Technological Disputation

Memo by Anthony Rosborough

Philip Hanspach (EUI) and Arthur Dolgopolov (EUI) discuss the quote: "*State-run algorithms should stay in the realm of science fiction*" (Tim Harford).

This event has been organised by the Technological Change and Society Interdisciplinary Research Cluster

Background

Harford's quote is taken from the 2017 article he wrote of the same name. In the article, Harford addresses the use of algorithms by states to manage the economy and markets. He initially draws historical reference to *Project Cybersyn,* a Chilean attempt to use computers for this purpose in the 1970s which ultimately failed to come to fruition. Nevertheless, Harford uses this example to address the possibility of success using modern computing. He references Polish economist Oskar Lange in opining that economic management by modern computers could only be performed if an economy 'could be described as a series of simultaneous equations for supply and demand'. Indeed, the central theme of Harford's article (and which formed the central discussion of the disputation) is whether an economy can be reduced to this type of logic.

Beyond supply and demand curves, Harford largely adopts the thinking of economist Fredrich Hayek, who felt that much of what an economy and markets do are things that cannot be easily counted or described in manner subject to computational analysis. Harford adopted the view of Hayek that the decisions of market actors to produce, consume, take risks or create new things are not necessarily predictable given that they are context-specific and often irrational. Secondly, Harford identified the pitfalls of power asymmetries in instituting algorithms for economic management, calling into question what authoritarian rulers may do when empowered with such knowledge and data over their societies and markets.

In the end, Harford agrees with Hayek that market forces act as a more sophisticated computer than anything that could be made of circuitry or silicon. Market forces can be challenged and shaped by civil society through pulling various levers, including taxation, income redistribution or market incentives to produce beneficial outcomes. Harford

concluded his comments by opinion that state- run algorithms would run as effective 'black boxes', and therefore the same malleability and contest of ideas may not necessarily play out to the benefit of everyone.

Arthur Dolgopolov began by observing that in many ways, states have been running centralised algorithms for at least 80 years (e.g., social security administration) using rudimentary and quasi-analog techniques such as physical punch cards. In this vein, Arthur's initial observation was that algorithmic involvement in centralized management of an economy may be nothing inherently new or disruptive.

Arthur then drew reference to the factor of scarcity in the modern economy. Namely, he expressed the view that in the post-scarcity world, the role of an algorithmic system to manage an economy may be easier than in a state of scarcity. He suggested that the notion of an algorithmic system for economic management may make more sense therefore in a post-scarcity utopia like Star Trek where there is no need for money or market mechanisms to act as intermediaries.

As for the role of an algorithmic economic manager in improving social order and cohesion, Arthur turned to *Cybersyn* and noted the role of British economist Stafford Beer in establishing it. Beer received a letter from the Chilean government asking him to oversee the operations of *Cybersyn,* which at that time had multiple components:

1. Cybernet: a communications network transmitting data from all levels of the economy (i.e., operations research teams sent out to gather data from industrial plans and other production sites);

2. Cyberstride: Bayesian analysis software[1] which had been subcontracted to a private organisation in London;

3. CHEco: the macroeconomic model; and

4. The famous 'Operations Room' featuring a number of computer screens, desks and largely ornamental fixtures to provide a futuristic and physical embodiment of the program.

Arthur reiterated that much of Cybersyn was about projecting a certain image and providing a type of false appearance. Much of the equipment in the Operations Room was false, or worked passively, such as slide carousels used to project images on false computer screens.

Nevertheless, Arthur points out that the Cybersyn system was not entirely false. It did in fact include a number of 300kg computers which were highly developed technology for the time.

Nevertheless, in comparison to modern computing standards, Arthur pointed out that the entirety of the system produced computing power that was several orders of magnitude less powerful than the typical iPhone.

