Automated Neoliberalism? The Digital Organisation of Markets in Technoscientific Capitalism

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Abstract: The core contradiction in neoliberalism (studies) is that markets are organised and require significant bureaucratic coordination and governance. In light of the increasingly technoscientific nature of contemporary capitalism, it is important to examine exactly how markets are organised and their governance configured by digital processes. In this article, I argue that the entanglement of digital technoscience and capitalism has led to an 'automated neoliberalism' in which markets are configured by digital platforms, personal lives are transformed through the accumulation of personal data, and social relations are automated through algorithms, distributed electronic ledgers, and rating systems. Two issues arise as a result of these changes: first, are markets being automated away, in that market exchange no longer underpins social organisation? And second, does individual and social reflexivity problematise techno-economic automation, in that new platforms, data assets, ranking algorithms, etc. are all dependent on individuals telling the 'truth'? My aim in this article is to answer these questions and to consider the political implications of automated neoliberalism and our reflexive enrolment in it.

Keywords: automated neoliberalism, data capitalism, technoscience

INTRODUCTION

The *Fourth Industrial Revolution* – or 4IR for those with a business-buzzword inclination – is the brainchild of Klaus Schwab, Founder and Executive Chairperson of the World Economic Forum (WEF).[1] It is a future vision of and for the world, premised on the current and ongoing fusion of digital, physical, and biological technologies to create 'cyber-physical systems', which Schwab imagines will revolutionise our economies and societies. Schwab throws in the gamut of disruptive technology tropes:

> Ubiquitous, mobile supercomputing. Intelligent robots. Self-driving cars. Neuro-technological brain enhancements. Genetic editing. The evidence of dramatic change is all around us and it's happening at exponential speed.[2]

1. Klaus Schwab, *The Fourth Industrial Revolution*, New York, Crown Publishing, 2017.

2. Klaus Schwab, 'The Fourth Industrial Revolution', *World Economic Forum*, undated: https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab [accessed 6 June 2020].

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Here, Schwab and the WEF are creating a narrative of constant and unstoppable technological and – by extension – political-economic change. Many people would argue that we should be sceptical of such claims about the future, not least because such promises and expectations shape the direction we take as societies, performatively taking on a sense of inevitability. Aside from this criticism, what is really interesting – and worrying – about the 4IR vision is the way that it frames almost everything around us as an asset or a potential asset; that is, as a resource that can be owned and that can generate future earnings. For example, Schwab argues that the 'Ability to predict the performance of an asset also offers new opportunities to price services. Assets with high throughout such as lifts and walkways can be priced by asset performance' (p56). We are being offered a future of micro-transactions, price discrimination, and constant marketing, all under the watchful gaze of increasingly automated markets.

This raises an important series of questions for critics of neoliberalism: can markets be automated? Can neoliberalism be automated? Does it make sense to theorise a new 'automated neoliberalism'? And what are the social and political implications if so?

My aim in this article is to answer these questions. My reason for doing so is to unpack what I see as the core contradiction in neoliberalism (studies), namely that markets are organised – they are instituted and require significant bureaucratic coordination and organisation – but the political and normative implications of this contradiction are rarely theorised adequately, if examined at all. My claim here contrasts both with the views of well-known neoliberals – Friedrich Hayek or Milton Friedman, for example – who frame markets as a spontaneous order or utopia of unregulated economic activity, as well as critics of neoliberalism, who criticise the installation or insertion of (anti-social) markets into all areas of social life (even if they are socially instituted). Markets are both naturalised as modes of social ordering, in the former case, or de-naturalised as aberrations of social life, in the latter case, even where there is an increasing acknowledgment that markets are necessarily organised.

Both neoliberal thinkers and neoliberal critics end up portraying people as market monsters; that is, they argue that people's subjectivities, identities, and behaviours are transformed by an all-encompassing market-based, competitive process that (re)configures every action, decision, and desire as the pursuit of individual, personal advantage.[3] Seemingly, contemporary capitalism has been and is being remade in support of this image through its entanglement with technoscience – for example, technology platforms institute new markets where they never existed before, our personal lives are turned into private data assets, social relations are automated by new algorithms, and our everyday economic decisions are embedded within new distributed networks and ranking systems.[4] In conceptualising these trends as 'automated neoliberalism', my aim is to analyse how these emerging techno-economic configurations automate markets so that human market

3. Kean Birch and Simon Springer, 'Guest introduction: Peak neoliberalism? Revisiting and rethinking the concept of neoliberalism', *ephemera: theory & politics in organization*, 19, 3, 2019, pp467-485.

4. For just some of this emerging literature, see Paul Langley and Andrew Leyshon, 'Platform capitalism: The intermediation and capitalisation of digital economic circulation', *Finance and Society*, 3, 1, 2017, pp11-31; Desiree Fields, ' Automated landlord: Digital technologies and post-crisis financial accumulation', *Environment and Planning A*, doi.org/10.1177/0308518X19846514.

exchange ends up no longer underpinning social order or organisation; and second, markets are then disrupted by individual and social reflexivity such that the implications of technological automation are far from certain, in that new platforms, data assets, ranking algorithms, etc. are all dependent on individuals telling the truth. Politically, then, we have to think about the compound effect of all the little lies we tell everyday (or omissions or fudges we make) on this automation of markets.

TECHNOSCIENTIFIC CAPITALISM

Before coming to neoliberalism, I want to first outline the importance of thinking, politically and analytically, about capitalism and technoscience together, as one and the same. The idea that we – or, at least those countries in the Global North – have entered a new era in which our societies and economies, and their futures, are specifically driven by technological innovation is rife across the political spectrum, and is perhaps best exemplified by Shoshana Zuboff's book, *The Age of Surveillance Capitalism*.[5] According to Zuboff:

> Surveillance capitalism unilaterally claims human experience as free raw material for translation into behavioural data. Although some of these data are applied to product and service improvement, the rest are declared as a proprietary behavioural surplus, fed into advanced manufacturing processes known as 'machine intelligence' (p8).

