Elif ÇEPNI*

THE NEW ECONOMIC THEORY AND HUMAN ECONOMY

Abstract: The "new economy" is a term many economists started to use in the last decade of the 20th century. They argued that information technology, the Internet, ultra-high-tech companies and globalization had created a completely new type of economy.

It changed how we work and live. It changed many basic economic rules. We are observing a very serious economic metamorphosis.

Hi-tech and the Internet have not only changed how we rest, work and play, they have also changed the fundamental laws of economics. The employment prospects of the blue-collar worker and the way we shop is vastly different today.

Some agree that some changes have occurred some insist that what makes an economy remains the same.

In all economic thought schools the formulation of solutions to main economic problems are written for the previous system. They made invaluable contributions to our accumulated knowledge. But we are living in totally different times. This is not a temporary transition. The idea of "being" should be replaced by "becoming" which describes the paradoxical simultaneity of stagnation and change.

"Rationality" constitute the basic assumption of almost all economic theories. The case was almost the same in terms of political philosophy. But today big companies are using our *"instincts"* and telling us what we need to do to survive.

The main aim of the paper is trying to reveal the possibility of having different than known ways of thinking about economic policies and economic theories.

Key words: *Rationality, neuroeconomics, decision-making, measurement*

1. INTRODUCTION

What sets us apart from other animals and everything else is that we can think and reason about what we ought to do. Our tradition of numerical

* World Academy of Art & Science,
Rector, Cyprus Health and Social Sciences University

prediction can be said to have begun with Pythagoras. But we are not super computers and super forecasters.

Economics gains its credibility from its association with hard sciences like physics and mathematics [1].

Today there are two different issues that may be the basis of creating new economic theories. The first one is related with the results of empirical studies on people's rationality. Economics is a mathematical representation of human behaviour and like any mathematical model it is based on certain assumptions. Almost all economic theories assume that human beings are rational. Recent empirical studies have proved that people are *home sapiens* not electronic calculator type *homo economicus*.

In neoclassical economic theories it is assumed that economy is stable and markets tend to equilibrium. Since the time of Ancient Greeks stability assumption has been used to model natural systems. But empirical evidence has proved that this assumption is not the main feature of economic systems or social sciences.

When we say *Homo economicus* — it is assumed that people are clever and well-informed, decision-making is rational and systematic; and economic actions are described as the outcome of mechanical data processing. A lot has been done to soften the standard approach, especially in microeconomic analysis, for example by recognizing the nature and implications of asymmetric information and other forms of market failure, and by introducing Bayesian models to replace models of rationality based on perfect information.

Empirical evidence proves that people act as a living organism rather like a machine. We live in the field of network science now.

The second one is arising from another source which is digitalization of our daily life. The methods of production and the traditional ways of consumption are transforming our life. People are working on four very promising areas namely virtual-reality, self-driving cars, private space flight and gene editing. These developments require the development of new economic theories which may use different definitions of wealth creation and value.

Neo-classical economics is sometimes notorious for its focus on unrealistic behavioural assumptions about humans' capacity for rationality (Almost all theories of economics treats people as if they are mathematical machines). The effect of our emotions on our decisions even were known in Ancient times. It is not a new knowledge for us.

The Pyrrhonians (Pyrrhonian Scepticism- the movement was named in honour of Pyrrho of Elis (c. 360–270 BCE)) suggested that behaviour can be guided by instincts, habit and custom rather judgement or knowledge [2].

After so many years behavioural economics have relaxed economists' standard assumptions to give models in which people decide quickly, often using simple rules of thumb rather than rigorously but robotically calculating the monetary benefits and costs of their decisions.

Behavioural economics also explores how quick thinking leads people into systematic mistakes but also explains how people can learn from their mistakes. In behavioural economic models, people look to others when making decisions and when seeking happiness. Their decisions are affected skills and personalities and also by moods and emotions.

Scott Galloway [3] in his book having the name "The Four" claims that the heart is a vast market. Because most of our actions, including purchases, are driven by emotion.