As to whether we should use modern technology to attempt a Cybersyn project in today's world, Arthur was equivocal. He canvassed the arguments against it, which are rooted largely in the complexity of many economic problems that likely cannot be addressed even with advances in computing power. Nevertheless, Arthur expressed the view that while many economic problems may not be able to solve outright by an algorithmic process, they could be brought within a high degree of approximation which may still offer some benefits. In recognising these limitations, Arthur pointed to the fact that today's open market systems also show an inability to completely solve economic problems because they incorporate many distributed elements that often do not converge to a solution.

When it comes to abandoning the notion of an algorithm as economic manager, Arthur credits Harford and Hayek's position by focusing on an aspect he refers to as "cognitive load". For Arthur it seems, the complexity required to fully accommodate the complexities of markets within an algorithm involves an immense expense of human cognitive power to implement and oversee. In comparison to traditional market forces, Arthur granted proponents of this view with some credit for the lower logistical costs in establishing and maintaining it versus an algorithm.

Rather than take a categorical position on whether state-run algorithms are worthwhile, Arthur's view was that it may depend on the type and use of algorithm. He noted that many governments and states already use algorithms successfully for numerous processes, including by central banks and empirical data collection. Brazil utilises an open source AI project for social control of public administration which includes a system for identifying suspicious transactions. Arthur made clear that the use of algorithms in this way is the topic of ongoing research, and in every case, the validity will depend on the particular use case.

Philip Hanspach's discussion began by distinguishing his comments somewhat from Arthur's. As opposed to a more grounded discussion of how algorithmic processes may actually be used (or not) in this way, Philip's thoughts focused largely on the issue of science fiction and what it may tell us about the use of centralised algorithms in this way.

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[1] The Bayesian inference is a method of statistical analysis which applies the Bayes theorem. It is used to perpetually update the probability of a certain outcome by incorporating new information or data as it becomes available.

In taking a look at science fiction's conceptualisation of centralised AI processes, Philip noted that economists rarely push the process of the market in new ways, but rather study and observe it and draw conclusions. Given this dynamic, Philip expressed the view that there may be room for science fiction to help economists answer bigger questions about the normative trajectory of economic systems and the types of outcomes that are seen as desirable.

Philip then turned to canvass several visions for the economy that come from science fiction works:

Star Trek

The first example he referenced was Star Trek's utopian state of abundance. In this world, the United Federation of Planets rests on two key technologies: energy converter technologies and powerful energy sources (effectively matter and anti-matter). In this world, Philip points out, there is really no room for economists because resource allocation has largely been resolved. He points out that even many services in the Star Trek world are supported by holographic and automated systems which preclude much of the disparities we could expect economists to resolve.

In looking to the roles for people within this world, Philip points out that Star Trek envisions the most valuable actors as those who essentially perform empathetic or personal tasks, such as doctors. Philip queries whether this view is consistent with the notion that AI may be predicted to have an effect on the labour market where kindergarten teachers are paid more than mathematicians or those who engage in processes that are more easily automated.

The Matrix

The second example Philip referenced was the Matrix, where machines exploit humans as batteries. He said that this dynamic forces us to ask uncomfortable questions about treating synthetic life forms as agents to some degree. He noted that economists routinely study the dynamic of property rights between humans and animals and how certain modalities of agency or property may assist animals toward a more equitable relationship. Philip suggests that the Matrix may offer us an opportunity to apply the same logic toward machines. So long as we are mutually dependent on machines, Philip suggests that we may want to ask what kind of new relationship could be negotiated with them: should individuals be able to negotiate with an algorithm to buy themselves privacy?

Cyberpunk genre of science-fiction

Philip's final example to draw from science fiction is the subgenre of cyberpunk, where

nation-states have almost disappeared and mega corporations rule. This is usually depicted as a world of intrigue and conspiracy, marked by extreme economic inequality and computer technologies that question the human/machine interface. In this world, Philip remarked, AI is often dangerous or banned.