Similar nightmare visions of Big Tech are offered up by other commentators and writers like Andrew Keen, who riffs on the threats posed by the internet, and Cathy O'Neil, who bemoans the threats of datafication and algorithmic prejudices to politics, specifically liberal democracy.[6] And yet others like Peter Frase sitting somewhere between nightmare and utopia, speculates about the range of possible futures for humanity, some obviously more preferable than others.[7] More optimistic voices abound as well, including journalists like Paul Mason promoting a vision of the future in which technological change liberates us from work and other forms of drudgery.[8]

Evident across these future hopes, fears, and ambiguities is a turn towards the technoscientific as the defining feature of contemporary capitalist and democratic society, leading myself and others to define the current economic system as technoscientific capitalism. By this we mean both that contemporary capitalism is configured by technoscience and that technoscience is configured by capitalism.[9] Our economies are driven by new technological products and services (e.g. smartphones, apps, platforms) and scientific specialties (e.g. data science, artificial intelligence), as well as the alignment of those technoscientific objects, processes, knowledge claims, and institutions with specific financial logics, rationalities, and imperatives (e.g.

5. Shoshana Zuboff, *The age of surveillance capitalism*, New York, Public Affairs, 2019. (Hereafter *Surveillance Capitalism*).

6. Andrew Keen, *The Internet is Not the Answer*, New York, Atlantic Monthly Press, 2015. (Hereafter *Internet is Not the Answer*). Cathy O'Neil, *Weapons of Math Destruction*, New York, Broadway Books, 2017. (Hereafter *Weapons of Math Destruction*).

7. Peter Frase, *Four Futures*, London, Verso, 2016.

8. Paul Mason, *Postcapitalism*, London, Allen Lane, 2015.

9. For example: Kaushik Sunder Rajan, *Biocapital*, Durham NC, Duke University Press, 2006; Kean Birch and Fabian Muniesa (eds), *Assetization: Turning Things into Assets in Technoscientific Capitalism*, Cambridge MA, MIT Press, 2020. (Hereafter *Assetization*).

return on investment, market disruption). Scholars across the disciplines, but especially critical scholars in science and technology studies (STS), have highlighted the problematic implications of these entanglements over the last decade or more.[10]

Strangely – or perhaps not – I find myself returning again and again to Jean-François Lyotard's classic *The Postmodern Condition* when reading and thinking about these techno-capitalist changes.[11] Writing at the end of the 1970s, Lyotard managed to identify and conceptualise this ongoing entanglement of (digital) technology and political economy. As he pointed out, even back then, we witnessed a shift in the regulation of social life in contemporary – and increasingly technoscientific – capitalism away from the state as the 'functions of regulation … are being and will be further withdraw from administrators and entrusted to machines' (p14). Here, technoscientific capitalism is premised on the increasing performativity of the techno-economic system, in that 'Technology is therefore a [performative] game pertaining not to the true, the just, or the beautiful, etc., but to efficiency: a technical 'move' is 'good' when it does better and/or expends less energy than another' (p44). A self-fulfilling consequence of this, according to Lyotard, is that wealth ends up driving technoscience 'since performativity increases the ability to produce proof, it also increases the ability to be right' and performativity 'increases proportionally to the amount of information about its referent one has at one's disposal'(p46-47). Alongside performativity – defined as the continual reinforcement of the techno-economic system – it is also important to consider, politically and analytically, how reflexivity fits into this notion of technoscientific capitalism – how our understandings of the world come to frame our performances in the world – because reflexivity offers a useful political foil for disassembling the technological determinism that often drives these discussions.

Yet, all of these academic ideas aside, it is important to stress that much of the popular intellectual and political current about the future of technoscientific capitalism (and society) is understood and analysed from a concern with specifically digital or data technoscience, especially as it relates to the automation of social life through algorithms.[12] This is particularly evident in the mainstream press and social media where stories about the dangers of Facebook, Google, Amazon, Uber, or Apple – Big Tech – are daily grist for the mill of media consumption, especially after major political controversies like the Cambridge Analytica affair where the personal data of 87 million people was collected and used without permission (although with third-party permission). Something about digital/data technoscience obviously touches a popular and political nerve, perhaps diverting concerns from other positive or negative technological changes (e.g. renewable energy, genomic engineering). Here, it is my contention that actually existing examples of 'data capitalism',[13] or 'data-as-capital',[14] or other framings, all raise a number of important questions for how we understand the role, function, and organisation of

10. For example: Philip Mirowksi, *ScienceMart*, Cambridge MA, Harvard University Press, 2011; Mark Robinson, *The Market in Mind*, Cambridge MA, MIT Press, 2019.

11. Jean-François Lyotard, *The Postmodern Condition*, Manchester, Manchester University Press, 1984.

12. Malte Ziewitz, 'Governing algorithms: Myth, mess, and methods', *Science, Technology, and Human Values*, 41, 1, 2016, pp3-16.

13. Sarah Myers West, 'Data capitalism: Redefining the logics of surveillance and privacy', *Business & Society*, 58, 1, 2019, pp20-41. (Hereafter *Data Capitalism*).

14. Jathan Sadowski, 'When data is capital: Datafication, accumulation, and extraction', *Big Data & Society*, doi.org/10.1177/2053951718820549

markets in contemporary society, which obviously has direct implications for how we understand the political implications of neoliberalism, especially as it is increasingly automated.

NEOLIBERALISM, BUREAUCRACY, AND THE ORGANISATION OF MARKETS

Neoliberalism means many different things to different people, not only to critical thinkers – who are prone to theoretical proliferation – but also to those generally identified as neoliberals, although they would perhaps not use the term.[15] Rather than attempt to outline these different conceptualisations of neoliberalism, which I have done elsewhere,[16] or run through their various analytical advantages and disadvantages, I am going to adopt an epistemic understanding of neoliberalism in this article.[17] By this, I mean that neoliberalism can be thought of as an epistemological mode of organising in which markets and/or market-like proxies are framed and installed as the best coordinating mechanism across a range of social institutions. In adopting this perspective, I want to outline the following in the rest of this section: first, how different neoliberals understand markets; second, what this means for understanding the organisation of markets, especially through bureaucracy; and finally, the implications this has for understanding neoliberalism.

