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ECONOMICS OF THE ARTIFICIAL INTELLIGENCE: CHALLENGES, ADVANTAGES AND RISKS

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Purpose of the article: Economics and economic research have been revolutionized in the age of Big Data and Artificial Intelligence. The "Race between Man and Machine" is becoming a hot topic for economists, philosophers, physicists, researchers, consultants, entrepreneurs etc. It is not accidental that the 2024 Nobel Prize in physics was awarded to scientists John Hopefield and Geoffrey Hinton who along with Yann LeCun are referred to as the modern "godfathers of AI"; Nobel Prize in hemistry – to prominent Google's AI specialists Demis Hassabis, John Jumper (Deep Mind chief executive, rector of the AI lab) and biochemist David Baker.

Methodology: Being heavily influenced by engineering and mathematics through various modeling, simulation techniques and experimental methodologies, modern economics, its methods of teaching and research should be revisited and reinvented, adjusted to new reality. This shifts the character and focus of the economics discipline from Theoretical to Empirical Economics. The AI requires an interdisciplinary approach, combining economics, statistics and computer science (machine learning). Approaching the AI from economic point of view, as Daron Acemoglu (Massachusetts Institute of Technology, 2024 Nobel laureate in economics, along with Simon Johnson and James Robison) observed, it is important to avoid a "false dichotomy between disastrous and totally benign effect of automation".

Key words: economic identity of AI, risks and limitations of AI, Digital Revolution and AI.

Introduction

Economics and economic research have been revolutionized in the age of Big Data and Artificial Intelligence. Being heavily influenced by engineering and mathematics through various modeling, simulation techniques and experimental methodologies, modern economics, its methods of teaching and research should be revisited and reinvented, adjusted to new reality. As Gregory Mankiw once observed "God put macroeconomics on earth not to propose and test elegant theories but to solve practical problems". The AI, as it is mentioned in the September 2024 issue of the Economist Technology Quarterly is becoming a "relentless innovation machine", is "eating the world" since power-hungry chips used to run large AI models by mushrooming data centers are consuming 460 terawatt-hours, or almost 2 percent of global electricity demand and this figure will double in the next few years (The Economist, Silicon returns to Silicon Valley, Chipmaking. Technology Quarterly, September 2024, p. 14.) The AI has a profound impact on the economy as a whole and economic theory, on the methods of economic analysis, on labor and capital markets. That is why it is important to investigate the economic identity of AI from a historical perspective.

Economics and economic research are changing in the age of Big Data.

Since mid-1980, according to D. Hamermesh empirical research has dominated the economic papers (more than 70%) elaborated by their authors on vast amount of data and controlled experiment. This shifts the character and re-focus the economics discipline from Theoretical to Empirical Economics. The "identification of novel patterns of behavior or activity, and the development of predictive models… differentiate modern approach from earlier methods used in economics" (Einav and Levin, 346).

First, data is now often available in real time, immediately and in big variation and this represents a great value added for economic researchers and policy makers.

Second, "data are available on previously unmeasured activities" such as personal communications, social network, consumer purchasing behavior and preferences, job search etc. This is infusing a new "blood" in "Behavioral Economics", a special branch of economic analysis and a "workhorse" of economics, which combines economics, psychology and neuroscience and is designed to enhance the consumer protection, "to keep individuals from making decisions they will (predictably) come to regret without proscribing individual choice".

Third, the big data is coming with "higher dimensionality and less-clear structure", and the challenge is how to organize, analyze, systemize it in order to extract the necessary information. Paraphrasing David Stephenson, an internationally recognized expert in data science and data analytics, the Big Data needs to be demystified, and economists need to learn how to use big data, data science and AI to make better business and consumer decisions, to gain competitive advantage, better recommendation and predictions for government, and better forecasts for domestic and global markets (Stephenson).

Last, but not least, mining the data and running mega-models, trained with graphic processing units (GPUs) is becoming expensive since they need a huge amount of memory, enormous quantities of data. For example, according to some estimates, every time someone asks the bot a question it costs OpenAI (the creator of ChatGPT) 36 cents. The energy used to train the large language models (LLMS) can take a nuclear power-plant to fuel them (The Economist, September 14-20th, 2024, p.54).

