# Aff Wiki Doc

# 1AC

## 1AC – NDT

### 1AC – Supply Chains

#### Contention one: Supply Chains

#### Surge pricing is spreading across the economy. The use of algorithms to raise prices in response to unexpected surges in demand is inherently anticompetitive.

Woodcock ’21 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “The Efficient Queue and the Case Against Surge Pricing,” SocArXiv; AS]

I. INTRODUCTION

It was on New Year’s Day 2012 that Americans first became aware of the spread of algorithmic pricing, as Uber charged revelers many times the regular fare for rides home, triggering a backlash on social media.1 The $27 ride that went for $135 was not some computer glitch, it turned out, but, as Uber explained, the result of a policy designed to equilibrate supply and demand.2 When demand for rides surges unexpectedly, argued Uber, there may be too few Uber drivers in the area to satisfy it.3 To coax them into entering the market, Uber must offer drivers more money, and to do that Uber must charge higher prices to riders.4 That is ultimately good for riders, argued Uber, because it ensures that enough drivers will enter the area to get everyone a ride home, and fast.5

The trouble with this story, researchers later found, is that the high prices Uber charges in response to unexpected surges in demand often fail to induce more drivers to enter the market, but Uber still charges those prices to riders anyway.6 Herein lies an important lesson about algorithmic pricing: it allows prices to change much more quickly than production— which for the most part remains a brick-and-mortar concept—can react. When Uber experiences a surge in demand, the company’s pricing algorithms respond immediately to raise prices for rides that are already in the area, long before additional drivers are able to enter the area, if they enter at all.

The mismatch between the speed of price and the speed of production in the information age is leading to harm not just to Uber riders but to consumers across the economy, as surge pricing—the use of algorithms to accelerate the process of raising prices in response to unexpected surges in demand—has spread far beyond rideshare to everything from Disney World tickets to highway tolls.7 It should also lead to antitrust liability. For efforts to deepen the mismatch between price and output speeds are fundamentally anticompetitive.

Surges in demand create shortages, because firms cannot increase output instantaneously, and shortages create market power, because buyers lack alternatives if they do not like the prices charged by the firm. But when the speed of price roughly equals the speed of production, firms are unable to exploit their shortage-based power. By the time they are able to raise prices, they and their competitors have increased output to satisfy the excess demand, and the shortage and associated power over price are gone. Thanks to the inability of price to adjust faster than output, the competitive prices of the pre-shortage period govern the shortage period as well. Surge pricing is anticompetitive because, by accelerating the speed of price relative to that of production, surge pricing prevents competitive pricing from carrying over from the pre-shortage period into the shortage period, weakening the effects of competition and enabling the firm to raise prices and harm consumers.

An unexpected surge in demand creates a shortage because firms choose the number of units they will produce to match demand at the market price. When the surge hits, many more prospective buyers show up willing to buy at the market price than the firm has units available to sell to them. A shortage is born. It would be great if the solution were for the firm simply to produce more units to satisfy the excess demand, as Uber hopes will happen when the company raises rideshare prices to draw more drivers into the area.8 But production takes time: minutes in the case of rides on New Year’s Eve, weeks in the case of a pandemic-induced run on webcams that must be manufactured in China and then shipped in containers across the deep blue sea.9 The shortage will therefore not disappear as soon as it strikes, but rather endure in the short term until additional output makes its way to market.

During the shortage period, the firm will have the power to raise prices because it is the ability of supply to adjust that normally puts downward pressure on prices.10 In a competitive market, a firm cannot raise prices because competitors have output handy that they can sell, at a lower price, to the firm’s customers. But when a firm faces an unexpected surge in demand, competition halts temporarily, because firms cannot adjust output instantaneously. Until the competition can ramp up production, the firm does not need to worry that if it raises prices competitors have output handy that they can sell at lower prices to the firm’s customers.

Surge pricing is anticompetitive because it undermines a technological status quo that once limited the ability of firms to exploit the market power created by unexpected surges in demand. Because firms once could not recall advertisements that had been printed and distributed, reprint all their menus, or cross the prices off the sides of all their packaging much more quickly than they could ramp up their output in response to an unexpected surge in demand, firms were stuck continuing to charge competitive prices even after a demand surge had given them the power to raise prices.11 Indeed, firms often did not even know that they faced a demand surge until it was all over, as they lacked up-to-date information on how quickly their products were selling out in far-flung retail outposts.12 The algorithms that enable surge pricing eliminate these obstacles, and the resulting price rigidity, allowing firms to jack up prices as soon as demand spikes and putting a premature end to the tendency of competitive pricing to carry over from the pre-surge period into the surge period.13

To be sure, surge pricing is not directly anticompetitive in the way of most practices prohibited by the antitrust laws. A firm’s decision to stop selling an essential input to a competitor, for example, directly increases the firm’s power to raise prices by depriving the competitor of the ability to remain in the market, which is why such terminations can violate Section 2 of the Sherman Act.14 By contrast, surge pricing does not drive competitors from markets or otherwise disrupt supply, and thereby directly create power over price. The unexpected surge in demand, and coincident output shortage, create that power.15 But surge pricing does prevent the relatively competitive prices of the pre-shortage period from carrying over into the shortage period, which is to say that it limits the effects of competition and enables exercise of the market power created by an unexpected demand surge.