15. Simon Springer, Kean Birch and Julie MacLeavy (eds), *The Handbook of Neoliberalism*, London, Routledge, 2016.

16. Kean Birch, *A Research Agenda for Neoliberalism*, Cheltenham, Edward Elgar, 2017. (Hereafter *Research Agenda)*.

17. Philip Mirowski, *Never Let a Serious Crisis Go to Waste*, Cambridge MA, Harvard University Press, 2013.

Neoliberals and Markets

In my view, markets are strangely under-theorised in most of the popular literature of neoliberals themselves (e.g. Hayek, Friedman) and most of the critical literature on neoliberalism. Obviously, there are exceptions; aside from my own work, people like Colin Crouch, Pierre Dardot and Christian Laval, and Philip Mirowski and Edward Nik-Khah have sought to unpack markets. According to Colin Crouch, for example, the defining features of 'pure markets' are: prices have to be comparable; everything must be traded; there must be multiple sellers and buyers; there must be many and regular transactions; everyone has to have perfect information; and politics has to be separated from economic decision-making.[18] Evidently, whether such 'pure' markets do or can exist is an important question, and probably a question whose answer has to be 'no'. However, that does not stop people trying to bring about those conditions or introducing those mechanisms or pursuing those outcomes, which is where neoliberals come in. Neoliberals from different schools of thought (e.g. Austrian, Chicago, Ordoliberal, Virginia, etc., etc.) often had and have different notions of what a market is or should be, even if it is under-theorised. Below I outline the intellectual evolution of the epistemology of markets with reference to several key neoliberal thinkers.

18. Colin Crouch, *The Strange Non-death of Neoliberalism*, Cambridge, Policy Press, 2011, p30.

Mirowski and Nik-Khah argue that Austrians like Friedrich Hayek saw markets and collective planning as ethically, politically and analytically

irreconcilable, in that they view markets as a subjective process of discovery that is derailed by the state.[19] Markets are, from this Hayekian perspective, ways to generate information (i.e. price), which is an output of a discovery process in which people come together and through their exchanges create a spontaneous order. Perfect knowledge, then, cannot exist prior to market exchange, since information results from human action, but does mean that markets are dynamic in that they evolve over time as a result of changing information. Hayek's position was that markets evolve and through this evolution society moves towards a better future.[20] However, Chicago economics neoliberals like Milton Friedman placed a stress on the foundations of a universal market, assuming that a 'pure' market can and does exist. As Dardot and Laval argue, Friedman's perspective is underpinned by a concern with market structure, or the starting conditions for market exchange.[21] As a result, Friedman saw government action as always and necessarily distorting the 'pure' market, which we should strive to free from such interference.

After Friedman, Chicago sociology neoliberals like Gary Becker simply treated society as if it was already a market. As Bernhard Harcourt points out, this perspective could be seen as progressive in the 1960s when Becker was writing about crime in these terms because Becker treated everyone as subject to the same incentives to commit crime (i.e. we will all commit crime if the benefits are high enough).[22] Becker's perspective meant that there was no need to institute free markets or wait for a market society, as it was already with us. Finally, and following Becker, were Chicago law neoliberals like Richard Posner who took the view that everything already was a market to its natural conclusion, building on the work of Ronald Coase's notion of 'social cost' and his treatment of markets as a series of transaction costs. In her analysis of Posner, Sonja Amadae points out that once you have worked out what markets should do – like Posner – then you actually no longer need those markets in the real world.[23] Society can be coordinated and governed *as if* markets – or their close proxies – are everywhere already, thereby legitimating the changing of a range of social institutions from the law through education to government, and beyond. According to Amadae, moreover, Posner's perspective is that 'Individuals inherently consent to that state or action that makes them better off' (p213), meaning that there is no need for them to actually engage in market transactions since rights can simply be reassigned so that assets are used in the most efficient way. Thus, Posner's perspective basically does away with the need for markets altogether.

19. Philip Mirowski and Edward Nik-Khah, *The Knowledge We Lost in Information*, Oxford, Oxford University Press, 2017.

20. Friedrich Hayek, *The Constitution of Liberty*, Chicago, Chicago University Press, 1960.

21. Pierre Dardot and Christian Laval, *The New Way of the World*, London, Verso, 2014 (Hereafter *New Way of the World*).

22. Bernhard Harcourt, *The Illusion of Free Markets*, Cambridge MA, Harvard University Press, 2012.

23. Sonja Amadae, *Prisoners of Reason*, Cambridge, Cambridge University Press, 2016.

Bureaucracy and the Organisation of Markets

The reason I provide this overview of neoliberal thought is to highlight that neoliberalism is not, then, necessarily or even sufficiently defined by the installation of markets as the key mechanism for ordering or coordinating society. This problematises the idea that neoliberalism was and still is,

especially in popular discourse, characterised by deregulation or the hollowing out of the state in some sort of freeing of markets from government interference – a classic Friedmanite perspective. Rather, it is necessary to understand how markets are designed and organised through bureaucratic and other means, whether deployed by public or private institutions.[24] Nowadays, most of the critical academic literature on neoliberalism takes this view as read, that neoliberalism does not entail some sort of erosion of the state or the eradication of bureaucracy and organisation.

Although many critics of neoliberalism focus on Hayek, Friedman, and Becker, in my view it is Posner's understanding of markets that best exemplifies contemporary neoliberalism; that is, neoliberalism is not best understood as the establishment of perfect market conditions, or the installation of markets as an information processor, or the idea that everything is already a market. Market-like mechanisms are, instead, very deliberately designed and installed in and across a range of social institutions. While the Posner position owes an intellectual debt to earlier neoliberal thinkers, the idea that markets can be administered as if they exist helps to frame them as thoroughly bureaucratic, subject to actions and decisions of an administrative cadre trained in the ideals, if not practices, of neoclassical economics (e.g. price theory). While this could be seen as technocratic, others more clearly frame neoliberalism as specifically configured by bureaucracy in the Weberian sense.

In his book, *The Utopia of Rules*, the anthropologist David Graeber proposes an 'iron law of liberalism' to explain why 'government policies intending to reduce government interference in the economy end up producing more regulations, more bureaucrats, and more police'.[25] He goes on to point out that even proto-liberals like Ludwig von Mises ended up admitting 'that markets don't really regulate themselves, and that an army of administrators was indeed required to keep any market system going' (p9). So, rather than any attempt to reduce government intervention in the economy by actually doing so, Graeber highlights the way that specifically neoliberal processes are by definition configured by bureaucratic logics (e.g. privatisation results in the expansion of regulatory agencies and rules). A number of other writers have made similar arguments about the extension of regulations in contemporary capitalism, in contrast to some of the more hyperbolic claims about neoliberalism representing a bonfire of government rules and red tape.[26] As Gerard Hanlon states in his review of Graeber's book, 'That neo-liberalism is rule bound seems beyond dispute', although much of the emphasis in the current critical literature seems to be on how these rules limit politics, especially democracy.[27]

The importance of Graeber's perspective is notable when bringing it into alignment with Posner's views of markets. Posner's perspective is that actually existing markets are irrelevant, since we can organise society as if it is coordinated by markets. What this necessitates, though, is bureaucracy; we need people to design, organise, and administer (as if) markets, since

24. Kean Birch, 'Market vs. contract? The implications of contractual theories of corporate governance to the analysis of neoliberalism', *ephemera: theory & politics in organization*, 16, 1, 2016, pp107-133.