Behavioural economics could be defined as the subject which attempts to enrich economic analyses of behavior — grounded as it is in theories about preferences, incentives, decision-making and strategy — with insights from psychology, sociology, cognitive neuroscience and evolutionary biology. Whereas neuroeconomics links economic behaviour to brain activity.

The brain often reacts more to losses than to gains, which can stimulate irrational behavior. While emotional responses are not always suboptimal, they are rarely consistent with the concept of rationality. As neuroeconomics becomes more developed, the field of study will improve the understanding of the mechanisms influencing decision-making.

Neuroeconomics, judgment, and decision making encompass different disciplines, including social, cognitive, and developmental psychology; neuroscience and neurobiology; and economics and business [4].

Herbert Simon replaced the global rationality of economic man with a model of bounded rationality. According to him an uncertain future, bounds to rationality, including cognitive and information processing constraints as well as imperfect information, will mean that people, at best, are able to act in a broadly reasonable rather than strictly rational way. They will be satisficers rather than maximizers [5].

At micro level it seems recent studies are supporting the existence of bounded rationality.

At macro level there is a great deal of controversy about the causes of aggregate fluctuations in economic activity. Related with these controversies different economic thought schools are arguing different policy implications.

There are lots of different economic policy solutions for the same economic problems in different economic thought schools. Although error-trial is not a right method in many countries including the most developed ones policy makers are compulsorily using this very costly method.

Why we need a new economic theory or theories? This paper aims to compile new developments to show the necessity of this requirement. First the digitalization of production second irrationality of people are the main arguments behind this humble request. In the second part the main problems of making precise predictions mainly in social sciences will be discussed then a short cost benefit analysis of moving from knowledge economy to human economy will be elucidated.

2. ERROR THEORY AND MEASUREMENT PROBLEMS

Measurement is at least as old as civilization. Error analysis is the study of uncertainties in physical measurements. Social measurement spans a vast range of topics. It underpins government, public policy, international relations, industrial relations, economics, academic social sciences research, aspects of business and commerce, and many other areas.

Social measurement is critical in designing our education and health systems, in running our transport systems, and in creating new towns and cities [6].

To collect data and extracting meaning from data shortly statistics helps us for predicting the future, making inferences about the unknown. There are problems with data too. It could be skewed (asymmetry in distribution), incomplete (missing observations) or incorrect in any number of ways and for any number of reasons [7].

Statistical models could be divided into two types, namely mechanistic and empirical models. A mechanistic model is based on some solid underlying theory for how things are related. These models will be based on theories about how things actually work. These models based on mathematical equations describing these theories or mechanistic models are direct mathematical ways of describing theories. In contrast, empirical models try to provide convenient summaries for the important aspects of observed data. If there is no underlying theoretical basis for the proposed relationship, the model would be an empirical model. Mechanistic models are widespread in the physical sciences and disciplines such as engineering. Empirical models are used more often in the social and behavioural sciences.

Although economics is a social science it is full with mechanistic models based on theories about how economic factors are related [7]. Many systems important to humans exhibit complexities (objects with many interconnected parts). Markets (buyers and sellers), economies, firms, industries, the internet, multi-celled organisms are well known complex systems.

The behaviours of complex systems are very difficult to model and predict. Their chaotic behaviour, self-organizing patterns, their fat tail behaviours, adaptive interactions makes their modelling almost impossible.

Apart from modelling these systems there are some very important problems in measurement. Different kinds of measurements are susceptible to different sources of errors. Measurements involving the direct intervention of humans are vulnerable to fatigue, motivation, carelessness, boredom, distraction, and a host of other causes of distortion.

Economic statistics may suffer from missing data. In social statistics only samples are questioned not the entire population and instead of individual measurements which may show big variations their averages are used. Through this way overestimates and underestimates of random measurement results will cancel each other. But this will not solve inaccuracy problem which may arise from systematic errors (error means the difference between an experimental value and the true value).

Human uncertainty can result in two types of experimental errors; both systematic error (bias) and random error.

Experimental errors are inherent in the measurement process and cannot be eliminated simply by repeating the experiment no matter how carefully we repeat them.

Bias errors are systematic departure from the underlying true value, affecting all of the repeated measurements. Random errors can be assessed by repetition of measurements, bias errors cannot; these need to be estimated using external information [8].