Antitrust treats action that magnifies the effects of an independent collapse in competition as anticompetitive conduct. One example is antitrust’s per se rule against price fixing.16 Price fixing can directly harm competition. If a group of firms engaged in competition with each other agree to fix a high price, the agreement itself may be said to eliminate competition in the market, for as a result of the agreement the parties will no longer behave like competitors. But often firms that agreed to fix prices are not initially in genuine competition with each other, but instead are already colluding tacitly.17 The firms use their price-fixing agreement only to make explicit the terms of their pre-existing cooperation.18 In this case, price fixing cannot be said directly to eliminate competition. Instead, like surge pricing, price fixing in this context can be said only to exploit a preexisting competitive vacuum, one that, thanks to antitrust immunity for tacit collusion, is, like the power created by shortage, not itself a violation of the antitrust laws.19

Firms might, for example, tacitly collude to charge a price of $10 for their goods, even though the power created by their collusive behavior would allow them profitably to charge a price of $15 instead. Entering into an explicit agreement to charge $15 enables them to choose the highest price made possible by their preexisting collusive behavior, but does not involve any additional direct harm to competition, since they are already colluding tacitly to raise prices.20 Like surge pricing, the agreement serves only to enable the parties more fully to exploit power created by another source: in this case preexisting, and entirely legal, tacit collusion.21 Antitrust law nevertheless would consider this example of price fixing to be anticompetitive conduct, and indeed would prohibit it, just as antitrust should consider surge pricing to be anticompetitive conduct as well, even though surge pricing is not directly anticompetitive.22

The antitrust laws do not, however, usually prohibit anticompetitive conduct per se, but instead generally prohibit anticompetitive conduct only when undertaken by firms having substantial market power, which may not be the case in every instance of surge pricing.23 The courts recognize an exception, however, where the conduct almost always harms consumers, and surge pricing always harms consumers, which is why antitrust should treat surge pricing as per se illegal.24 Surge pricing always harms consumers because, the special case of ruinous competition aside, firms choose their prices to cover their costs, inclusive of the return that investors demand for having invested in the firm. It follows that when a firm raises its prices in response to an unexpected demand surge, the firm raises its prices above its costs, and so redistributes wealth from consumers to the firm unnecessarily. But unnecessarily redistributive pricing is the very definition of consumer harm in antitrust.25

#### Surge pricing causes bullwhips that roil supply chains in key industries.

Minderest ’20 [Minderest; “What is the bullwhip effect, and how does it affect prices?”; <https://www.minderest.com/blog/bullwhip-effect-on-prices>]

The bullwhip effect, whiplash effect or Forrester effect is a mismatch in the demand forecast that extends along the supply chain of an e-commerce business. It happens when an inaccuracy or error in the demand forecast at one point in the supply chain increases as it moves away from the end consumer. This exponential error can cause problems in the sale and distribution of different products and affect the company’s profitability. At the same time, the bullwhip effect maintains a two-way relationship with the e-commerce business’s pricing strategy. Sales prices can cause the bullwhip effect to either increase or decrease. Variations in this effect can lead to price changes. We explain in detail below.

In a more graphic example, the whip effect occurs when:

The consumer’s demand forecast is 10 units.

The retailer orders 15 units in case demand increases.

The distributor orders 20 units.

The manufacturer buys material to make 40 units to lower costs.

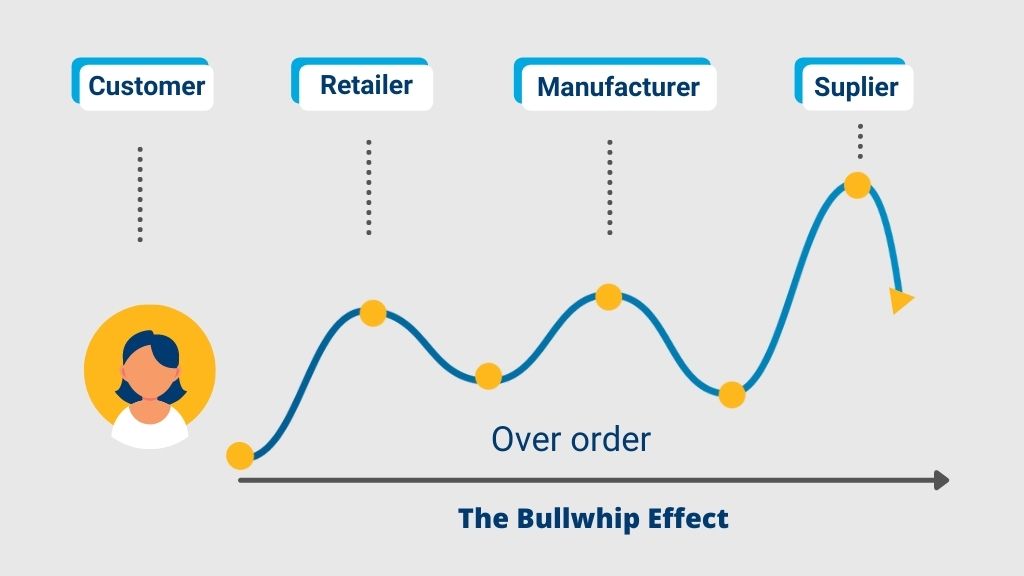
Result: between 1 and 10 units will be sold, and 40 units have been manufactured that will not go to the market in the short term. And the problem compounds if the difference between actual demand and available stock throughout the supply chain continues to widen month on month.

This mismatch can result from inventory problems and over-production, equipment rental overruns or extra staff hours. If the downwards estimate is wrong, it can result in a stock break that leaves the e-commerce business out of stock. It can also cause low production periods for manufacturers and logistical delays affecting end consumers. This is what happened in international trade in 2021, which led to a shortage of electronic products such as graphics cards, computers, or game consoles, such as PlayStation 5.

What is the role of pricing in the bullwhip effect?

On the one hand, price variations are factors that can lead to an increase in the bullwhip effect. In this sense, when an e-commerce business launches a special-offer campaign, demand is likely to increase based on the discount percentage. In addition, higher prices can lead customers to be more averse to purchasing products, thereby reducing demand. Therefore, it is essential to know the degree of elasticity of demand for each product. It is also necessary to maintain seamless communication with all agents in the supply chain, ensuring that they are aware of expected changes in demand.