25. David Graeber, *The Utopia of Rules*, Brooklyn, Melville House, 2013, p9. (Hereafter *Utopia*).

26. John Braithwaite, *Neoliberalism or Regulatory Capitalism*, ANU, RegNet, Occasional Paper No. 5, 2005.

27. Gerard Hanlon, 'Total bureaucratisation, neo-liberalism, and Weberian oligarchy', *ephemera: theory & politics in organization*, 16, 1, 2016, p181.

they cannot be left to spontaneous, individual human action (cf. Hayek's view). A significant aspect of administration is technical and technological, in that bureaucracy is tied to the pursuit of technoscientific change, both as promissory myth and solution to societal problems according to Graeber. In particular, Graeber emphasises that there was a shift in the 1970s away 'from investment in technologies associated with the possibility of alternative futures to investment in technologies that furthered labour discipline and social control' (*Utopia*, p71). We, thereby, arrive back at the reason for examining the entanglement of technoscience and capitalism outlined in the first section, although this now highlights the need to examine the technologies developed to organise (as if) markets.

Implications for Understanding Neoliberalism

At this point, it is important to (re-)emphasise that (as if) markets are made. But, and this is important to stress, with neoliberalism they are an abstract rather than concrete mechanism – in a Posnerian sense – being political-economic simulations or models used to make (technoscientific) capitalism and politics performatively appear to be the 'only possible economic system' (*Utopia*, p76). Neoliberalism entails the reflexive creation of (as if) markets – henceforth 'quasi-markets' – across the spectrum of social life, whether that is schooling (e.g. vouchers), universities (e.g. metrics), law (e.g. social cost judgements), or government (e.g. procurement rules). It is, then, in this sense that we need to understand neoliberalism afresh; that is, as the creation of quasi-markets for everything, where this seemingly depends on a simultaneous – and reflexive – encoding of market logics by social actors – who can henceforth be treated as primarily market, rather than social or political, actors.

In their book, *The Knowledge We Have Lost in Information*, Philip Mirowski and Edward Nik-Khah provide a useful outline of how this process has unfolded as a result of epistemological changes in neoliberal and neoclassical economics, stretching back to Hayek's article on 'The use of knowledge in society'.[28] According to Mirowski and Nik-Khah, the changing perception of economic agents by economists – which replaced markets as the focus of economic theories – reached its apogee in theories of *market design*; here, 'individual markets have been viewed as algorithms' (p157). As a result, economists have largely jettisoned the notion that markets are (naturalised or organic) mechanisms for identifying individual preferences and then allocating societal resources and effort accordingly (e.g. supplying a range of individual preferences). The implications of this are profound when it comes to understanding neoliberalism. They illustrate an elective affinity with Sonja Amadae's arguments about neoliberal legal theorist Richard Posner's approach; namely, that once you know how markets *should* work, you no longer need actually existing markets. Market designers can just create whatever

28. Philip Mirowski and Edward Nik-Khah, *The Knowledge We Lost in Information*, Oxford, Oxford University Press, 2017. (Hereafter *Knowledge We Lost*).

market they want in order to achieve whatever outcome the designers desire.

Rather than the promotion of markets, market conditions, and market society, as stressed by neoliberals like Hayek and Friedman (and even Becker), neoliberalism is therefore analytically defined by the construction of quasi-markets – for want of a better word – to achieve specific outcomes desired by their designers and not to meet the preferences of the (economic) agents operating in those markets. Here, any notion of spontaneous order is irrelevant as quasi-markets are not configured as information processors in the Hayekian sense, but rather as information processors in a Weberian bureaucratic sense; that is, contributing to the efficient and rational organisation and coordination of social life, entailing systematic and hierarchical processes and systems to create social and economic order.[29] And, it is important to note, part of the reason that this has led to a 'total bureaucratisation' of social life – to use Graeber's term – is because of the enrolment of information, digital, and logistics science and technology ('technoscience') in the construction and automation of quasi-markets. Notably, though, none of this implies that we, as individuals, have no reflexive agency, since our understandings of the world and actions in the world can and do still have significant impacts on the expected outcomes of these quasi-markets; namely, in terms of 'gaming' the system, a point I return to at the end of the article.

29. Max Weber, 'Bureaucracy' in T. Waters and D. Waters (eds.), *Weber's Rationalism and Modern Society*, London, Palgrave Macmillan, 1922[2015].

AUTOMATED NEOLIBERALISM

Quasi-markets, which represent the main form of markets today, are designed to achieve the specific ends of their designers by incentivising certain actions and behaviours as well as dictating to market actors how to think and act. In particular, Mirowski and Nik-Khah argue that concerns about the cognitive capacity of market actors (i.e. dumb humans) has led market designers to offload 'most of the task of information processing entirely onto the market mechanisms', which is characterised as a digital techno-economic configuration. (*The Knowledge We Lost*, p188) In this understanding of markets, then, the best way to take unpredictable market actors out of the equation is to automate the operations of quasi-markets altogether; that is, automating neoliberalism. In this section, I outline three examples of market automation, covering technology platforms, personal data, and blockchain – other examples could include the Internet of Things, algorithmic management, and so on. In the following section I then return to the question of agency and reflexivity.