The difference between the systematic and random errors can be seen by repeating a measurement of a physical quantity several times under the same conditions. Random errors are statistical fluctuations or variations in the measured data produced by the experimenter's inability to take the same measurement in exactly the same way to get exactly the same reading.

On the other hand, systematic errors are repeating inaccuracies that cause the measurements to constantly be either too high or too low. They are mostly due to defects in the measuring devices which make them continually present throughout the entire experiment [8].

Accuracy is the closeness of agreement between a measured value and a true or accepted value. Measurement error is the amount of inaccuracy.

Precision is a measure of how well a result can be determined (without reference to a theoretical or true value). It is the degree of consistency and agreement among independent measurements of the same quantity also the reliability or reproducibility of the result.

The uncertainty estimate associated with a measurement should account for both the accuracy and precision of the measurement [8]. Precision shows us how much repeated measurements fluctuate about a central value. These kind of measurement errors may give us wrong results and these wrong results may give us wrong policy and decision formulations.

When scientists refer to experimental errors, they are not referring to what are commonly called mistakes, blunders, or miscalculations.

The lack of information and data, measurement errors, complex and nonlinear relationships, using wrong models or making predictions by using the parameters of previous regressions which are not valid anymore may make perfect predictions impossible.

Most theories of choice assume that decisions derive from an assessment of the future outcomes of various options and alternatives through some type of cost-benefit analyses. The influence of emotions on decision-making is largely ignored [9].

We generally use highly centralized mechanistic (bureaucracy) decision making process. But studies prove the better performance of decentralized organic (adhocracy) decision making process [10].

Another source of formulating wrong decisions or economic policies is the rationality assumption of almost all traditional economic theories.

Rational models are generally normative, theoretical and sometimes unrealistic. Rational models follow deterministic approach to problem-solving. In these models it is believed that there exists optimum situation for decision-making and managers can make optimum decisions.

They are based on complete information and knowledge. In these models it is believed that outcome of each alternative is known with certainty and perfection. They don't use managerial judgment, intuition and personal biases. They advocate perfect rationality in decision-making.

Non-Rational models are descriptive. They are practical or realistic in nature and follow probabilistic approach to problem solving. They are based on incomplete information and incomplete knowledge about outcomes of various alternatives. Moreover, they are based on managerial judgment, intuition and personal biases. They advocate bounded rationality in decision-making [11].

Regret is defined as the difference between the actual payoff and the expected payoff. We all seak pleasure and more importantly avoid pain. That is what drives us. But psychological measurement can be more difficult than measurement in the natural sciences. To formulate economic theories to explain the observed economic events around us in a better way, to improve

the well being of people it could be better to redesign many unrealistic assumptions of current traditional economic theories.

After explaining the basic possible problems of measurement especially in social sciences it could be possible to add new ways of thinking to current economic theories and economic policies.

3. FROM ORTHODOX ECONOMY TO HUMAN ECONOMY

Life in the information age is becoming increasingly complex. New technologies are introduced into the workplace on a daily basis. Local economies are increasingly affected by global market situations. People are moving about and interacting with others in ways never before seen. Challenging problems have arisen unlike any witnessed before. To sustain progress on our fragile planet, society must design new systems to manufacture safe and useful products. In short, people must become better at understanding and coping with complex, dynamic problems. At a very simple level "dynamics" means the problem situation changes as circumstances change.

In classical model it is assumed that: all economic agents are rational and aim (firms and households) to maximize their profits or utility (further more). They do not suffer from money illusion. All markets are perfectly competitive, so that agents decide how much to buy and sell on the basis of a given set of prices which are perfectly flexible. All agents have perfect knowledge of market conditions and prices before engaging in trade. Trade only takes place when market-clearing prices have been established in all markets, (including labour market) this being ensured by a fictional Walrasian auctioneer whose presence prevents false trading. Agents have stable expectations [12].

But no one thinks that markets are perfectly stable, or that investors are perfectly rational, or that markets are fair and everyone has access to the same information.

