traditional micro- and macroeconomic theories. The main objective of the research is to analyze the achievements of various scientific schools concerning nanoeconomics. In the research methods of historical and comparative analyses are used. As for the novelty of the work, the issues of nanoeconomics are considered here in terms of hierarchical analysis.

Behavioral economics denies the idea of economic agents rationality; evolutionism is based on bounded rationality; neoinstitutionalism and ethical economics preserve the concept of rationality in the theory developing criteria for rationality of higher orders (metarationality). Evolutionism rejects neoclassical economics and suggests a new paradigm; behavioral economics criticizes the axiom of rationality, but it is still not clear what changes into the theory it entails; neoinstitutionalism broadens and deepens the neoclassical theory maintaining its core; ethical economics develops the neoclassical model as its own special case. Neoinstitutionalism is like economic imperialism that tries to extend the methods of economic analysis on issues of other fields such as sociology. Behavioral economics is, rather, expansion of psychology into economics; evolutionary theory - biology expansion into economics; ethical economics – ethics expansion into economics.

Keywords: hierarchical economics, nanoeconomics, behavioral economics, rationality, evolutionary economics, institutional economics.

In the XXth century theoretical science underwent some sort of “humanist switch” – it focused attention on the range of issues related to an individual. In philosophy it developed into appearance of existential schools and philosophy of life, in public conscience – in renunciation of scientism and technocratism. Economic science wasn't left aside.

It is enough to give one example of how a personal aspect is important for economics. In Keynesianism it was supposed that individuals are susceptible to monetary illusion, monetarism described economic agents' behaviour via adaptive expectations, neoclassics – via rational expectations. Realizing importance of studying subjects as basis of macroeconomics, G. Akerlof paid attention to the fact that neoclassical synthesis disregards issues connected with an individual [34, p. 40]. Another Nobel laureate, E. Phelps insisted on getting an individual back into economic models, e.g. through taking into account their expectations [34, p. 46].

In modern economic science the issue of an individual is moving to the forefront, and it is possible to say that a new field of study has appeared along with traditional micro- and macroeconomic theories – nanoeconomics.

The term “nanoeconomics” was first introduced by K. Arrow¹ as “theoretical description eco-

nomical behaviour of an irrational agent” [27, p. 83]. The nanolevel was defined by G.B. Kleiner as “behaviour of individual participants of processes of production, distribution and consumption” [14, p. 104; 15, p. 45], by E. Popov and M. Vlasov – as a field of economic theory studying behaviour of individual participants of economic processes” [27, p. 83]. A.G. Khudokormov prefers to use a term “micromicroeconomics” and defines its gist as cognition of inscape of a firm, household and the state and establish linkage between appearance of the new field and neo-institutionalism [34, p. 20-21].

It was neo-institutionalism that ceased considering a firm or household as a black box, as it used to be in neoclassical microeconomics. R. Coase and his successors look inside a firm, analyse it as a tool of reducing transaction costs. G. Becker studies household, issues of conclusion of marriage, choice of a partner, number of children, etc. Finally, J. Buchanan looks inside the state apparatus using the same tools of neoclassical economics.

It is obvious that all economic decisions on price making, production output, investment, consumption, economy are taken not even by a household or a firm but by an individual. The more surprising it is that nanoeconomics as a subject of independent study has appeared relatively recently. However, before consider-

¹ It should also be noted that V.M. Galperin attributes appearance of “micro-microeconomics” to works by H. Leibenstein who considered

not a household or a firm but an individual to be an ultimate subject of decision-making [7, p. 379].

ing the current state of nanoeconomics, it should be noted that scholars of the XIXth century pay close attention to an individual component of economics.

For example, J.-B. Say considered an entrepreneur as an individual who is ready to take a risk and manufacture a product [1, p. 193]. V. Pareto noted that successful entrepreneurs (“elite”) possess energy and will aimed at achieving goals even using criminal methods [26, p. 99]. W. Sombart contrasts different types of entrepreneurs’ behaviour: “commercial spirit” as such and “burgher spirit”. The first type is characterised by such features as conquering, organising and trading, which are typical not only of manufacturers and merchants but also of bandits and pirates. A. Marshall [20] accentuated managing functions of an entrepreneur: combining of labour and capital, planning and production control etc.