In one particular game, *Deux Ex*, a world exists where nearly all present day conspiracy theories have come true and the player-protagonist decides the ending of the story in accordance with a number of options and choices. One of the options for the ending of the story is for the player to partner with the powerful illuminati which advocate for the strict and centralised regulation of the economy and all of society – a type of "deep state" promising stability and prosperity thanks to AI surveillance. An alternative ending to the game is to side with an independent algorithm named Helios which seeks to integrate all human minds into a single digital consciousness, realizing real-time democratic decisions and perfectly reactive markets. Philip asked rhetorically whether this could be a beneficial application of state-run algorithms, especially the output is balancing human decisions and supply/demand outside of traditional market forces.

Viewed in this light, Philip suggested that we can draw a distinction between mere computational calculation utilised by Cybersyn from AI-based prediction models now available to us. He suggested that today's technologies can offer much more than Cybersyn could have. A discussion of the idea of "Sentient Econometrics" in Sid Meier's Alpha Centauri by an anonymous commentator suggests that the processing of economic and market forces into something digestible by algorithms would effectively transform the study of economics into a hard science. This would involve a complete revolution in social and historical understanding of the discipline and study of economics. The envisioned outcome seems similar to what Asimov referred to as "psychohistory" – a fictional science which combines history, sociology and mathematical statistics to make general predictions about future behaviour of very large groups of people. In essence, Philip's comments call upon us to think of the fundamentals of economics really are in relation to their ability to be automated. It is unquestionable that these are value choices about the type of societies and economies we want to build and live within, and many works of science fiction show us where certain approaches may take us.

Discussion and Remarks

Attendees to the disputation provided their thoughts on Arthur and Philip's comments:

A EUI Professor focused his comments largely on Philip's reference to Asimov's psychohistory. He asked whether this may result in a very deterministic reality where entire

societies are transformed into deterministic processes. In response, Philip remarked that the overall point is that we should be asking big questions about what we want and why. Beyond efficiency, Philip remarked that economists need to articulate a larger policy goal and that economists can be more ambitious in this respect.

A PhD researcher commented that markets exists for a number of things beyond mere efficiency or allocation of resources – they also protect autonomy and self-expression. He suggested that even if we could solve the efficiency problems, markets exist for other things as well, and algorithms may not be able to preserve these things. He referenced Katherina Pistor's work, which shows us that markets are really not just one thing.

Philip responded by referring to Hayek (and others') position that that it is more important to preserve fundamental rights than achieve perfect market efficiency. In this view, if you start with state planning as your modality for economic or market organisation, you will always end with communist totalitarianism or the Nazi equivalent. It is therefore important that we choose the trajectory which is inclusive of all of the roles of the market, beyond mere resource allocation.

Another participant remarked that one difficulty he has with state-run algorithms is that AI by nature derives an "ought" from what "is". For lawyers, he thought that this is very difficult to understand. One problem with state-run AI, therefore, is that a certain community (often narrow) will set the limits, standards and policy objectives to a given AI and that AI will determine the rest of the future. He felt that the biggest risk we face with AI is that it predicts the future forever, and therefore the moment where we define the AI will set the constitution for the community. He asked whether it is dangerous to think that one community would essentially be setting the future in motion forever.

A EUI Professor felt that these thoughts remind him of the first disputation held during the academic year, which focused on the quote, "AI is communist, crypto is libertarian". He remarked that we may be going far beyond the representations of Hayek and the like as being supporters of extractive economic systems – rather, we may be looking at a new dynamic where they look like the good guys supporting individual freedom against bad state-run Ais which look to extract things from people. He said that in the technological environment we now live in, the dispute for the centralised system is about what will preserve humanity in the system.

In response to the participant's thoughts, Philip referenced the work of the Singularity Institute, which is focused on developing human friendly AI. Philip drew a distinction based on the work of this institute between "Agent AI" and "Tool AI". He explained that Agent AI constitutes AI

systems which perform actions, whereas Tool AIs are systems which merely provide results based on metrics given to them. In this way, we may limit the potential pitfalls here by assessing risk. On this point, a Professor contended that this distinction may not be entirely helpful as many so-called "Tool AI" systems actually have the effect of acting as agents. He drew the example of Google Maps in offering differing routes to travellers with other objectives in mind, such as reducing traffic congestion.