These changes are not questioning the importance of traditional economics, economic methods and methodology of analysis, but require revisiting and revising them according to the challenges of modern AI. It comes in forms of three interconnected and interdependent revolutions: "software" with informational technology at its heart; - "smart manufacturing" - new material science, which in combination with automation and information systems, 3-D printing radically changes not only "What", but also "How" and "For Whom" economy is producing; and "wireless revolution" that is opening new opportunities for billions of people to communicate, socialize and trade, transforming the economy into "Borderless Economy" with the most important core resource factor – human capital (Ciobanu, 2017, 272).

AI, AGI Economic Identity

If you ask Siri, - your Apple's i-Phone personal digital assistant (or Amazon's Alexa, Microsoft's Cortana, Samsung's Viv), what Artificial intelligence is, she probably will give you the Wikipedia's definition: "Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals… Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving" (Wikipedia). Siri (Alexa, Cortana, Viv), itself is a product and the best illustration of what AI is. It is an algorithm – a step-by-step explicit set of instructions that a computer can follow.

Nick Polson and James Scott, professors of Econometrics and Statistics, mentioned that behind these venerable modern AI ideas there are three technological forces: first, exponential growth in the speed of computers, known as Moor's Law (the number of transistors in a dense integrated circuit doubles about every two years); second, the explosive growth in the amount of data available as all information has become digitalized (so-called, new Moor's Law; the period of doubling of transistors is often quoted as 18 months - a prediction by Intel executive David House); third, cloud computing (Polson and Scott 6-7). Are these new ideas behind the AI, once converted into reality, a "gate" for better future for civilization with "more profound" impact than electricity or fire in the words of Google's boss Sundar Pichai, or are they an "existential threat to humanity", as Nick Bostrom, a philosopher at Oxford

University, argues (The Economist, June 25, 2016, 13)? This is not just a Shakespearean rhetorical question, and a brief historical excurse could be useful and informative.

Two hundred years ago, on January 1-st, 1818, Mary Shelley, a twenty years old English author, published a novel "Frankenstein: or The Modern Prometheus" about a young scientist who created a hideous human-like creature in an unorthodox scientific experiment and who turned against his creator, taking even his name: Frankenstein. Was it the precedent of raising machines ("waking up" as Frankenstein) threatening the human race? Three years later David Ricardo, an illustrious representative of the classical school of economics, expressed his fears that "substitution of machinery for human labour… may render the population redundant". His concerns were shared and reinforced by Thomas Carlyle, a Scottish philosopher, historian and mathematician: thoughts on "demon of mechanism" (1839). John Stuart Mill, a prominent 19th century British political economist and philosopher emphasized another side of "machinery question" – "benefit to labourers of mechanical invention" (1840).

These thoughts surprisingly resonate with some comments of today's most innovative entrepreneurs, such as "disrupter" billionaire Elon Musk. He characterized the creation of the super-intelligent AI systems as "potentially more dangerous than nukes," "summoning the demon", and the "biggest existential threat to civilization" (The Wall Street Journal, September 15-16, 2018, C1).

The evolution of "machinery question" has never been straightforward despite its obvious positive impact on labor productivity and economic efficiency, on the consumer and producer behavior, and, ultimately, on their entire life. Just remember how Luddites at the dawn of the Industrial Revolution protested and destroyed machines, considering them the main threats for their jobs and livelihoods. Joseph Schumpeter, the Austrian- American economist, caught precisely the essence of this evolution in apparently paradoxical term "creative destruction": the "process of industrial mutation…that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one", a process that is "the essential fact about capitalism" (Schumpeter 83).

The AI, or "advanced machine learning," is based on huge volumes of data necessary for learning systems to train themselves, and frequent feedback for self-adjusting in changing circumstances. It is a cause and effect of the unprecedented disruption since the middle of the 20th century. Klaus Schwab, German engineer and economist, the founder and chairman of the World Economic Forum, emphasizes that the First Industrial Revolution used water and steam power to mechanize production; the Second – electric power to launch mass production; the Third – electronics and information technology to automate production, and now; a Forth Industrial Revolution – the digital revolution, - a fusion of technologies that is blurring the lines between the physical, digital and biological spheres. It represents technological breakthroughs evolving at exponential pace in such areas as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, material science, energy storage, and quantum computing (Schwab).