Finally, J. Schumpeter emphasizes a fundamental role of an innovative person. The innovative person has such qualities as unrestrained accumulation of property, strong will to victory and labour, intuition, which is necessary under risk and uncertainty. Narrow-mindedness is compensated by immersing deeply in the problem [1, p. 197-198]. Further, in his works F. Knight [23] analyzes an entrepreneur who takes a risk and makes a profit. An entrepreneur is used to making decisions under uncertainty, believe in his rightness and is ready to prove his case at the risk of losing his capital.

As a general property of all early theories of entrepreneurship V.S. Avtonomov names “dynamic view of economic processes, rejection of an abstract idea of absolutely balanced equilibrium economics with complete and available information” [1, p. 199].

Moving on from the theory of an entrepreneur to the consumer theory and the issue of rationality, first of all it is necessary to mention F. Fetter, who can be named a forerunner of modern behavioural economics and one of the first critics of marginalism. As early as in 1915, he insisted that subjective cost determination is not a result of rational decision-making but an impulsive act of choice based on unconscious preference. So choice is largely driven by influence of external and internal random factors, instinct and habit [1, p. 190].

According to M. Weber’s sociological theory, an individual’s behaviour is mainly explained by instincts, however not biological, but cultural and social ones: instincts of workmanship, idle curiosity, parental bent, inclination towards acquisitiveness and egoism, as well as an instinct of a habit. In Germany H. Münsterberg was also engaged in experimental studies of such issues as monotony and organization of labour, fairness of remuneration of labour and advertising efficiency [29, p. 11].

It is impossible not to note innovativeness of J. Keynes, whose macroeconomic theory is saturated with psychological aspects: a psychological law in the theory of consumption, realistic description of an investor’s behaviour while choosing a project to finance, constant use of concepts of uncertainty and expectations, description of subjects’ irrational behaviour through the category “money illusion” etc.

It is possible to name three fields of modern economic theory that actively develop nanoeconomic issues. They are behavioural economics, neo-institutionalism and ethical economics, fined by R. Kapeljushnikov as a “revolution” [13, p. 71] and “the most interesting and remarkable event in economic science development over the past decades” [13, p. 66], appeared in 1970s. It is H. Simon, the Nobel laureate of 1977, who can be considered as its author. The term “behavioural economics” was introduced by psychologist and economist G. Katona, who investigated behaviour, including irrational behaviour, of consumers and entrepreneurs, as well as their expectations [29, p. 11-12]. The Nobel Prize was also won by such behavioural economics theorists as R. Selten (1994), D. Kahneman (a psychologist) and V. Smith (2002).

Behavioural economics can be reduced to critics of the neoclassical postulate on rationality basing on the experimental method.

Basing on laboratory experiments, R. Selten showed that while decision making an individual can be guided by habit, imagination and logical reasoning [34, p. 34]. D. Kahneman and A. Tversky, who applied cognitive psychology to economics, conducted a lot of experiments that demonstrated inadequacy of the classic model of absolute rationality [34, p. 37]. Finally, V. Smith examined basic postulates of economic theory under laboratory conditions and discovered that they only hold true under “the simplest and most primitive variants of the market configuration” [34, p. 35].

Among the empirical results not corresponding to classical theory, modern authors name the following: dependence on the reference point, unacceptance of losses, social preferences, a switch of preferences, framing, hyperbolic discounting, a sunk cost effect, an anchoring effect, decision bracketing, mental accounting, a context effect, availability bias etc. [6, p. 54-56; 8-10; 33, p. 61]. According to some estimates, the number of such types of irrational behaviour approaches to 50 [13, p. 75].

Departures from the postulate on rational behaviour were found not only in the processes of consumption. Nobel laureates R. Shiller, who had predicted the US stock market crash in 2000, G. and Akerlof, find examples of instinctive (“spiritus animalis” can be translated as “animal instinct”) behaviour and its consequences: money illusion, job search, processes of saving and investing, cyclicity and financial crises, national minorities poverty etc. [2]. A lot of conducted experiments made economists come to the conclusion that “departures of the actual behaviour from the normative model are too numerous to be ignored, too regular to reject them as occasional ones and too fundamental to try to add them to the normative system by weakening its initial premises [13, p. 73]².