On the other hand, in cases of stock overproduction, one way to control and reverse the bullwhip effect is to reduce items’ prices. This helps spark greater interest in retailers or end customers, depending on the location of the excess products.



#### Empirical research proves the relationship is causal, reverse causal and has no alt causes.

Özelkan ’18 [Ertunga; William States Lee College of Engineering @ University of North Carolina; Churlzu Lim and Ziaul Haq Adnan; “Conditions of Reverse Bullwhip Effect in Pricing Under Joint Decision of Replenishment and Pricing”; *International Journal of Production Economics*, 200, p. 207-223]

As companies have been continuously looking for innovative ways to deliver values to their customers, pricing has been gaining a lot of attention in recent years as a strategic weapon. Today many corporations apply dynamic pricing strategies as it is beneficial for both sellers and buyers (Dugar et al., 2015). Dynamic pricing takes into account the needs of different customer segments (Ahmadi and Shavandi, 2015), and also the quality and availability of suppliers (Abrate et al., 2012). As reported in Chen and Simchi-Levi (2004b), companies such as Dell, Boise Cascade Office Products, and Ford Motor Corporation change their prices often, some as often as on a daily basis. Dynamic pricing and price variation (in terms of price discounts) are common in online retail businesses (Gao et al., 2017). There have been also an increased interest in e-marketplaces that enable business-to-business (B2B) transactions. B2B Marketplaces such as Aeroexchange, APX, CommerceOne, Covisint, and NYMEX bring suppliers and buyers together, and provide procurement mechanisms such as auctions and reverse auctions to integrate the supply chain players (www.emarketservices.com; www.mfg.com; Popovic, 2002; Belleflamme and Toulemonde, 2004; Li and Penard, 2014). While dynamic pricing mechanisms aim to deliver values while maintaining a competitive edge, and e-marketplaces help with supply chain integration, it is evident that they create price variability in the supply chain. Usually, the instability of price comes from the sellers side, as mostly sellers determine prices.

However, some researchers analyze the price fluctuation in the case of a reversed pricing mechanism (where the buyers determine the prices) as well, and report potential influences on the bullwhip effect (see e.g. Mujaj et al., 2007). Additional analysis of the impact of price discounts on the bullwhip effect can also be found in Gao et al. (2017). Root causes of the bullwhip effect are also analyzed by multiple researchers (see e.g. Lee et al., 1997; Paik and Bagchi, 2007; Bhattacharya and Bandyopadhyay, 2011 etc.). Paik and Bagchi (2007) statistically analyze the relative contribution of nine possible causes of the bullwhip effect through a computer simulation model of beer distribution game and a fractional factorial design. They find the price variation as one of the three most significant causes of the order variability. According to Hamister and Suresh (2008), price stability reduces the bullwhip effect. In other words, price instability causes bullwhip effect (Lee et al., 1997; Bhattacharya and Bandyopadhyay, 2011). Thus it is important to understand the mechanisms that can cause an amplified price variability in supply chains.

#### Bullwhips specifically devastate semiconductor supply chain key performance indicators – key to competitiveness.

Weiling ’21 [Tobias Leander Welling; Corporate Supply Chain Organization @ Infineon Technologies; Ludmila Quintao Noel; Corporate Supply Chain Organization @ Infineon Technologies; Abdelgafar Ismail; Supply Chain Expert in the Supply Chain Innovation Department @ Infineon Technologies, MS in Environmental Engineering @ Polytechnic University of Milan; “Identifying Potentials and Impacts of Lead-Time Based Pricing in Semiconductor Supply Chains with Discrete-Event Simulation” Proceedings of the 2021 Winter Simulation Conference, p. 1-12]

Supply Chains (SC) are the key factor for an industry to guarantee its competitiveness and flexibility. SCs are currently facing the challenge to become more efficient in an unstable and complex market, where customers are expecting a high service level despite numerous difficulties which the industry might be experiencing. The semiconductor industry is an example for a multifactorial SC that is exposed to different constraints and effects. Product variety, complex production processes, short product life cycles, rapidly advancing technologies and as such products with a perishable character describe only a few of the challenges faced by the semiconductor industry (Ehm and Lachner 2016; Ehm et al. 2019). Besides that, the development is limited by long manufacturing times in global production networks and strong economy of scales due to capital intensive equipment (Ehm et al. 2019; an Kuo et al. 2019). These characteristics combined with the semiconductor’s upstream position in the SC, which highly exposes it to the bullwhip, commonly result in severe demand amplifications and dramatic operational consequences (Lee et al. 1997).

Being developed under similar circumstances to optimize the sales of perishable inventory, the approach of Revenue Management (RM) presents new opportunities to balance demand and supply (Seitz et al. 2016). RM offers also an opportunity to expand the available-to-promise logic in the advanced planning systems used in the manufacturing domain. This requires the inclusion of RM into the scheduling but this area needs to be the focus of research studies to achieve more benefits in this area (Klein et al. 2020). In addition, by fulfilling the requirements for SC planning in the semiconductor industry, RM enables further benefits by combining capacity planning, inventory management and demand fulfillment (Uzsoy et al. 2018). Despite the promising benefits of greater flexibility and increased revenue, the semiconductor and other businessto-business (B2B) industries failed to transfer ideas of RM into their own SC planning. Consequently, the central research question of this paper is how RM methods impact SCs in the semiconductor industry and to what extent this impact is beneficial regarding SC related Key Performance Indicators (KPI). Contributing to this goal, we additionally answer the question how RM is applied and how it could be transferred to the semiconductor industry. Moreover, the paper proposes answers to which methods of RM should be applied as the most beneficial ones and to what extent lead-time based pricing (LTBP) is able to increase flexibility, customer satisfaction and revenue in the semiconductor industry SC.