The term "Artificial Intelligence" was coined in 1956 in a research proposal of a group of scientists, organized by mathematician John McCarthy at Dartmouth College in Hanover, New Hampshire. It was an attempt "to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves" (Russell and Norvig.17). At that time, the expectations for the AI proved to be overoptimistic, promising much more than it could deliver. Only in 2012 the term and the idea were "rehabilitated" after an online contest – ImageNetChallenge in a series of fascinating innovations ("deep learning" for the first time surpassing humans in image recognition; "artificial neural networks" – ANNS – biological inspired networks of artificial neurons, or brain cells (The Economist. June 25th, 2016, 5). The First Industrial Revolution changed the world by replacing the human muscle, but today's digital revolution could replace the human brain with smart robots to do the muscle work as well as the brainpower needed to run themselves, according to some experts.

About two decades ago a new term was introduced – Artificial General Intelligence (AGI, Mark Gubrud of North Carolina University), which is defined by Wikipedia as "the intelligence of a machine that could successfully perform any intellectual task that a human being can", or a system "capable of solving a wide range of tasks – rather than building a new AI system for each problem" (The Economist, June 25th. June 25th, 2016, 6). This AGI perspective is at least a couple of decades away, since a new technological revolution has not yet materialized in significant increase in productivity, as it happened during the first Industrial Revolution. Nevertheless, the race between humans and machines is already evolving into a new stage. It is illustrated by fierce competition between the U.S., China, South Korea, and Japan for the next generation of cellular networks with ultrafast speeds and a wide range of new applications – the competition for wireless future, -5G. In a recent survey the AI experts predicted about 50 percent chance that AI would be able to perform all human tasks by 2060, with the Asian experts considering that it could happened even sooner – by 2045 (Drum. 45).

If initially AI was a branch of computer science separated from mathematics because of its distinctive subject and methodology, gradually it has evolved into a multidisciplinary science with strong implications and impact on philosophy, economics, neuroscience, psychology, computer engineering, linguistics, and of course mathematics.

One of the best analyses of all these economic challenges and opportunities of the AI has been done in the collective monography "The Economics of Artificial Intelligence: An Agenda", edited by A. Agrawal, J.Gans, and A.Goldfarb and published by The University of Chicago Press in 2019, based on National Bureau of Economic Research Conference Report, featuring the leading economists, statisticians, scientists. From this very impressive collections of articles on this subject, especially important is the context in which AI is functioning: 1) AI is not machine learning (ML), but the general purpose machine learning (GPML) is the driving force, "electrical motor of AI", a "tool that is getting better, faster, and cheaper"; 2) the practical purpose of AI is to "drive a real increase in productivity", more exactly total factor productivity (TFP) that is quintessential for economic growth and development; and finally 3) the practical implication of the AI should be considered in more general context: "the role of economics in industry", and in this respect, "the economists are those who can provide structure and rules around messy business scenarios". The authors' conclusion is: "Just as big data led to data science, a new discipline combining statistics and computer science, AI will require interdisciplinary pioneers who can combine economics, statistics and machine learning" (The Economics of Artificial Intelligence. p. 84-85).

From these prospects it is important to focus on a few critical issues for economy and economics: a) what is AI impact on labor market, particularly, how it is affecting the demand for labor, wages and employment; which effect is prevailing: "displacement" or "productivity"? b) is AI a substitute or complement of capital; c) how AI is affecting economic growth and development through intelligent decision-making, transforming social governance, labor and capital, industry 4.0 and innovation; d) what are the risks, costs and benefits, limitations of the AI?

"Technological Unemployment": paradox of technological progress.

Predictions that automation will make humans redundant could be traced back to two centuries ago, to the time of David Ricardo. In 1930s John Maynard Keynes coined a special term "technological unemployment" that is "due to our discovery of means of economizing the use of labour outrunning the pace at which we can find new uses for labour" (Keynes 358–73). Other well-known economists and economic historians (Wassily Leontief, Robert Heilbronn) proved to be equally pessimistic regarding the implications of machines and displacement of work. Were their predictions, right?

Fears of "automation progressively replacing labor" provoked tremors in society all the time in 19th and 20th centuries, but became especially worrying at the beginning of the 21st century with the

emergence of the AI (AGI as the latest form of automation) and respective concepts of "singularities" (a hypothetical situation in which the Artificial Intelligence exceeds human intelligence, escaping human control with potential disastrous consequences),"super-intelligence" widely debated and discussed in the machine intelligence community, especially among economists and economic researchers.

The question is: will machines "destroy" human labor as one of the main factors of production, or they will create new jobs by replacing the old ones?