² R. Myerson wonders why economists obstinately continue to use the rational behaviour premise and provides the following answer: “...theories of inconsistency and stupidity of human behaviour which are accurate enough and capable of being analytically interpreted haven’t been elaborated yet” [19, p. 28]. Besides, he points out that in the long term people can be inclined to rational behaviour, despite the results of some experiments. Finally, science has not only descriptive tasks. Economists have a right to build a virtual world with

It is important to note that not only the postulate on rational behaviour, but also connected with it statement on complete knowledge was subjected to criticism. In our opinion, its wittiest and deepest criticism is represented in works by a Nobel laureate K. Arrow [35-36]. For example, he paid attention to the idea that according to the theory of oligopoly a firm has to know not only the price, but also the demand curve. But a demand curve is estimated via techniques of econometrics (which didn't exist in 1838 when A. Cournot worked on his famous model). As a result, neoclassic assumes that agents behave as scientists³. To support this idea, it is possible to add D. Colander's argument: rational economic agents should have unified understanding of real economic laws, whereas even among economists there is not any unity of views on this issue [18, p. 16-17].

There is a more profound observation: if when making decisions every agent assumes rationality of others, as a result "rationality of all the agents has to be common knowledge [36, p. 253]". For hierarchical analysis of economy it means that "...rationality and knowledge of rationality are social, not only individual phenomena" [36, p. 254]. Finally, the complete knowledge hypothesis requires infinite amount of information on not only existing, but also future markets, and even on markets of goods that don't exist yet.

It can also be noted that K. Arrow establishes linkage between the neoclassical hypothesis about rational behaviour and the premise of homogeneity: "... the hypothesis about rationality as such is very weak. Trying to make it more useful a researcher is tempted to introduce some strong assumptions. In particular, the assumption of homogeneity seems to me to be the most dangerous" [36, p. 251]. This assumption contradicts the data on human capital, savings etc. The assertion that the premise of homogeneity rules out the possibility of trade is not an indisputable conclusion but the strongest one. As K. Arrow insists, trade is only possible in case of limited knowledge and information, in case of nonidentical individuals.

On the basis of behavioural economics a new ("the newest" [33, p. 70]) theory of welfare ("new paternalism") appeared. Whereas the traditional theory of government regulation admits market failures at the microlevel and rectifies their consequences at the macrolevel, new theoretical ideas suggest that the state should eliminate the very causes for market failures at the microlevel by stimulating subjects to optimal behaviour for their own sake. In other words, the state has to rectify not only market failures, but also behaviour failures, e. g. introduce a "tax on sins" (alcohol, tobacco,

gambling etc.), restrict use of credit cards⁴, legislate on the "cooling" period (when it is possible to return donations or purchases from travelling agents), print information on winning probability on lottery tickets etc. [7, p. 370-376; 13, p. 84-88].

As is noted by A.G. Khudokormov, in economic theory the question of correlation between neoclassical mainstream and behavioural economics has not been settled so far. On the one hand, results of experiments can be included in the core of the traditional science. On the other hand, in this case it turns out that competitive equilibrium implying absolute knowledge and rationality is only a special case which doesn't exist in reality and for which market only strives as for an unachievable ideal [34, p. 38].

Basing on researches in behavioural economics it is possible to draw one more conclusion: economy can be considered from both perspective of levels even deeper than nanoeconomics and perspective of levels beyond the framework of traditional economic theory. Even at the nanolevel the role of psychology is quite big. Lower, there is a level of neural impulses in brain (neuroeconomics) [28, p. 49; 33, p. 63]. As is noted by V. Smith, the biggest "... part of the knowledge that we use and decision-making ability are subconscious by their nature" [26, p. 10], which makes it possible to analyse rationality at the neurolevel (neuroeconomics) and evolution of genes responsible for an individual's behaviour (psychogenomics).

It is neuropsychology that allows us to see the problem of rationality from the new perspective. It appears that behaviour which is irrational from the economic point of view in fact can turn out to be rather hedonic.