#### Solves Chinese tech supremacy and Taiwan war.

Spivak ’22 [Kenin; 3/11/22; JD and MBA @ Columbia, Founder and Chairman @ SMI Group LLC; “The Chips are Down”; <https://americanmind.org/salvo/the-chips-are-down/>]

Bharat Kapoor, a senior partner in A.T. Kearney’s technology practice, observes that “superpower status is going to be defined by the ability to make semiconductors.” A Reuters analysis warns that allowing an increasingly powerful China to overrun TSMC’s foundries would threaten U.S. military and technological leadership, while the destruction of the plants would damage China, as well.

In the face of an increasingly belligerent China, and its repeated overflights of the Taiwan air defense identification zone, the U.S. is already well behind developing and implementing plans to address the loss of Taiwan, let alone supply shortages caused by Covid.

Nearly a year after the Senate passed legislation authorizing $52 billion to support manufacturing and R&D for semiconductor companies in the U.S., last month, the House passed similar legislation, allocating only $19 billion of the total to manufacturing. A conference committee will have to resolve the differences.

Also last month, the European Commission recommended the European Parliament and member countries adopt the Chips Act, a $48 billion plan to bolster Europe’s competitiveness in semiconductor technologies, and reduce reliance on Asian manufacturers. The investment will be staged through 2030 and will include investments in next-generation technologies, providing access to design tools and pilot lines for prototyping and testing, and support for start-ups and expansion.

Japan recently announced $8 billion to support increases in chip production.

These paltry, multi-year investments have to be assessed against the cost of foundries, TSMC’s investments in Taiwan, and investments being made in other Asian countries.

Last year, Semico Research president Jim Feldhan estimated that building and equipping a foundry for chip manufacturing requires an investment of at least $10 billion, and up to 30 months to ramp up production. Last month, Will Hunt, who leads semiconductor policy research at Georgetown University’s Center for Security and Emerging Technology, wrote in the Wall Street Journal that the “window of opportunity to shift the center of gravity of global chip-making back the U.S. is rapidly closing, as the cost of building advanced semiconductor manufacturing facilities is rising exponentially. By 2030, a single plant may cost more than $50 billion.”

During 2021, TSMC invested about $28 billion to expand its capacity in Taiwan and announced plans to invest a further $100 billion. That’s more than triple the proposed U.S. and EU investments in manufacturing.

Last year, Intel announced a $20 billion investment in advanced chip manufacturing capacity in Arizona, and has signaled that its investment in all chip manufacturing could reach $100 billion. Samsung has announced a $17 billion plant near Austin, set to open in late 2024. TSMC also announced a $12 billion Arizona foundry to make chips for Apple.

Semiconductors, principally flash memory, are already South Korea’s largest export. Samsung’s South Korean foundries are the only manufacturers of advanced chips outside of Taiwan. In May 2021, South Korea announced a 10-year program to bolster its semiconductor manufacturing industry, with the government contributing about $225 billion in tax credits to be matched by private sector investments. The plan’s goal is to expand capacity for advanced chips.

According to a Congressional Research Service report, China has already committed $150 billion to fund development of its semiconductor industry. The European Commission estimates that the fund will be fully invested by 2025. In October 2019, China announced a further $29 billion investment.

At best, if China stays out of Taiwan, planned investments may ameliorate current shortages over the next 24 months, as the West falls further behind Asian manufacturers.

Absent timely action, if China acts against Taiwan, grievous damage will be done to U.S. security interests and the economy if China either destroys or diverts existing production. Critical U.S. secrets will be handed over to China.

There is no good choice here and probably not enough time to avoid a crisis. Still, the United States and its allies must step up efforts to deter a Chinese invasion. Every decision the U.S. and its allies make about Ukraine will affect China’s calculus. The West must do everything feasible to buy time, and must use that time to strongly incentivize investments in chip manufacturing, particularly advanced chips. As soon as it is feasible, the U.S. must prohibit the export of sensitive IP to Taiwan.

If the clock runs out before the West is able to develop local manufacturing capacity for the chips it needs for national and economic security, the risks of war in the defense of Taiwan may be secondary to the hazard of U.S. subjugation to China.

#### Taiwan war causes extinction and turns every impact – MAD fails.

Kulacki ’22 [Gregory; 3/7/22; China Project Manager @ Union of Concerned Scientists, PhD in Political Theory @ University of Maryland; “Could US Nuclear Weapons Prevent an Attack on Taiwan?”; <https://allthingsnuclear.org/gkulacki/could-us-nuclear-weapons-prevent-an-attack-on-taiwan/>]

Today, Chinese military manuals teach troops they are training to “fight a conventional war under conditions of nuclear deterrence.” More specifically, they are preparing to fight a war to prevent Taiwanese independence even if the United States threatens to use nuclear weapons to try to stop them. If the United States were to use nuclear weapons against the Chinese forces attacking Taiwan, Chinese military planners intend to retaliate, most likely against US military bases in Okinawa and Guam.

Once it starts, no one can reliably predict how far or how fast a nuclear contagion could spread. The worst-case scenario is too horrible to imagine. Within an hour, every major city in China and the United States could be reduced to rubble. Hundreds of millions of people could be killed. The global economy, and the global environment, could collapse.

It is precisely because of this possible outcome that Chinese communist leaders believe they can safely ignore US threats to use nuclear weapons. This is what the peasant revolutionary leader Mao Zedong meant when he called US nuclear weapons a “paper tiger.”