According to David Orrell the specific misconceptions of traditional economics are as follows; the economy can be described by economic laws, the economy is made up of independent individuals, the economy is stable, economic risk can be easily managed using statistics, the economy is rational and efficient, the economy is gender-neutral, the economy is fair, economic growth can continue forever, economic growth will make us happy, economic growth is always good.

These ideas form the basis of orthodox economic theory. To date, still in decision-making process (at individual, corporate, and societal level) they are used in the formulation of strategies and economic policies.

Expectations about future involves hopes are fears as well as hard facts. In economic theories two different versions of expectation formulation are used. These are weak and strong versions.

The main idea behind the weak version is that informing forecasts or expectations about the future value of a variable rational economic agents will make the best (most efficient) use of all publicly available information about the factors which they believe determine that variable.

In other words, expectations are assumed to be formed "rationally" in line with utility- maximizing behaviour. expectations of economic variables on average will be correct.

Economic agents' subjective expectations of economic variables will coincide with true or objective mathematical conditional expectations of those variables.

The rational expectations hypothesis which is known as the the strong version goes even further than this. Agents will need to take into account what they believe to be the correct macroeconomic model of the economy. Since available information will be incomplete then this means agents will make errors in their forecasts.

In this theory, the forecasting errors from rationally formed expectations will be; random with zero mean, be unrelated to those made in previous periods, have the lowest variance (like blue) compared to any other forecasting method.

In other words, rational expectations is the most accurate and efficient form of expectations formation. The Lucas — Sargent — Wallace policy ineffectiveness proposition, added further weight to Friedman's attack on discretionary policy (discretionary (optional, flexible) policy is the selection of the decision which is best).

Kydland and Prescott provided a reformulation of the case against discretionary policies. They assumed that the policy maker is engaged in strategic dynamic game with sophisticated forward — looking private sector agents.

Kydland and Prescott attack the theory of economic policy which evolved during the 1950s and 1960s. Kydland and Presscott argued that there is no way that "optimal control theory can be made applicable to economic planning when expectations are rational (this can be very useful in the physical sciences, the control of social systems are different). They believe there are intelligent agents will anticipate policy actions. In the dynamic economic systems discretionary policy (the selection of that decision which is best) may not maximize the social objective function.

In this economic though school, economists believe that "economic planning is not a game against nature but, rather, a game against rational economic agents".

According to mainstream theoretical studies, rational individuals use all available information during the expectation formation process and they optimize the expected value of a well-defined objective function under the assumptions of von Neumann and Morgenstern's expected utility theory. But we need to emphasize that; rational expectations does not mean that agents can for see the future exactly. Rational expectations is not the same as "perfect foresight" [12].

Still the assumptions of von Neumann and Morgenstern's theory may not be fulfilled since most real-world probabilities are imprecise or immeasurable.

The Arrow-Debreu theory does not take into account adaptive interactions typical of complex adaptive systems. From complex adaptive systems viewpoint the fully rational agent assumption is a very strong assumption.

Complex adaptive systems are different than complex physical systems. In complex adaptive systems the elements called "agents" learn or adapt themselves to interactions with other agents.

The brain often reacts more to losses than to gains, which can stimulate irrational behaviour. While emotional responses are not always suboptimal, they are rarely consistent with the concept of rationality. As neuroeconomics becomes more developed, the field of study will improve the understanding of the mechanisms influencing decision-making.

Expected utility theory assumes that people try to maximize their expected utility. According to economic theories of choice under uncertainty or decision-making under risk and uncertainty requires information on the probability distribution of outcomes such as the expected value of the distribution, the variance and standard deviation, and coefficient of variation.

These are just expected or estimated values. But we are humans not machine type or robot type unfeeling stolid creators. Today still some scientists dislike problems whose results are irreproducible even in theory. Some of them even go further and work on econophysics. Econophysics could be defined as explicitly modelling social and economic affairs using statistical physics approaches [6].

Of course, the best guidance in life is science but treating humans as machines and underestimating the importance of human qualities (character, passion, collaboration, creativity and more) may increase alienation, stress, isolation and some other sociological and physiological problems.

Considering human side of management and human side of economic policies may make us more anti-fragile. Through this even without knowing the future we may get ready for it in a healthier way.