For example, neurobiologists discovered that when decision making different brain regions can be activated. For instance, when making a decision on whether to smoke or not, brain regions responsible for pleasure and for evaluation of probable consequences of smoking are active. Another example: consuming absolutely the same wine people consider more expensive wine to be tastier. This example seems to be absurd and show that people behave irrationally. However, what is interesting is that brain tomography when being made while a person is drinking wine, shows that people get more pleasure when drinking expensive wine than when drinking the same wine with a lower price on the price tag. Although such behaviour doesn't correspond to traditional understanding of rationality, following brain chemistry individuals themselves get the greatest satisfaction (at the level of brain neurons) when behaving exactly this way and consequently strive for it.

Let us now proceed to the evolutionary theory, whose authors R. Nelson and S. Winter [24] came to the conclusion that innovators make discoveries and introduce inventions guided not by rational consideration but by habitual behaviour models. In other words,

ideal agents. However, it is necessary to note that these virtual worlds are unequal to reality and it is impossible to create forecasts and develop economic policy basing on them.

³ It should be noted that modern marketologists estimate consumer demand and preference functions using a very sophisticated technique of microeconomics, multivariate statistical analysis, data mining etc. One more conclusion drawn by K. Arrow on that "... a monopolist needs a full model of general equilibrium" [36, p. 253] doesn't seem fantastic to us: a lot of state, commercial and scientific organisations elaborate such models.

⁴ The Central Bank of the Russian Federation applies analogous measures to protect citizens from "imprudent" offers of high interest credits (URL: <http://expert.ru/2013/12/4/napotreblvali/> (accessed: 02.04.2014)).

under insufficient information economic agents have to rely on social conventions and stereotypes (routines) as ways of transmission of knowledge. Moreover, most inventions are created in organisation that are not aimed at gaining profit (such as universities) and/or in government-funded ones.

It is important to note the following. First, even exponents of evolutionary theory state that behavioural “mistakes” are predictable because they develop [13, p. 74]. In terms of evolutionism, these patterns of behaviour could have been optimum at the previous stage of development, but in the present context they are not optimum and will be adjusted in the process of evolutionary adaptation of mankind. So evolutionary approach admits more dynamic (in comparison with behavioural economics) interpretation of rationality.

Second, for hierarchical analysis it is important to note that there are three levels of decision-making distinguished within the evolutionary approach: biological instincts, culture and conscious choice [32, p. 79]. These three levels, which are beyond the framework of pure economics, interact, compensate and supplement each other for the sake of a single aim – survival. Utility maximization, which goes on under different restrictions, can only be the aim of a lower level in comparison with the strategic aim – survival. Everything that increases probability of survival at any given stage of the progress of population (religion, morality, altruism and avidity, love and hatred, patriotism and vindictiveness and other phenomena) is admitted to be rational. So they are not individuals or even society but genetic¹ and cultural routines that turn out to be a unit of evolution and subject of evolutionary approach analysis. Therefore it is genetics that appears to be foundation for nanoeconomics, not brain chemistry as in case of behavioural economics.

After stating foundations of behavioural economics, it is necessary to dwell on some results obtained within neo-institutionalism and important for hierarchical analysis of economy.

In his theoretical schemes G. Becker proceeds from the premise that “...various personal characteristics of some individuals influence utility functions of others” [4, p. 232]. It explains phenomena of altruism and charity which contradict principles of rationality at first sight. For hierarchical analysis of economy the most important conclusion from Becker’s theory is a “rotten kid theorem”: “if one of a family members takes care of others intensively enough to perform the function of the head of the family, all other members will be guided by the same motives as this member, thus maximising the family capabilities” [4, p. 252]. As a result models of single individuals boil down to the model of only one participant – the head of the family.

¹ A. Markov, Doctor of Biological Sciences, leading researcher of the Paleontological institute of the RAS considers not an individual or a population but a gene as a unit of evolution: “only ultimate result is important: how many more copies appears in the next generation. Egoism at the level of genes turns into altruism at the level of an individual”. (Saraev V. Gen altruizma [The gene of altruism] // Эксперт [Expert]. 2013. № 29 (860). URL: <http://expert.ru/expert/2013/29/gen-altruizma> (accessed: 02.04.2014)).