#### Tech supremacy checks space war, cyber war, and caps escalation of every conflict – extinction.

Lynch ’22 [Justin; 3/1/22; Army officer and House Armed Service Committee, National Security Commission on Artificial Intelligence, and the Office of Science and Technology Policy. Nonresident Fellow @ Modern War Institute; and Emma Morrison; National Security Professional; “The War We Dread”; <https://warontherocks.com/2022/03/the-war-we-dread/>]

Ackerman and Stavridis remind Americans that the U.S. can lose just as quickly and easily as other countries, and that victory is not preordained. The scenario they lay out — a minor confrontation between the United States and China that escalates and exposes technological weaknesses that ultimately bring America down — is plausible. Second, information technology has already changed warfare. The diffusion of precision-guided munitions, electronic warfare systems, and cyber weapons to America’s competitors gives those competitors the potential to disrupt traditional American strengths. As such, it is important that the U.S. military update its technology, training, and perhaps most importantly, its expectations for how wars will be fought. In 2034, a combination of cyber attacks, stealth surface vessels, and electronic warfare negates many of the U.S. military’s traditional advantages. Stripped of their ability to communicate with subordinates, and even with many of their systems, U.S. forces were sometimes left helpless to defend themselves against Chinese forces, much less defeat them. Warfare is actually changing more significantly than is described in 2034. Emerging technologies will have an impact well beyond disrupting communications and decision-making. The U.S. military is exploring concepts like multi-domain operations, mosaic warfare, and algorithmic warfare. These concepts differ significantly, but all three argue that artificial intelligence, changing information architectures, and contested communications will increase the importance of achieving decision-making superiority. The People’s Liberation Army has focused on winning “informatized local wars,” which involves recognizing the importance of information as a domain and moving away from focusing on platforms like aircraft and carriers, and towards a network-on-network approach. Despite the differences between U.S. and Chinese modernization efforts, each of the concepts above rely on new technologies to change the speed of decision-making. Perhaps more important, they rely on AI, which changes the way decisions are made. For example, in Henry Kissinger, Eric Schmidt, and Daniel Huttenlocher’s The Age of AI, the authors show that AI can discover correlations across extremely large, high-dimension data sets, and thus draw conclusions that no human could possibly reach. 2034’s depiction of American technological disadvantage is rather alarming. Failure to account for an adversary’s new capabilities and ways of fighting can cause the American military’s capabilities to be far less effective against their adversary than they might seem. Third, a limited nuclear war might be possible. The study of nuclear war is marked by a distinct lack of empirical evidence and based almost entirely on theory and speculation. The authors show one way that political and military leaders, under pressure to win and with few paths to victory, might turn to nuclear weapons. Their depiction of a limited nuclear exchange is both terrifying and a relief. It is a relief because it shows the possibility of a nuclear war that does not end in apocalyptic scenarios drawn from mutually assured destruction. Yet it is equally terrifying because if enough of the right people believe limited nuclear exchanges are feasible, it lowers the barriers to nuclear use. 2034 navigates complex scenarios and ultimately leads readers to the above three conclusions through the eyes of five principal characters. Each character provides a different lens through which to view the conflict, making for an engaging and informative read. In a genre where characters can often be one dimensional, Ackerman and Stavridis’ characters are well-developed with nuanced motivations and personalities that add a sense of reality to this work of fiction. The authors also use their characters to demonstrate how major world events can be contingent upon the personalities of key leaders, and their inclination to escalate or deescalate crisis situations, or willingness to risk catastrophe. It is inevitable that 2034 will be compared to the techno-thriller, Ghost Fleet. 2034 has several advantages for readers that want to use fiction to explore possible futures. Showing Stavridis’ influence on the story, 2034 captures more about strategy, showing the perspective of high-level decision-makers and the strategic impact of battles. Its biggest advantage, though, is that 2034 doesn’t rely on the oft-employed American come-from-behind story. Showing that the United States can lose a war and suffer the consequences is far more thought-provoking than a comforting Hollywood ending. Despite these strengths, 2034 also has its weaknesses. The book provides a reductive depiction of war. A reader new to the topic could be forgiven for thinking that wars are fought exclusively by carrier battle groups and occasional cyberattacks, with no involvement of armies or air forces. There is also little mention of U.S. allies, despite the prominent role they play in almost every conversation about a war between the United States and China. There is also no description of how cyber warfare functions or what happens beyond effects. Readers may be tempted to conclude that the best way to defeat cyber attacks is to rely less on technology, not to improve security. Notably, this is only true for America, not China. Space warfare is also ignored, despite the critical role it is likely to play in such a conflict. Furthermore, U.S. military leaders blithely ignore new Chinese capabilities, sending carrier battle groups to fight without addressing newly found, massive vulnerabilities. One of the book’s most frequent themes — that the United States is no longer the country it once was — is discussed but never explicitly explained. America’s decline is shown only through military losses and a mild lack of unity after a war with China. The bitter partisanship that has led to so much recent dysfunction is never shown. It is therefore a much less compelling theme. Even worse, it leaves readers with a sense of loss and melancholy, but without a greater understanding of American decline, or of how to fix the problem the authors diagnose. Despite these aforementioned issues, 2034 still raises some uncomfortable, and therefore important, questions. How fragile is American power? Could decades of U.S. global leadership be lost in a matter of days due to an attack on the homeland and a combination of military losses? Or is it more likely that the United States would have the political will, economic power, and national resilience to continue fighting and recover? 2034 also encourages readers to consider how a conflict between the United States and China could escalate in unexpected ways. How likely is it that a small war between the United States and China would escalate beyond anyone’s intent? Would a war in the South China Sea remain local, or will it inevitably spill over into the United States? If so, how painful would the ensuing war be? The authors’ vivid narrative raises questions about the costs of war between the United States and other great powers. What interests should the United States fight to defend? Some argue that Taiwan is not worth the cost of war with China. Others argue that reunification by force would cause America’s regional alliances and partnerships to fall apart, paving the way for Chinese regional hegemony. Reasonable people can disagree on the answer, but all should agree that choosing an answer is increasingly important to American national security. Many of the questions motivated by 2034 are ultimately about military power. Does the United States have the ability to maintain escalation dominance, and can dominance be achieved without resorting to nuclear weapons? Is the United States preparing for its adversaries’ changing capabilities, or is it trying to maintain power using tools and weapons from the 20th century, regardless of their relevance in the 21st? Numerous studies of American military technology argue that the United States is focused on maintaining superiority in traditional military arenas at the detriment of new, and likely to be more important, technologies. If the United States were to face a conflict similar to the one fought in 2034, would it be ready? At its core, 2034 is about the mutual destruction of two great powers through a war that escalated far beyond anyone’s original intentions. It’s a story that played out in Europe during World War I, retold by the authors in the near future. In some ways, 2034 is an attempt to rewrite Barbara Tuchman’s, The Guns of August, but as a warning rather than a memorial. What would Europe’s leaders have done differently at the beginning of the 20th century had they been armed with Tuchman’s masterfully written description of their coming self-immolation? Overall, 2034 is a gripping read. Many who pick it up will struggle to put it down as they read, helplessly watching the world inside its pages descend into chaos, as our own threatens to do the same.