Technology Platforms: One Platform to Rule Them All

Our economies are increasingly shaped by technology platforms like Amazon, Facebook, Uber, Airbnb, Google, Etsy, and TaskRabbit – amongst many others – offering a range of goods, services, or connections that enable their users to

interact with one another through a digitally-mediated network, whether the users are individuals or organisations. At their simplest, a platform enables one user to offer a service or good for sale or rent (or for free) to any other user who wants to buy or rent that good or service (or get it for free). What sets these platform exchanges apart from conventional market interactions is that, first, they involve a digital intermediary (which usually collects all sorts of data) and second, they sidestep conventional market operators (e.g. businesses). Kenney and Zysman argue that these technology platforms are best thought of as 'multisided digital frameworks that shapes the terms on which participants interact with one another'.[30] As such, they are constructs of technoscience *and* capitalism, representing the epitome of technoscientific capitalism. On the one hand, platforms are constructs of new technologies and technological systems like big data, algorithms, and mass computing; on the other hand, they are constructs of new financial logics and business models like winner-takes-all monopoly thinking, subscription or rent-based business models, and personal data accumulation logics.[31]

Originally framed as the sharing economy – because users could exchange directly with each other rather than through indirect business interaction – platforms are now more commonly understood as part of platform capitalism, especially where they are based on the extraction of data as a free resource. According to Paul Langley and Andrew Leyshon, there are different types of platform, each of which has a different mode of operation and form of exchange: online exchange markets (e.g. Amazon, eBay) that enable users to sell and buy from one another; social media platforms (e.g. Facebook, YouTube) that host user-generated content; sharing platforms (e.g. Uber, Airbnb) that act as marketplaces for renting so-called idle assets; crowdsourcing platforms (e.g. TaskRabbit, Upwork) that act as marketplaces for contractual work or services; and crowdfunding platforms (e.g. Kickstarter) that act as a marketplace for lending and investing money.[32]

Different platforms are configured in different ways, but they are all generally have three key characteristics according to Nick Srnicek.[33] First, they are designed to be intermediaries, allowing two or more users to interact through various technological tools and applications; however, a platform is also the 'ground upon which their activities occur' meaning that through their operations they can collect data from users and set the terms of their interactions (p44). One study of Uber, for example, highlights the extent to which the platform controls pricing, influences driver behaviour, and manages supply and demand through 'automated functions, such as algorithmic pricing or blind passenger acceptance'.[34] Second, Nick Srnicek argues that platforms 'produce and are reliant on 'network effects'', meaning that they have a 'natural tendency towards monopolisation' (*Platform Capitalism*, p45). Returning to Uber as an example, Andrew Keen notes that investors love Uber because it 'eats taxis', reflecting the tendency in platform capitalism towards winner-takes-all competition (*Internet is Not the Answer*, p186). Finally,

30. Martin Kenney and John Zysman, 'The rise of the platform economy', *Issues in Science and Technology*, 32, 3, 2016: https://issues.org/the-rise-of-the-platform-economy/ [accessed 02 March 2020].

31. For example: Kean Birch, 'Technoscience rent: Towards a theory of rentiership for technoscientific capitalism', *Science, Technology, & Human Values*, 45, 1, 2020, pp3-33; Jathan Sadowski, 'The internet of landlords: Digital platforms and new mechanisms of rentier capitalism', *Antipode*, 52, 2, 2020, pp562-580. (Hereafter *Internet of landlords*).

32. Paul Langley and Andrew Leyshon, 'Platform capitalism: The intermediation and capitalisation of digital economic circulation', *Finance and Society*, 3, 1, 2017, p6.

33. Nick Srnicek, *Platform Capitalism*, Cambridge, Polity Press, 2017. (Hereafter *Platform Capitalism*).

34. Alex Rosenblat and Luke Stark, 'Algorithmic labour and information asymmetries: A case study of Uber's drivers', *International Journal of Communication*, 10, 2016, p3771. (Hereafter *Algorithmic Labour*).

Srnicek argues that platforms – while obviously designed to be attractive to as many people as possible – are really a way to set the rules of the game; for example, Uber 'shapes the appearance of a market' through things like surge pricing and creating phantom cabs (*Platform Capitalism*, p47).

A key aspect of these platforms is that they represent an automation of (quasi-)market exchange, especially in terms of automating supply and demand but also when it comes to automating social trust.[35] Most platforms are enclave economic systems, by which I mean that users are limited in their market-like interactions to other users on the platform; they have no access to non-platform (market) actors while on them and, as such, the supply and demand of a particular good or service is limited to those within the enclave and controlled by the platform. For some platforms this is a deliberate business model (e.g. Apple), since wider supply and demand is restricted anyway, but for others this is a consequence of the platform itself (e.g. Amazon). As a result, market supply and demand are automated by platforms, meaning that competition, especially of the idealised and naturalised 'perfect' kind in neoliberal imaginaries, is also automated – and thereby eroded or erased. A further consequence of platforms for market exchange is the automation of social trust that platform intermediaries engender; the platform becomes the mediator between users, often through ranking systems and branding, so that users no longer have to (or even can) rely on their past (market) experiences with each other to develop trust – instead, trust has been automated through ranking systems controlled by the platform. For example, Airbnb and Uber operators install cameras in their properties and cars – and are allowed to do so by the platforms – in order to surveil users, thereby monopolising trust.[36]

Personal Data: User Metrics, Dynamic Pricing, and Micro-transactions

Platforms do not work without data, and personal data in particular. Personal data are conceptualised in different ways by different people: as 'capital', reflecting a logic of data accumulation;[37] as 'a core commodity of the internet age' (*Data Capitalism*, p23); as a 'data asset' that generates capitalisable future earnings; and as a 'behavioural surplus' representing the digital traces left by people in their daily lives (*Surveillance Capitalism*, p8). In popular and policy discourse, personal data is often presented as the 'new oil' or 'new asset class',[38] emphasising the fact that it has to be mined and processed before it can be transformed into something valuable.[39] Perhaps more simply, personal data can be defined as user-generated information: it is the web searches we make, the things we watch, the emails or tweets we send, the comments we make, the rankings we give, the websites we visit, the digital record of real-world places we visit, the things we like on Facebook, and so on. Personal data are also generated by third parties (e.g. data brokers) who track and trade personal data through various means. The extent to which our everyday digital – and

35. Jonas Andersson Schwarz, 'Platform logic: An interdisciplinary approach to the platform-based economy', *Policy & Internet*, 9, 4, 2017, pp374-394.

36. Rob Horning, 'The house we live in', *Real Life*, 2019: https://reallifemag.com/dispatches/the-house-we-live-in [accessed 2 March 2020].

37. Jathan Sadowski, 'When data is capital: Datafication, accumulation, and extraction', *Big Data & Society*, doi.org/10.1177/2053951718820549

38. Dan Gallagher, 'Data really is the new old', *The Wall Street Journal*, 9 March 2019: https://www.wsj.com/articles/data-really-is-the-new-oil-11552136401 [accessed 3 March 2020].