In our opinion, this theorem has some parallels with social ideologies that consider interests of the whole society as interests of only one of its classes. For methodology of economic science this theorem is important in terms of the representative agent approach. If it is really possible to sufficiently describe some set of agents, aggregated economic sectors and economy on the whole through only one agent, it validates the representative agent principle.

On the other hand, Becker’s theorem states possibility of modelling a family not through a typical family member but through the head of the family, to whose interests interests of all other members boil down. So it is reasonable to simulate macroeconomics not through a representative firm or a household, which pursue their own objectives, but through the state and some altruistic economic sectors which are aimed at maximising social welfare.

It is interesting to note that “dependence on the context” is not an example of the irrational behaviour for Becker, as it is for Kahneman. According to Becker, an individual’s demand depends on the demand of other consumers [4, p. 273] and “depends positively on the aggregate demand level” [4, p. 274]:

$$D = \sum d_i(p, D) \quad (1)$$

with $d_i(p, D)$ denoting the demand of the i -th consumer and D denoting the market demand.

For hierarchical analysis the equation (1) is notable since it describes interaction between an individual d_i and market D . Ascending links are represented by aggregating operator of summation, descending links – by reverse influence of the market demand on individual demand. Thus, the Nobel laureate uses a model close to hierarchical analysis in order to defend the concept of rational behaviour.

Arguing against behavioural economics, the economist identifies “social types of activity of which collaborative, partly public consumption of products and services is typical” [4, p. 273] and points out that such approach was corroborated by scholars conducting researches into segregation, customs, gambling, choice of place of abode etc. Thus, Becker introduces a concept of “status” into economic science, which means not just social position but certain resource providing access to other benefits, e. g. to quality education and health care [34, p. 24-25].

Becker insists that principle of rationality is sufficient to explain all the examples given by behavioural economics without recourse to ad hoc hypothesis about stupidity, shifts in value system etc. [4, p. 32].

For hierarchical analysis it is important not only to state existence of the nanoeconomic level of hierarchy but also to analyse relations between the level of an individual and micro- and macrolevels. So it is necessary to mention researches of V.M. Sokolinsky and Ju. Olsevich [25-26], who analyse psychological aspects of perception of value of money, consumption and savings, state economic policy, shadow economy, labour market and labour relations, economic equilibrium and growth etc. Besides, the authors identify nanoeconomic tools of the state policy: influence on subjects’ consciousness and subconsciousness,

achievement of social equilibrium, building of an advantageous image of the state etc.

V.V. Mikheev's research is not less interesting for hierarchical analysis of nanoeconomics [21]. The scholar establishes links between the nanolevel and level of the world economy, revealing an individual's need for international security. Thus, the author not only connects extreme levels of economic hierarchy but also broadens Maslow's well-known hierarchy of needs.

Apart from appearance of the nanolevel of economic theory it is possible to name some tendencies characteristic of science of the XXth century on the whole. Earlier appeal to morality was prerogative of religion. However, modern scientists tend to particular humanistic orientation, attention to an individual ("new discovery of a man in sciences" [16, p. 15]) and protection of an individual against unregulated capitalism ("globalization with a human face" [34, p. 344]).

It is possible to give different examples of this new trend. For instance, the fact of bestowing the Nobel Prize in Economics on A. Sen, who considers not cost or material wealth but "plethoric, free, full of long-lasting physical and mental health" life to be the aim of human activity, including economic activity [34, p. 298]. The Indian economist states that success of capitalism is based not on egocentrism but on a complex value system.

Another example is substitution of the concept of economic growth for the concept of sustainable socioeconomic development. Finally, conspicuous is the fact that the list of factors of production including land and physical capital was supplemented with an entrepreneur's talent and human capital assets connected with such spheres as education, health, quality of life, security [31, p. 34]. So both aim and tools of economic science and policy have changed – now they are for the sake of an individual and through an individual's development [34, p. 312].

We have listed only a few examples of anthropologic, humanist switch in economics. Our research doesn't aim at considering propositions and results of ethical economics¹. We will only state some points important for hierarchical analysis.