#### Independently, pull driven supply chains skyrocket fleet level emissions and destabilizes urban logistics.

Perboli ’21 [Guido et al; ICT for City Logistics and Enterprises Center @ Turin, Italy; Luce Brotcorne, Maria Elena Bruni, and Mariangela Rosano; “A new model for Last-Mile Delivery and Satellite Depots management: The impact of the on-demand economy.” Transportation Research Part E: Logistics and Transportation Review, 145, 102184]

The paradigms of the on-demand economy and e-commerce let emerge new business models, challenging the success of non-digital native companies. This shift has dramatically affected several business processes, from marketing to production. The logistic sector has been completely reshaped by this change: the delivery options are no longer driven by the supplier, but more and more influenced by the customers’ preferences, with a consequent disruptive impact on the delivery process, and the urban distribution in particular (Perboli and Rosano, 2019). Customers have become increasingly connected, informed and empowered, continually demanding more choice and flexibility in delivery options, raising their expectations for fast (usually within very limited timeslots as 2 h), and cheap deliveries of purchased goods. To address their needs and provide a faster service, enterprises and e-commerce giant platforms are moving from a push-driven supply to a pull-driven approach (i.e., demand-driven logistics), completely reshaping the logistic chain and in particular, its last leg, known as the last-mile.

The last-mile delivery is currently regarded as the most expensive, least efficient and most challenging section of the entire logistic chain. Bad design and management of the last-mile freight distribution may bring negative effects, threatening the quality of life, triggering traffic jams and increasing the level of emissions of associated pollutants. In the last few years, in the field of city logistics, a growing number of studies have investigated the competitiveness of alternative distribution systems architectures. A particularly promising solution is the adoption of a two-tier system. In the first level of this two-layered distribution network, trucks perform deliveries from distribution centers (generally logistic platforms located in a strategic node of the city) to Urban Consolidation Centers (UCCs), also called satellites (generally transshipment points situated in the proximity of a city center). At the second level, customers’ orders are consolidated into small vehicles (also called city-freighters) that can travel along any street in the city center area such as minivans, electric vans and cargo bikes, and delivered to the final customers. Each city freighter performs the route serving the designated customers and then travels back to the satellite for its next cycle of operations.

Although in principle satellite-based consolidation approaches aim at enhancing the efficiency of last-mile distribution, still operational issues remain to be addressed. The limited capacity of city freighters and the presence of regulatory measures to reduce traffic during peak hours, like restrictions on the times when freight activity can take place, are some noteworthy examples. The promotion of these more and more popular initiatives is a promising strategy for offsetting the traffic impacts of urban freights, but prompts the inclusion of time-dependent parameters into the system optimization, raising significant challenges to policy and decision-makers. Setting up the coordination of this complex system, that involves multiple stakeholders, such as the courier company, the satellite manager and the local authority, is not a trivial task.

To the best of our knowledge, the literature lacks in terms of joint models for satellite management in last-mile and urban delivery. Moreover, one of the distinguishing aspects of the problem is the time-dependent structure of the costs. The latter aspect becomes more and more influential due to the increasing importance of on-demand economy and e-commerce, that fostered the switch from the offer-driven logistics to the demand-driven one.

This paper provides a broad perspective on the problem, namely the Shared Satellite-based Last-Mile Delivery problem (SS-LM-D), tackling the tactical issues involved in last-mile delivery with heterogeneous vehicle fleet and investigating the efficiency and the viability of the underlying business model. The SS-LM-D is modeled as a new variant of the Bin Packing Problem (BPP) with time-dependent costs, namely the Variable Costs and Size Bin Packing Problem with Time-Dependent Costs (VCSBPP-TD), enriching the vast literature on variants of the BPP. Our approach can guide the decision-maker strategies to reduce the costs and to better control the whole process, offering practical insights to manage the last-mile delivery, while taking into account some specific features of the on-demand economy and e-commerce as, for instance, the effects of the customers’ preferences. The problem setting and the data used in the paper come directly from the analysis of a real case study of the city Turin conducted by CARS@Polito,1 and the ICELab@polito,2 with the collaboration of the Torino Living Lab project and the Amazon Innovation Award, while the managerial insights coming from this work will be part of the new Logistics and Mobility Plan to be activated in 2022 in the Piedmont regin.

The paper is organized as follows. The relevant literature is analyzed in Section 2. The problem setting and the model are defined in Section 3, where two constructive heuristics, able to tackle large-sized instances, are also described. The heuristic performance is discussed in Section 4. In Section 5 an analysis of the impact of the application of the VCSBPP-TD to the on-demand economy, and e-commerce in particular, is performed and managerial insights are thoroughly discussed. Finally, Section 6 concludes the paper and sheds light on possible future research directions.

