Pietro Terna

Cyber Markets: What about Economic Freedom?

We start with a possible subtitle to clarify the contents of this presentation: "The good and the bad of the economic revolution coming from the web".

In the presentation, I will move from cyber markets to planning to agent-based simulation, artificial intelligence from the perspective of the markets' behavior.

First of all, the dawn of the second part of the last century's novelties, with the magic moment of the middle of the 40s, when great minds like John von Neumann, Oscar Morgenstern, and John Nash, lead to critical new emergencies. Morgenstern was an economist, not a computer scientist or a mathematician, but his role was vital in explaining to Neumann the economic reality.

We had there new calculation tools, and a new language for science and social science, with game theory and the new concept of complexity. But we have not to forget Wiener, who was a mathematician and a philosopher with the creation of cybernetics. Cybernetics it is the attempt of joining the analysis of machines and humans both behaving with connections, with similarities. This element is essential in my presentation because the idea of planning comes from there. After all, cybernetics was not only related to intelligence – now we name artificial intelligence most of the parts of the cybernetic studies – but it was also a fundamental organizational analysis.

From there, the idea of searching new tools for planning, putting together cybernetics, and the input-output tables construction to understand the connections operating within an economic system. Microeconomic data, or big data, are essential, but we were at the beginning of the second part of the last century, quite far from the current situation.

To plan an economy, we need the data and, most of all, to decentralize both the collection and the utilization of data. We have an excellent book and a superb paper of Gerovitch (2004, 2008) written at the beginning of this century, where we can find underlined the critical points towards transforming an economy. An important date was 1961 when the Cybernetics Council of the Soviet Academic of Science published a volume (Berg 1961-1962) whose title is essential: Cybernetics at the service of communism.

We repeat that we consider cybernetics both as the study of humans and machines' behavior and vice versa and both as an organizational tool. The book is significant, and you have a link to a large part of its contents at https://terna.to.it/CybCom/. From there, the Soviet government had the possibility of planning the economy. Still, the process never started working effectively.

Why? Did they lack computers? For technological problems? Probably not. The most significant obstacle to starting the new planning activity was in designing the technical and organizational choices and in power contrasts. To create a whole economy with central planning, it is necessary to proceed step by step, with trials and errors and learning adaptation, and not to operate top-down trying the create a unique applied planning system.

If you want to know deeply, what the proposal was in 1961, you can read the 1962 translation made by the Department of Commerce of the United States. All the world was paying a lot of attention to this massive experiment to these profound changes. The book is practically impossible to have. To my knowledge, there are few copies in the world in five libraries. I asked a European library to have the possibility of reading the book, and I obtained it for a few weeks. I don't think I have done a lousy action putting a part of its chapters online.

If you want to have a light knowledge of the same arguments, you can read the Spufford (2010) book: it is not a technical book, but it is fascinating to have a broad picture of that period, where to place also the starting activity of planning.

Why am I dedicating a large part of my introduction to Soviet planning to talk about the web and the economic activity? We are close to discovering why.

Planning cannot work in a world without valid prices. As a great economist, Enrico Barone, wrote in Italian in 1908 with the title *Il ministro della produzione nello stato collettivista* or *The ministry of production in the collectivistic state* (Barone 1908a; 1908b; 2012). All this was before the creation of the first collectivistic state. Barone was one of the "three of Lausanne", with Léon Walras and Vilfredo Pareto. He was a mathematician, and his work is formally grounded. His key sentence is that "The determination of the coefficients economically most advantageous can only be done in an experimental way: and not on a small scale, as could be done in a laboratory; but with experiments on a very large scale, because often the advantage of the variation has its origin precisely in a new and greater dimension of the undertaking". Pay attention, all this in 1908.

Now we have other tools as agent-based simulation and artificial intelligence. The agent-based simulation is my field of research. In the last 30 years, we started building models composed of small parts of code. These are computerized models, but, in my view, they are a part of the mathematical models. Each piece of the code represents an agent with articulated characteristics and capabilities in a heterogeneous construction. In this way, we can observe the artificial agents' behavior in a metaphorical space to analyze the emergent macro-level effects.

Another step: artificial intelligence. Is artificial intelligence already a concrete reality? My reply is yes. I use as support the wonderful incipit of a paper of Kasparov (2018), in «Science», after the world chess championship of 2018. In Kasparov's words, that was not the contest between the two strongest players of the planet but only between the two strongest humans.