39. Antonio Garcia Martínez, 'No, data is not the new oil', *WIRED*, 26 February 2019: https://www.wired.com/story/no-data-is-not-the-new-oil/?mbid=social_twitter&utm_brand=wired&utm_campaign=wired&utm_medium=social&utm_social-type=owned&utm_source=twitter [accessed 3 March 2020].

physical – activities are now surveilled, recorded, and traded is phenomenal (and quite scary).

Sarah Myers West argues that the mass proliferation and accumulation of data resulted from the search for a new business model after the 2000 dotcom crash (*Data Capitalism*, p24). The failure of e-commerce models premised on the online sale of products or services led to post-2000 internet companies (personified by Google) adopting an advertising model underpinned by Web 2.0 interactivity. The Web 2.0 transition – seemingly built on user-generated content and user interactivity – turned the internet into a massive personal data generating machine; in doing so, it basically automated the production of the twenty-first century's key resource (i.e. data). Alongside this, companies built their business models around the leveraging of personal data through the development of algorithms and machine learning. Early examples included, according to West, the development of bots to barter and buy our food; algorithms designed to predict our purchasing preferences and make recommendations on this basis; and cookie technologies to accumulate information on our activities. All such technologies, having since been extended significantly, have automated our market roles, status, and decision-making, including automating negotiations (e.g. prices and pricing), preferences (e.g. purchasing decisions), and identity (e.g. user profiles).

Personal data, whichever way they are conceptualised, provide a range of options and opportunities to automate markets in ways that reflect the quasi-market design process characterising automated neoliberalism. Here I am going to outline just three related examples: user metrics, dynamic pricing, and micro-transactions.

First, user metrics – the number of people who visit, view, click, like, or whatever on specific content – underpin the whole advertising business model that increasingly dominates the technology sector, because these metrics provide the data that companies use to decide whether and how much to pay Google or Facebook (primarily) to advertise on their platforms. However, user metrics are increasingly problematic because an increasing amount of online traffic – some estimate half – consists of automated bots. For example, Max Read reports that clicks, views, mouse movements, and logins can all be faked by bots, automating an enormous range of the activities supposedly underpinning the usefulness of user metrics and value of personal data to those paying for advertising; he goes on to suggest that half of YouTube traffic consists of bots.[40] This automation has economic consequences; for example, Tepper and Hearn outline how Facebook is being sued for 'misreporting' its ad metrics, allegedly overstating viewing times by 60-80 per cent.[41] Similarly, they report on a study that suggests 54 per cent of paid ads are never seen by a human. Such automation, even the wholesale replacement of humans by bots in the online world, still creates value for someone though, and is increasingly industrialised through things like click farms.

Second, dynamic pricing – or price discrimination – is not new to capitalism;

40. Max Read, 'How much of the internet is fake? Turns out, a lot of it, actually, *Intelligencer*, 26 December 2018: https://nymag.com/intelligencer/2018/12/how-much-of-the-internet-is-fake.html [accessed 3 March 2020].

41. Jonathan Tepper with Denise Hearn, *The Myth of Capitalism*, New York, Wiley, 2019.

businesses have always priced things differently for different people, in different countries – the obvious example being pharmaceutical prices in the US versus everywhere else. Basically, it means charging one person more for something than another person, often legitimated on the basis of personal preference and willingness to pay. For example, airline prices are subject to dynamic pricing on the basis of the preference of customers to book in advance, or at off-peak times. Another example is the justification for Uber's surge pricing (*Algorithmic Labour*, p3765). Personal data, however, enables the automation of dynamic pricing to an extent not thought of before since companies can use personal data to analyse how much each person might be willing to pay for a product or service, especially when this comes to digital goods.[42] Pernicious, and longstanding, examples of dynamic pricing include racist 'redlining' which entails insurance and mortgage companies identifying certain neighbourhoods in the US where they would not operate (*Weapons of Math Destruction*, p162). Today, all of this can be done through algorithms that analyse personal data and then automate pricing for different products and services (e.g. insurance) according to an assessment of the purchaser – there is no negotiation anymore, or little choice if you need something. This may be beneficial for some people – e.g. those with high social media status, or what Marian Fourcade and Kieran Healy call 'übercapital'[43] – but it is as likely to be disadvantageous for others – e.g. those who live in the 'wrong' neighbourhood.[44]

Finally, anyone who plays computer games has heard of micro-transactions; they are in-game purchases which can be purely cosmetic (e.g. a different avatar skin) but also performance-enhancing (e.g. better in-game equipment). While they might currently be largely limited to computer games, micro-transactions are the logical extension of automating competition and pricing. As Jathan Sadowski and others note, every product or asset can be turned into a service through a subscription model that incorporates personal data into a wider and automated techno-economic infrastructure like the Internet of Things (*Internet of Landlords*, p562). For example, in his book *A Billion Little Pieces* Jordan Frith outlines how Disney's My Magic+ system works through RFID tags that connect wearers to Disney travel and hotel services, food and park services, and so on, meaning that wearers no longer need to carry cash or cards. However, it also illustrates the extent to which businesses and governments can automate our interaction with the world; examples like motorway tolls already illustrate the way micro-transactions could be extended to many things, automating our experience of the world through a series of small, monetary payments (e.g. for walking up stairs, using an escalator, entering a mall, etc., etc.).[45]

Distributed Ledgers: Automating Contracts and Exchange

A final set of digital technologies that I consider here are distributed electronic ledgers, which are more commonly associated with peer-to-peer

42. Michael Smith and Rahul Telang, *Streaming, Sharing, Stealing: Big Data and the Future of Entertainment*, Cambridge MA, MIT Press, 2017.

43. Marion Fourcade and Kieran Healy, 'Seeing like a market', *Socio-Economic Review*, 15, 1, 2017, pp9-29.

44. Phillip Longman, 'Big tech is spying on your wallet', *Washington Monthly*, April/May/June 2019: https://washingtonmonthly.com/magazine/april-may-june-2019/big-tech-is-spying-on-your-wallet/ [accessed 3 March 2020].