Daron Acemoglu, an MIT economist and 2024 Nobel Prize winner in economics, is asking in this context: "why this might (or might not) lead to lower employment and stagnant wages"? He used a large amount of data to measure the share of new job titles performed by workers that previously did not exist and came to a conclusion that 60 percent of about 50 million jobs added in the last 35 years are associated with the new job titles: in 1980 the new job title was "management analyst", in 1990 – "radiology technician", in 2000 – "computer software developer" (Acemoglu and Restrepo 1488-1542). What about 2025 and beyond?

Carl Benedict Frey and Michael Osborn, two Oxford researchers, examined the effect of computerization for the 702 occupations in the U.S. They found that 47% of jobs in America are under high risks of automation in the next two decades, particularly in logistics and transportation, office support, sales, and services (subsequent studies estimated the same trend for 35 percent of jobs in Britain and 49 percent in Japan). Even for the economists the probability of computerization and replacement of their jobs is 43 percent (Frey and Osborne). As early as by 2030, according to PricewaterhouseCoopers, an auditing firm, 38 percent of all jobs in the United States are "at high risk of automation". AI researchers predict that by the 2040s, computers will be able to conduct original math research, perform surgery, write best-selling novels and other highly cognitive jobs performed by professionals today (Drum 46-47).

The fact is that unprecedented advancement of technology in production, transportation, logistics, communication, and other areas, with limitless possibilities for labor-saving displacement of jobs did not reduce the share of labor in national income, which remained relatively constant (Jones, and Romer 224-45). Automation did not displace labor as a factor of production. Rather than destroying jobs, they were redefined, created, and relocated, and grew significantly faster in the field of computer-intensive jobs. Consulting firm McKinsey & Co predicts that AI and automation could add 20-50 million new jobs globally by 2030 with people switching their occupation rather than losing their job (The Wall Street Journal Report, April 30, 2018, R1).

This "pitfall" or "paradox" of technological progress – increase in labor aggregate demand along with the decline in labor-share and employment fall in industries with fastest productivity growing, is explained by Daron Acemoglu and Pascual Restrepo in a model with two countervailing economic forces: "displacement effect" that tends to reduce the labor demand and wages, and counteracting "productivity effect" as a result of cost savings generated by automation that increases the demand for labor in non-automated tasks. The "productivity effect" increases the demand for labor also due to "capital accumulation, triggered by increased automation" which is increasing the demand for capital, but also for labor, and by "deepening automation" (automation at the intensive margin, since it is intensifying the productive use of machines) (Acemoglu and Restrepo. January 4, 2018, 6-8).

Since the AI increases automation in production of goods and services, it is boosting TFP as a measure of technological progress (TFP incorporates productivity growth from all sources, particularly from capital and labor in the Cobb-Douglas production function). From here we can conclude that AI impact economic growth on both: micro – concrete industry and firm, and macro levels – economy as a whole with reflections in the aggregate output, as well as in aggregate labor displacement and aggregate productivity effects.

On microeconomic level Jean Tirole, a French economist, provided a comprehensive analysis of how the firms should adapt their internal organization, composition and size of their labor force, their wage policy to opportunities and challenges of AI. He considers that to introduce AI the firms should increase the wage gap – wage (or college) premia- between skilled and unskilled workers, with middle-men performing more monitoring task, and encouraging self-employment for individuals to "build up reputation" (Tirole).

Economists are examining this micro-macro "transition" in sophisticated econometric and mathematical models on three levels: a) cross-industry input-output relationships to trace the effects of productivity growth in different industries, particularly in customer and supplier industries; b) aggregate economic growth and sectoral labor demand since each industry productivity growth is contributing to aggregate income and aggregate demand growth; and c) the uneven productivity growth across industries, which affected each industry's share in value-added and in the end – labor's share in aggregate value added, and respectively in total economy's growth (David Autor 3). Although these findings could address the pitfalls linked to this micro-macro transition, there are remaining limitations and constraints, and even negative impact of the AI on economic growth. Let us focus on a few of them.

First, economists are referring to the so-called William Baumol's "cost disease": the rise of salaries in jobs that have experienced no increase of labor productivity, in response to rising salaries in other jobs that have experienced the labor productivity growth. This pattern goes against the classical economics theory in which real wage growth is closely tied to labor productivity changes. For example, sectors with rapid productivity growth (agriculture or manufacturing) often see their shares in GDP decline, while sectors with relatively slow productivity growth (services) are experiencing increases (Aghion et all).