For Kasparov, chess is the *drosophila*, the fruit fly, in some way easy to examine. From there, more complicated reasoning operations can be undertaken by artificial intelligence. Certainly, chess is *drosophila* as we cannot imagine using artificial intelligence to ask for philosophical constructions' basic answers. In a more straightforward but not so simpler field, such as economics, I guess that machine learning could quite soon produce direct analyses, and maybe it is already doing them.

From cybernetics, agent-based simulation, artificial intelligence, are suggestions also arising for planning toward markets? Are we still living in a free market context? Maybe not. A consideration of mine: perhaps you have noticed that Amazon can send us in a few hours non-common use objects. In which way? Forecasting our probable decisions and feeding the warehouses whit the goods that we have not still ordered but that forecasts say we will buy. If a colossal operator decides what to buy, it is not far from determining how much to

produce. This kind of action is already planning. If it also chooses those productions' selling prices, it is not far from planning the economy.

In which way? From «The Economist» (2019), we have another exciting incipit: each year, Amazon asks all the managers to explain how they plan to use machine learning, and a reply "not so much" is not appreciated. Machine learning to prepare what to do as merchants and a lot more than merchants. Amazon is starting to have preferred exclusive producers, so it is moving to the industry.

Summarizing in Fig. 1 about artificial intelligence power and markets, what is emerging?

A network of AI capabilities that helps reduce transportation overload, waste of resources, energy needs, environment damages, inequalities, or… a world of fighting or colluding oligopolies, managing markets, and directing consumptions?

FIGURE 1 • A FLOWCHART REPORTING THE DISCUSSION OF THIS NOTE IN A SCHEMATIC WAY
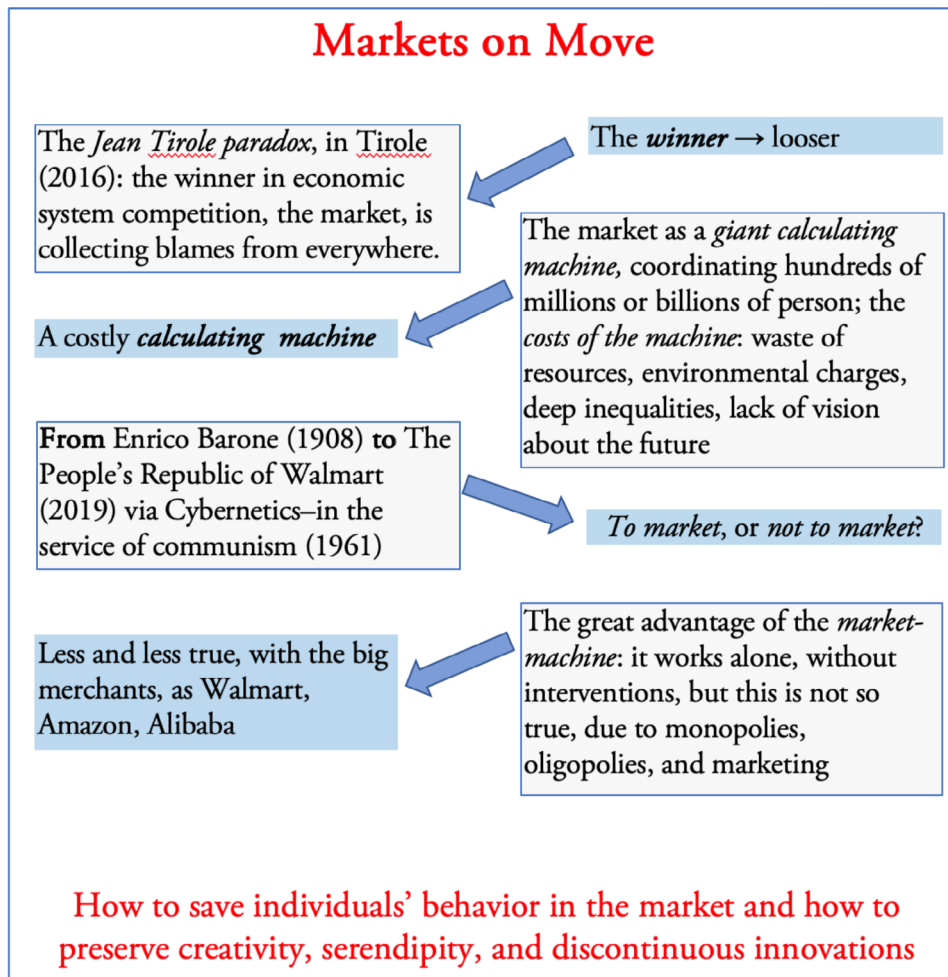
The reply is open.

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