45. Jordan Frith, *A Billion Little Pieces: RFID and Infrastructure of Identification*, Cambridge MA, MIT Press, 2019. Frith also highlights the potential that the Internet of Things has for 'removing human decision making from the domestic task' by automating use of the washing machine (e.g. inserting RFID tags into clothing with specific washing instructions) or refrigerator (e.g. ordering food when it runs out) (p123).

networks rather than bureaucracy, but are, in the end, dependent on forms of bureaucratic legal organisation (despite claims otherwise). The most well-known is blockchain, which Arun Sundararajan describes as 'an actual anonymised ledger of financial transactions'.[46] He goes on to argue that combining this 'with peer-to-peer filesharing technologies, cryptographic techniques, and a novel incentive system' enables a distributed ledger (e.g. Bitcoin) to create 'trusted peer-to-peer transactions without a third-party intermediary' (p59). While the intricacies of blockchain might cause most people a headache, my aim here is not to outline how it works but to focus specifically on the transactional dimensions of it as a techno-economic process, primarily through a discussion of smart contracts. Contracts are a crucial, but often ignored, feature of neoliberalism, representing, alongside property rights, the key capitalist institution necessary for market transactions, according to neoliberals like Hayek (e.g. people need to be able to claim things as their own and then need to be able to transfer them to other people).[47]

Nick Szabo – who some speculate is the mythic Satoshi Nakamoto, creator of bitcoin – proposed the notion of smart contracts as a way to transact without requiring third-party oversight and enforcement – basically without the courts and the state.[48] Szabo, who specifically references Ayn Rand and Friedrich Hayek as inspirations for blockchain and smart contracts, defines the underlying principles behind smart contracts as follows:

> The basic idea behind smart contracts is that many kinds of contractual clauses (such as collateral, bonding, delineation of property rights, etc.) can be embedded in the hardware and software we deal with, in such a way as to make breach of contract expensive (if desired, sometimes prohibitively so) for the breacher.

All of this is based on decentralising and automating contractual arrangements, where contracts are defined by Szabo as 'a set of promises agreed to in a "meeting of the minds"'. Key to this idea is that smart contracts automate transactional performance, verification, and enforcement, all of which can then replace (supposedly inefficient and bureaucratic) contract and contract law as it currently stands. But here is where some issues arise.

I have previously written about neoliberalism as a contract-based order, noting that contemporary capitalism is underpinned by boilerplate or standard contracts where one party determines the transactional conditions (e.g. end user license agreements we 'accept' every day); over 99 per cent of contracts we enter into are of this type (*Research Agenda*, pp156-179). And standard contracts are an important way to protect *against* the vagaries and uncertainties of market transactions, especially as contracts are – in US and UK contract law – defined as legally enforceable promises rather than a meeting of minds.[49] Standard contracts reinforce power asymmetries, providing one party with the ability to enforce their conditions on another. However, it is

46. Arun Sundararajan, *The Sharing Economy*, Cambridge MA, MIT Press, 2016, p59. (Hereafter *Sharing Economy*).

47. Friedrich Hayek, *The constitution of liberty*, Chicago, Chicago University Press, 1960.

48. Nick Szabo, 'Formalizing and securing relationships on public networks', *First Monday*, 2, 9, 1997: https://journals.uic.edu/ojs/index.php/fm/article/view/548/469 [accessed 3 March 2020]

49. CleanApp, 'Crypto's founding fallacy: How mistakes in the 'smart contract' genesis block weaken the whole chain', *medium.com*, 31 January 2019: https://medium.com/cryptolawreview/cryptos-founding-fallacy-aaa151b795ff [accessed 3 March 2020].Clean App 2019

important to note that contracts – standard or otherwise – are defined by the involvement of third parties, contrasting with the smart contracts proposed by Szabo. According to Karen Levy, for example, smart contracts are meant to 'automatically and securely execute obligations without reliance on a centralised enforcement authority', the latter representing a significant market transaction cost (e.g. bureaucratic oversight, enforcement, litigation, etc.).[50]

Envisioned as a way to automate market transactions and reduce transactional frictions, Pesch and Ishmaev further argue that smart contracts are configured by 'economic theory that now drives the design of market systems'.[51] Ultimately, the aim of smart contracts is to eliminate bureaucratic organisations, whether public or private. However, as Pesch and Ishmaev also point out, the notion that automating transactions through smart contracts helps to reduce transaction costs – i.e. rules – is inaccurate (and problematic). On the one hand, smart contracts simply reinforce existing information and power asymmetries, especially in a digital economy characterised by a tendency towards monopoly. On the other hand, contract law entails a series of interpretations about markets and market actors that cannot be automated by smart contracts; in particular, very few people are considered, legally-speaking, to be sophisticated market actors, subject to all the terms of a contract they sign. These issues notwithstanding, the automation of transactions without the intervention of legal institutions fits into the notion of automated neoliberalism in which quasi-markets are designed and automated through specific technologies. Part of the driver of smart contracts seems to be a desire to create complete contracts for every transaction – i.e. containing all the applicable terms – rather than rely on incomplete contracts, as most people do today. In automating transactions this way, smart contracts are meant to enable a massive increase in the number and velocity of transactions that could be made, such that all activities and their continual and constant renegotiation could be eventually incorporated into all sorts of quasi-markets. Obviously, only automation would enable this.

50. Karen Levy, 'Book-smart, not street-smart: Blockchain-based smart contracts and the social workings of law', *Engaging Science and Technology Studies*, 3, 2017, p1.

51. Udo Pesch and Georgy Ishmaev, 'Fictions and frictions: Promises, transaction costs and the innovation of network technologies', *Social Studies of Science*, 49,2, 2019, p1.

A REFLEXIVE AND AUTOMATED NEOLIBERALISM

The previous section might come across as politically and economically totalising, representing neoliberalism as an epistemic force driven by a set of capital-data logics and imperatives that make it seem inevitable. My intention in this last section is to problematise this vision by bringing reflexivity into the mix.

'Click farms' are a good place to start when considering reflexivity in automated neoliberalism. A click farm is a place where workers are paid to imitate 'real' internet users by clicking on promoted links, or viewing videos, or following social media accounts. People pay for these 'manufactured' clicks, views, and followers to boost the value of their online presence. Click farm workplaces contain shelves or tables with hundreds or thousands of cell-phones, tablets, and other devices which workers use to generate the interactivity that produces value in Web 2.0. Click farms are a good indication

of how capitalism is being gamed, and while they might seem slightly seedy, or sitting somewhere in a grey-zone, it is worth remembering that major global corporations like Facebook are also being sued by advertisers for allegedly inflating viewing figures on their platform. As Max Read argues, our digital economic system is increasingly driven by all sorts of automated digital agents – click farm workers or bots – interacting as if they are human; that is, bots follow other bots, bots count other bots clicking on ads, and bots watch bot-generated content on bot-created websites. It would all seem entirely delusionary if for the fact that it all still creates value for someone.[52]

This gaming of capitalism – exploiting the techno-economic configuration of automated neoliberalism – is underpinned by the transformation of our real and digital lives into data assets, which are then meant to provide the underlying resource base for the future of technoscientific capitalism.[53] However, in order to understand the political implications of this automated neoliberalism we have to examine the reflexive logics in the attempts at gaming the system.