Second, AI affects growth and innovation by altering product market competition, facilitating imitations of leading consumer products and technologies, particularly through "reverse engineering," escaping in such a way competition and huge initial allocation of capital (investments) into research and development (R&D). An investigation of the U.S. administration of allegations that China has forced American companies to hand over intellectual property, or even stolen it in some cases. It is widely expected to conclude that "China's bad behavior" has cost American companies more than $1 trillion, which served as an argument to impose some $60 billion in tariffs in the first D. Trump administration (The Economist, March 17-23d 2018, 23-24).

Third, in a recently developed model of firm-level innovation, productivity growth and reallocation featuring endogenous entry and exit, Daron Acemoglu and his colleagues investigated the implications of several types of industrial policies on long-run economic growth and welfare, as well as potential pitfalls of these polices. They came to an apparent paradoxical conclusion that "optimal policy is not to subsidize R&D –type of activities," but "free up resources from the operation of low-type [unproductive] firms to be used by high-type [productive] firms." This "selection effect" will "compensate" underinvestment in R&D, leading to "socially optimal allocation," which can increase growth rate per annum from 2.26 percent to 2.94 percent, and welfare by 4.47 percent (Daron Acemoglu et all. 2018, 108(11).

Fourth, the effects of introducing AI in production technology for new ideas, could increase economic growth either temporarily or permanently and potentially generate some forms of singularity. At the same time economic growth as a consequence of automation and AI "may be constrained not by what we do well but either by what is essential and yet hard to improve" (Philippe Aghion et all).

Last, but not least, a core issue relevant to both AI and economics is modeling human decision-making, which is fairly well developed in psychology, sociology, anthropology, and surprisingly not too much in AI or in economics. Examining realities in descriptive modeling of human decision-making could be important for both AI and economics. In elaborating and using these models we cannot overlook the limitations of AI systems. As Robert Elliot Smith of University College of London mentioned "AI

has shown that models of human reasoning that are based on idealization of mathematics or logic do not embody the real-world, robust decision-making in the face of ontological uncertainty observed in humans. Thus, one must use caution when attempting to model the decision-making of economic actors using similar tools" (Smith 34-35).

Risks, effects, and challenges for regulation AI

The AI is reshaping, "reinventing" the market, reconfiguring both its sides: supply and demand. On the supply side the introduction of AI and related new technologies are creating totally new industries, products and services, significantly impacting and disrupting existing industries and value chains. The new innovating companies are ousting and replacing the well-established old ones faster than ever by using extensively global digital platforms for development, marketing, sales and distribution. On the demand side the AI and new technology platforms are changing the consumer behavior, increasingly determined by access to mobile networks and data, are creating total new ways of consuming products and services, of designing, marketing and deliver them. Victor Mayer-Schonberger and Thomas put in evidence that the key new technologies that are crucial in reconfiguration of the markets "allow us to (1) use a standard language when comparing our preferences, (2) better match preferences along multiple dimensions so that we can select the optimal transaction partners, and (3) device an effective way to comprehensively capture our preferences". All these technologies are facilitating "the translation of rich data into effective transaction decisions… and provide the foundation for an economic revolution." (Reinventing Capitalism in the Age of Big Data, p. 64).

The AI is changing not only the traditional functions of business, such as finance, HR, customer service, cost-benefit analysis but also the concept, the prediction and forecasting of the markets, every aspect of business, which is becoming more data driven. The experts of McKinsey Global Institute, a consultancy think-tank, consider that the companies could derive between $1.3 trillion and $2 trln. new economic value from using AI in supply chains and manufacturing, $1.4 trln.- in marketing and sales. The return on investment in AI in customer service and human resources, for example, will be about 20 percent (The Economist. March 31 2018). AI and Big Data are bringing great benefits to business firms that are embracing them, as well as to their customers, but this is coming also with great challenges and threats, and not just for business, but for the economy and society.

There are four main effects that AI and digital revolution have on business and economics: on customer expectations, on product enhancement, on collaborative innovations and on organizational forms, as Klaus Schwab observed. Along with these effects there are at least three major areas in which traditional economics approach needs to be revisited: competition, markets, and anti-trust regulation.