In our opinion, the most interesting and comprehensive results (among recent research), which lie far beyond the framework of economic theory, were obtained within M. S. Zagulin's "economic theory of an individual". Its subject is "an individual as a subject of management" [11, p. 7], its content is studying laws of people's economic behaviour. Zagulin notes that an individual's fundamental characteristic is the ability to be a worker, an owner and a consumer all in one. These roles are analysed by the author from various aspects (at various "levels of knowledge" [11, p. 15]): ideological, political, legal, socio-psychological etc. As an optimal, a personality type "ideal manager" is defined, which possesses the following qualities: as a worker – realism, ability to defend his/her rights, self-

organisation, business activity; as an owner – spirituality, efficiency, business morality; as a consumer – humanism, social partnership, legislative initiative etc. [11, p. 118].

Taking all the aforesaid into consideration, it is possible to represent the following schematic view of economy in terms of ethical economics: an individual is the origin and the ultimate aim of social development; however, society can limit individuals' activity as well as form their moral compass with the help of morality.

At the same time pure economic theory is a tool of analysing only rational activity while ethical economics is aimed at "investigating exactly formation of preferences and development of perception of value qualities and possibilities of use" [17, p. 154]. So as a positive science ethical economics applies methods of ethics in economics and as a normative theory it is a theory of ethical rules and guidelines. In the latter meaning ethics turns out to be close to politics as they both provide rational economic activity at the individual and public levels [16, p. 8].

Rational ("economical") principle is formal, indifferent – that is purpose-rationality (according to M. Weber [16, p. 73]). It can be applied when the aim is very clear (profit or utility maximisation or costs minimisation). This principle is opposed by axiological rationality, which is guided by the values given from without (e.g. by tradition or authority) and create the aims of activity itself.

At the same time ethics and economics are "in interconnection, which is close and fundamentally harmonious, however not completely free from tension" [30, p. 291]. Ethical economics doesn't deny or substitute economic theory and its scientific conclusions on market functioning: "a morality that believes itself able to dispense with the technical knowledge of economic laws is not morality but moralism" (cardinal J. Ratzinger, pope Benedict XVI) [30, p. 299].

In this respect economic and ethical rationality correlate hierarchically. Ethical rationality is at a higher level and determines economic rationality, in accordance with which individuals act. However, an economic criterion underlies ethical rationality in that choice of the most efficient ethical norm is always made basing on economic considerations.

Here it is useful to note that ethical economics found its application in practice of German ordoliberalism. O. Schlecht identified 10 principles of the "economics of order" [30, p. 284-299], which can be briefly stated the following way: market is the most efficient economic model (thesis 1), but it is reasonable only if it is competitive (4); at the same time it cannot reject morality (2) as it cannot resolve all important social issues (3) and needs "social equilibration" as a condition for social progress (5). Market as a mechanism of regulating microrelations should be supported by the state macro policy (6), infrastructure investments (7), protection of nature (8), democracy and free state (9-10). M. Albert contrasts this German-Japanese model with an Anglo-Saxon one [3, p. 23].

In conclusion we would like to introduce some integrating observations. In modern economic theory a

¹ The publishing house "Ekonomicheskaya shkola" ["Economic school"] has issued a whole series of monographs on ethical economic [3, 5, 16, 17, 30].

new nanoeconomic subject of research is being elaborated. Different scientific schools are engaged in developing this field, and they present essential difference in methodological approaches and theoretical results:

– behavioural economics denies the idea of economic agents rationality; evolutionism is based on bounded rationality; neo-institutionalism and ethical economics preserve the concept of rationality in theory developing criteria for rationality of higher orders (metarationality).

– evolutionism rejects neoclassical economics and suggests a new paradigm; behavioural economics criticises the axiom of rationality, but it is still not clear what changes into the theory it entails; neo-institutionalism broadens and deepens neoclassical theory maintaining its core (in Lakatos' understanding); ethical economics develops the neoclassical model as its own special case, which is of interest to scientists but not to practitioners.

– neo-institutionalism is a sort of economic imperialism that tries to extend the methods of economic analysis on issues of other fields such as sociology. Behavioural economics is a sort of expansion of psychology into economics; evolutionary theory is expansion of biology into economics; ethical economics is expansion of ethics into economics.

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