First, a reflexive investment logic impinges on the political and societal choices and futures we get to make, or even just imagine. As noted above, personal data are the effects of our behaviours, actions, and choices – the webs searches we make, the emails we send, the videos we view, and so on – and their transformation into private data assets means that we do not own these personal data; they end up belonging to large corporate monopolies like Google, Facebook, and Amazon. However, owning these data is not enough because the value of data depends on its use and flow. It needs to be both owned and its use and flow must also be captured and capitalised by the owner, in many diverse ways; data assets have this dual quality. The use of personal data is highly reflexive, by which I mean that the owners recognise how their actions and claims affect the world and that they have the capacity to act upon that knowledge. With personal data, this means that its owners – Google, Facebook, Uber, or whoever – can claim they will use it in a specific way in order to achieve a certain outcome – e.g. monopoly – and they know investors (and others) will act upon those expectations (e.g. by investing in them). Here, reflexivity engenders self-fulfilling effects as investors (and others) can end up locked into achieving those expectations, or risking negative blowback (e.g. lost investment capital, weakened investor appetite for risk, etc.). As a result of gaming the system, data companies can end up owning the future; for example, whether or not Uber is successful will largely depend on government decision-making about taxi and monopoly regulations, not some technological miracle.

Second, and perhaps more interesting politically, we have to remember that although personal data can be turned into a private asset, they are still actually 'us'. Treating data as the future of technoscientific capitalism, then, is not without its risks. If we are the asset – our personal, individual traces as they are captured by technology platforms, identification tags, and distributed

52. Max Read, 'How much of the internet is fake? Turns out, a lot of it, actually, *Intelligencer*, 26 December 2018: https://nymag.com/intelligencer/2018/12/how-much-of-the-internet-is-fake.html [accessed 3 March 2020].

53. Kean Birch, 'Personal data isn't the "new oil", it's a way to manipulate capitalism', *The Conversation*, 5 November 2019: https://theconversation.com/personal-data-isnt-the-new-oil-its-a-way-to-manipulate-capitalism-126349 [accessed 3 March 2020].

ledgers – then our reflexive understanding of this and its implications – that everything we do online or in real life can be mined to advertise to us, or roll-out dynamic pricing, targeted micro-transactions, or banking fees – then we can knowingly alter the way we act and behave in a reflexive attempt to game capitalism ourselves. Can we tell how many of our friends already fake their social media selves? We can already see the consequences of our collective gaming of the system in the unfolding scandals surrounding Google, Facebook, and others when it comes to political campaigns, debates, and elections, but it could get far worse for businesses and governments. Data can be wrong, we can game that data, and this can be done in an ongoing dance that leaves us with no idea about what is what anymore. Ultimately, we have to consider what the compound effects of all the little lies we tell and retell millions of times a day across multiple platforms, have on automated markets.

CONCLUSION

In this article, I addressed several questions: can markets be automated? Can neoliberalism be automated? Does it make sense to theorise a new 'automated neoliberalism'? And what are the social and political implications if so?

I started with an outline of how Klaus Schwab's vision of the future – of a 'fourth industrial revolution' – implies the wholesale transformation of our lives into a future of micro-transactions, price discrimination, and constant marketing, a vision that seemingly offers us little but markets everywhere, automated to enable the efficient capture of rents from a range of assets. As one vision of the future, it ties in with the more pessimistic framings of an increasingly technoscientific capitalism by the likes of Andrew Keen and Shoshana Zuboff. Key to these dystopic visions is an understanding of neoliberalism as organised, not some spontaneous order. Rather than a free market ideology or policy suite, neoliberalism is better conceptualised as the deliberate design and implementation of quasi-markets framed by the idea that we 'can make markets produce any desired outcome *regardless of what people want*', as Mirowski and Nik-Khah put it (*Knowledge We Lost*, p158). Actually-existing markets – on which a spontaneous order is premised – are not to be found in neoliberalism, but rather market designers create whatever quasi-market they want in order to achieve whatever outcome they desire.

Market design represented my starting point for conceptualising the automation of markets – that is, the automation of market competition, prices, and transactions – or a specifically 'automated neoliberalism'. In offloading all these elements of quasi-markets onto machines, rather than rely on unpredictable and irrational human actors, I outlined three examples of automated neoliberalism: technology platforms, personal data, and distributed electronic ledgers – noting that they are other examples too. First, technology platforms help to automate competition by controlling supply

and demand and actor's behaviours by reducing the sellers and buyers to only those within an enclave economy (i.e. platform) and only those who accede to the rules established by the platform. Second, personal data help to automate pricing by controlling user metrics, buyer's willingness to pay, and potentially enabling the roll-out of micro-transactions. Finally, distributed electronic ledgers like blockchain automate contracting by attempting to erase transaction costs and thereby enable the massive expansion of contractual relations in number and velocity.

Although I think it is possible to conceptualise a specifically automated neoliberalism and identify a range of problematic outcomes as a result, it is still important to consider the implications of human agency and reflexivity in a world of automated digital systems. In making this point, I wanted to illustrate the important political dimensions of our everyday actions and lives. If automated neoliberalism is built on the back of a mass digital and bureaucratic system, it may seem impossible to resist or even find spaces to exist outside this system. However, reflexivity – the idea that our understanding of the world ends up changing the world – is key to finding ways to challenge, or simply disrupt, the increasing dominance of automated neoliberalism. And this can be done in simple ways. We can lie about ourselves on Facebook, we can search for random things on Google, we can write fake emails to people, we can hide our joys and our fears from the online worlds, we can use cash rather than cards, we can demand political protection of our privacy, we can vote for those who will implement what we want, and much more besides. We can, moreover, ask searching philosophical questions that pull back the veils surrounding automated markets: are they freeing us from power and control? If not, then why do we acquiesce to these visions of our world?

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