4. CONCLUSION

In order to change the quality of life and promote solidarity we need dreamers, change makers, story tellers, action takers. What students learn today will very likely irrelevant within 30 years.

As Oscar Wilde said it seems we know the price of everything but the value of nothing. What we count as value in the calculation of national incomes (some of the productions of unproductive sectors) could be very detrimental to environment and for the future generations. We need to rethink about the side effects of some economic activities and whether to name these activities as value creation or value extraction [13].

Yuval Noah Harari in his book says that "in the past we humans have learned to control the world outside us, but we had very little control over the world inside us" [14].

Through the eyes of chaos theory, we live in a world consisted with unpredictable events and we cannot control these unpredictable events and human behaviour.

What at first seemed like knowledge can turn out to be something less than the real thing. Reflecting on the difficulty of enquiry, knowledge is not easy to get. There is a big difference between just thinking that something is true and actually knowing that it is. Knowing something and believing something is the difference between knowledge and opinion. We know that knowledge is power. When we use our opinions as if they are true facts we may take wrong decisions quite easily. Even with knowledge to make precise predictions are not possible especially in complex systems such as economic systems.

In recent years, the fallacy of the rationality assumption has been proved through empirical evidence by different studies. Economists have shown that people often lack self-control, are short-sighted, and overreact to the fear of losses. But to date, these attacks on rationality -- under the broad heading of "behavioural economics" -- have seemed more like a grab bag of anomalies than a consistent alternative theory. So the assumption of rationality survives [15].

Definitely we owe a lot to all contributors of traditional economic thought schools. Knowledge accumulation through gaining different perspectives is our richness and biggest wealth. Related with economic theory and policy design, decision making at individual or corporate level requires more

realistic analysis of how real people decide and choose. We need to replace these models associated with modern mainstream economics, which assume that people decide as if they are mathematical maximizers with renewed new theories which may combine behavioural aspects and complex dynamic external factors into consideration. We are not very good at taking a long-term perspective. We need to improve our abilities to deal with change and discontinuity.

REFERENCES

[1] D. Orrell: Economythes, How the Science of Complex Systems is Transforming Economic Thought, Icon Books Limited. 2012.
[2] J. Nagel: Knowledge, A Very Short Introduction, Oxford University Press. 2014.
[3] S. Galloway: The Four, The Hidden DNA of Amazon, Apple, Facebook, and Google, Portfolia/Penguin. 2018
[4] E. A. Wilhelms and F. R. Valerie: Neuroeconomics, Judgment, and Decision Making, Psychology Press. 2015.
[5] M. Baddeley: Behavioural Economics, A Very Short Introduction, Oxford University Press. 2019.
[6] D. J. Hand: Measurement, A Very Short Introduction, Oxford University Press. 2016.
[7] D. J. Hand: Statistics, A Very Short Introduction, Oxford University Press. 2016.
[8] Y. Xiaoming, H. Liu, M. Ling and X. Xiao: "The New Concepts of Measurement Error Theory" Measurement. 2016.
[9] A. Bechara: "The Role of Emotion in Decision-Making: Evidence From Neurological Patients With Orbitofrontal Damage" Brain and Cognition, Elsevier. Volume 55. Issue 1. June 2004. p. 30–40.
[10] A. Riabacke: "Managerial Decision Making Under Risk and Uncertainty" IAENG International Journal of Computer Science, Volume 32. Issue 4. 2006.
[11] A. Tanuja: "Differences between Rational and Non-Rational Models Decision Making", http://www.businessmanagementideas.com/decision-making/differences-between-rational-and-non-rational-models-decision-making/4841.2019.
[12] B. Snowdon and H. R. Vane: Modern Macroeconomics, Its Origins, Development and Current State, Edwar Elgar. 2005.
[13] M. Mazzucato: The Value of Everything, Making and Taking in the Global Economy, Hachette Book Group. 2018.
[14] Y. N. Harari: 21 Lessons for the 21st Century, Penguin Random House United Kingdom. 2018.
[15] J. Chen: Neuroeconomics, Investopedia, https://www.investopedia.com/terms/n/neuroeconomics.asp. 2019.