2. Literature review

In recent years, with the increasing interest in Last-mile Logistics and City Logistics, different linear programming models have been proposed to deal with several issues and inefficiencies in the last-mile segment of the supply chain. These models do not consider, or only partially, the usage of shared spaces (e.g., shared satellites). The reason lies in the current practices in this industry imposing the adoption of proprietary warehouses and consolidation centers. However, changes in the regulatory assets at the national and international level, are moving toward the sharing of logistics resources. Also, new and recent paradigms, as crowdsourcing and dynamic access policies, are emerging to deal with the complexities of the sharing economy (Fadda et al., 2019, Rosano et al., 2018). These two factors combined with the double-digit growth of e-commerce make needed some simplifications of routing and the complex functional costs. In this direction, several attempts have been proposed in the literature, belonging in two main categories: BBPs and service network design. The latter is unsuitable for the large-scale problems that characterize the urban context. The former is gaining interest in describing logistics processes, showing how complex real situations can be modeled as BPPs (Crainic et al., 2016, Hemmelmayr et al., 2012, Baldi et al., 2019). However, to the best of our knowledge, no bin packing model has been formulated to address our problem. We choose a bin packing formulation because it maintains the complex functional costs related to the business model with a compact mathematical structure able to efficiently work with realistic instances in urban parcel delivery. Following this literature trend, we propose to model the SS-LM-D as a new variant of the BPP with time-dependent costs. Friesen and Langston first introduced the Variable Sized Bin Packing (VSBPP), i.e., a variant of the BPP where several bin types are present and the bin cost is directly proportional (or equal) to the bin volume (Friesen and Langston, 1986). They introduced the model and one online and two off-line algorithms with their worst-case ratios. An algorithm with upper bounds for some fixed size bin is presented in Seiden et al., 2003, Monaci, 2002. Heuristic and exact solution methods are designed for the case of correlated bin volume and cost. The variant of the problem where bin cost is not directly correlated to the bin volume is introduced by (Crainic et al., 2011), namely the Variable Cost and Size Bin Packing (VCSBPP). The authors introduce both lower and upper bounds and can solve realistic instances. Several studies have been dedicated to the VCSBPP, assuming that the cost of the unit size of each bin does not increase linearly as the bin size increases (see for instance Hemmelmayr et al. (2012)), but no one considered the time-dependent case. A variant of the BPP in which bins of different types have different costs and capacities and each bin has to be filled at least to a certain level, depending on the bin size, is discussed in Bettinelli et al. (2010). In this paper, the authors consider an additional constraint named the minimum filling constraint, which imposes that the volume of each bin is at least equal to a certain percentage of the total volume. For the sake of brevity, we omit the details of this constraint, but the interested reader can refer to Bettinelli et al. (2010). Fazi et al. (2012) considered time constraints related to the availability of the bins as well as service deadlines. Crainic et al. (2016) introduced a stochastic formulation considering the unavailability of the orders over time and presented a first study of the impact of some time-dependent demand distributions on long-haul transportation. Other related problems in the literature to SS-LM-D are the variants of the BPP with delay, and the batch scheduling problem. In the BPP with delay, the costs for the bins are reduced whenever some delay occurs. The batch scheduling problem is quite similar in its structure to the BPP with delay. Indeed, the cost for the batch is reduced with respect to time delays. Moreover, the setting is online (the items arrive with no knowledge of the future) and the cost is unique for all the batches (Dobson and Nambimadom, 2001, Li et al., 2019). Another important stream related to our setting is the on-line version of the BPP (Epstein, 2019, Dosa et al., 2013). In an online setting, no information about the item arrivals is available meaning that the management is done when the event occurs (Ahlroth et al., 2013, Epstein, 2019). Conversely, in our case, the delivery timeslots of the customers are known before the starting of the daily operations. Moreover, in our case, the cost structure is much more complex, differing the bins both in costs and sizes. This prevents a straightforward adaptation of the results of the online counterparts of (Dosa et al., 2013), as already proven for the basic variable costs and size BPP (Baldi et al., 2013). In addition, from an industrial point of view, using an on-line approach might not be a good modeling approach, since the information on the delivery timeslots is known in advance and can be incorporated in the decision process for deriving better solutions.

The literature on urban logistics problems is vast, but the great part of contributions is focused on the operational models (e.g., the routing), while few papers deal with the sharing of satellites. Indeed, our problem setting is quite new and no specific model or method of the literature copes with it. However, due to the adoption of multiple delivery modes and non-professional drivers, the costs structure of this system becomes complex enough that our problem setting cannot be ignored.

3. Problem setting, model formulation and heuristics algorithms

In this section, we describe the SS-LM-D problem, formally define the mathematical model, and propose heuristic methods able to solve large size instances within a limited computational time. We focus our attention on the problem of a decision-maker represented by a courier company operating a satellite-based consolidation policy in the second layer of a two-tier distribution system. This courier company has to perform a set of customers’ deliveries with a limited and heterogeneous fleet of vehicles within one day. Even if order consolidation can be cost-efficient (since it increases the vehicle loafing factor and reduces the number of deliveries to be made) it challenges an efficient use of the satellite storage capacity. Satellites are usually located in existing urban areas and are characterized by different available space, yielding different capacities. In this paper, we assume that the location of the satellites, which is a strategic decision, is pre-defined. The satellites can offer a wide range of value-added logistics activities, including off-site stockholding, inventory management, unpacking, and waste collection services. To offer these services the satellite operator requires a payment (in the foregoing called tariff), typically related to the volume of the stocks. As the satellite capacity can be freed up for other more profitable activities, such as retailing, during the day, it is important to smooth out the demand accordingly. One way to reach this goal is to define incentives like time-varying tariffs. More precisely cheaper rates can be charged at certain times of day or night, when demand is low, and higher rates can be defined at peak times. Peak and off-peak timeslots may be a few hours long, but typically not too short. The fleet is composed of private or, more often, contracted couriers using a mix of traditional vehicles and low-environmental vehicles (i.e., electric vans and cargo bikes). A vehicle (or an entire vehicle type) may be unavailable in certain hours due to access restrictions in some city areas. Moreover, due to the possible unavailability of the driver, a vehicle type can be used only in a specific timeslot of a day. The driver’s unavailability is mainly due to crowdsourced delivery. Crowdsourcing, also called Uberization of the last-mile, is an emerging application in the urban context that outsources the parcels delivery to crowd drivers. They are a network of local and non-professional drivers who are willing to temporarily work for delivery companies and to provide their own assets (e.g., the vehicle) to perform the parcel delivery (Arslan et al., 2018) Thus, this emerging method leverages networks of crowd drivers to manage deliveries, sometimes in less than an hour. The orders arrive the day before the planning process; indeed, customers might express time delivery restrictions, requiring parcel delivery in a particular timeslot of the day. Since vehicle and satellite capacities cannot be exceeded, and all the orders must be delivered, reflecting the current practices in the market, we assume that if needed, additional capacity can be bought on the spot market at a higher price (Crainic et al., 2016, De Marco et al., 2017).