The abundance of data is changing the nature of competition, which traditionally was the driving force of productivity and efficiency, distribution, and reallocation of resources, and finally - a "disciplinarian" force of the markets. Today oligopolistic technology companies, so-called "superstar firms," are concentrating enormous power, benefiting from network effects, and dominating the digital markets. For example, nine out of every ten Internet searches worldwide are performed by Google. Together with Facebook, a leading social media platform with about two billion users, these two "digital titans" control more than half of the advertising market. Apple runs the world's largest mobile app store in terms of revenue, seizing about 80 percent of the market. Almost every other dollar spent online in the US is captured by another giant - Amazon. Booking.com enjoys a monopoly position for hotel reservations with more than 75% of the clients using its network for their reservations. All this market power is concentrated in just a few companies, and it is converted into unimaginable profits (Mayer-Shonberger and Ramge. Big Data. 48).

This super concentration of market power is stifling the competition in at least two ways: it is erecting insurmountable barriers preventing new entrants to the market and it is providing a competitive

advantage for superstar firms to impose large fees on market participants and discourage innovation (Philippe Aghion et all. 32). An example is the Facebook $22 billion acquisition of WhatsApp, a messaging app with just fewer than 60 employees. Another aspect of this distortion of competition and markets are threats to individual freedom and choice: Google is seeing what you are searching for, Facebook – what information and with whom you are sharing it, Amazon – what you are buying and how much you are paying and so on.

These evolutions linked to AI and Big Data are posing unprecedented new challenges and threats for people freedom and security, especially cyber security and require legislators and regulators to revise the outdated system of regulations, adjust it to the rapid changes of economic and social environment due to impact of AI. The governments need to change their traditional antitrust model of regulation, which functioned very well in previous eras (break up of Standard Oil in 1911, or AT&T in 1984, or even Microsoft in the 1990s), but not now. The new models of antitrust regulation may include enforcement of progressive data-sharing, which would not impose any direct cost on companies, but would allow firms and individuals to use the same data, would in the end spur innovation. The consumers' interest could be much better represented and protected by independent and competing digital assistants.

Modernizing the legal and regulatory framework does not mean that the government should turn to another extreme – digital protectionism, as, for example China did in 2016 forcing companies to store all their data within Chinese borders, pass security reviews, and standardize the collection of personal information, which de-facto gave the government access and control over vast amount of private data. Russia adopted a similar law in 2015. Such and other forms of digital protectionism, according to the Information Technology and Innovation Foundation, is reducing growth rate for the economy by 1.7 percentage points (Foreign Affairs, May-June 2018, 137). Central control of data gives a particular superstar firm potential power over decision–making of a single consumer, but also of every market participant. It is even more dangerous because could create a precedent of some kind of Central Planning for the government. Marxists already speculated this idea: let robots control the means of production and then distribute the spoils to everyone according to his or her needs" (Foreign Affairs, July August 2018, 47).

Conclusions

The impact of AI on human life is becoming one of the most investigated and debated topics in various aspects. Ajay Agrawal, Joshua Gans and Avi Goldfarb, three eminent economists, published a book about extraordinary potential of the AI: "Prediction Machines. The Simple Economics of Artificial Intelligence." They emphasized: "AI is everywhere. It is on our phones, cars, shopping experiences, romantic matchmaking, hospitals, banks, and all over the media." The economics of Artificial Intelligence is a branch of economic discipline rapidly gaining popularity as Smartphones and other modern electronic devices are conquering minds and hearts, especially of the young generation (Agrawal et all, 1).

Economics of Artificial Intelligence is emerging as a new, complex and interdisciplinary rewriting of the classical economics, as its contemporary complement and not a substitute in both branches: Microeconomics – how the AI is modifying the market structures, competition, production and cost, consumers' and producers' behavior; Macroeconomics- how the AI is redefining the Growth and Development, Economic Efficiency, Fiscal and Monetary Policy, Banking, Finance and Business, Government and Regulation. It is important to capitalize on benefits and advantages of AI for transforming economy and economics as a discipline, for enhancing productivity, efficiency of using the potential of data-rich markets and improving living standards. But it is also important do not overstate the role of AI, to see its limitations, challenges and negative effects reflected, particularly, in increased

inequality, “digital protectionism” and “digital authoritarianism.” It is necessary to have a balanced approach, to avoid a falls dichotomy between totally disastrous and benign effects of AI.

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