#### Prohibiting surge pricing under antitrust law reinvigorates competition

Woodcock ’21 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “The Efficient Queue and the Case Against Surge Pricing,” SocArXiv; AS]

C. Antitrust Liability

1. The Existence of Anticompetitive Conduct and Monopoly Power

Legislatures could respond to this problem by banning the practice of surge pricing, which would be easy to do because surge pricing requires unique software and systems that enforcers can easily identify and shut down. 75 But surge pricing also has an anticompetitive characteristic that makes it a good candidate for condemnation under existing antitrust laws.76 Surge pricing’s anticompetitive characteristic is that it makes competition weaker. Regardless of the structure of the market before the surge in demand, whether the market had one firm charging the monopoly price, or many firms competing prices down to costs, the pre-surge market price always reflects competitive pressure of some kind. A firm may be a monopolist in a particular market and still charge a price that reflects competitive pressures because all products compete with other products to some extent, even a monopolist’s.77 The firm that monopolizes all the aluminum in the country cannot charge too high a price, for example, because buyers must have some cash left over to buy food. It follows that aluminum competes with food: not hard enough to prevent an aluminum monopolist from charging a price in excess of cost, but hard enough to force the aluminum company to choose a price low enough to allow customers some room in their budgets for food. Firms in more competitive markets naturally face even more competitive pressure on price.

Without surge pricing, the effects of this competitive pressure extend into the surge period, because, as already observed, firms cannot raise their prices instantaneously in response.78 A firm that cannot raise prices before the surge because it has competitors waiting in the wings, for example, is forced to continue charging the same price, even though the unexpected increase in demand renders those competitors unable to increase their prices in response to any price increase by the firm, allowing the firm, as we have seen, to raise prices should the firm have the technical capacity to do so.

This is true even for the monopolist who has no direct competitors waiting in the wings. The very fact that demand is surging for the monopolist’s product implies that buyers of other products are now willing to devote more of their income to the monopolist’s product, and so firms in other industries wishing to compete for those dollars may now wish to produce the monopolist’s product.79 But of course they cannot ramp up production of the monopolist’s product instantaneously, and so the monopolist is free to raise prices during the surge without fear of competition, something the monopolist could not do before the surge, when consumers were willing to spend their cash on competitors in other industries. But, before the advent of surge pricing, the monopolist would have continued to charge the pre-surge price, because the monopolist would have lacked the technical ability to raise prices, despite the demise of the competitive pressures that once constrained the monopolist’s pricing.

It follows that technological limitations on a firm’s ability to raise prices prolong the effects of competition in the pre-surge period into the surge period, and that surge pricing, in eliminating those technological limitations and enabling instantaneous price adjustment, destroys those effects of competition.80 For this reason, surge pricing should count as anticompetitive conduct under the antitrust laws.

Most conduct classified as anticompetitive under the antitrust laws is directly anticompetitive in the sense that it hobbles competitors, preventing them from continuing to exert downward pressure on prices.81 Surge pricing does not drive competitors from markets and so is not anticompetitive in this way. But some conduct already classified as anticompetitive is, like surge pricing, only indirectly anticompetitive in the sense that it blunts the effects of competition, rather than competition itself. The antitrust laws treat price-fixing as anticompetitive conduct even when the price fixing amounts to no more and formalization of the tacit terms of pre-existing, consciously-parallel conduct. 82 The agreement does not, in this case, directly harm competition—the cartel members did that when they first started tacitly colluding—but the agreement does allow the cartel members more fully to exploit their power.83 Firms colluding tacitly can nudge each other in the direction of charging higher prices, by suggesting a game of follow the leader, but they cannot pick a price target for the group and ensure that each member hits it; communication is required for that.84 Thus price fixing in this case solves a technical problem regarding the picking of prices that magnifies the effects of a pre-existing decline in competition. Surge pricing does the same and so should similarly be treated as anticompetitive.85

Liability under the antitrust laws usually requires, in addition to proof of anticompetitive conduct, proof that the defendant has monopoly power, defined as the power profitably to raise prices.86 That requirement is necessarily met for any firm engaged in surge pricing, because surge pricing is the act of raising prices, and it is profitable, as we have seen; the inability of competitors to increase output as quickly as the firm can increase price gives the practitioner of surge pricing the power profitably to raise prices. But there should be no need for plaintiffs to prove monopoly power in an action against surge pricing, because the courts do not require proof of power where the challenged action is certain or almost certain to harm consumers and, as we have seen, surge pricing always harms consumers. 87

2. A Proposed Test

A per se rule against surge pricing should take the following form. A firm that (1) uses algorithms to set prices, (2) experiences a surge in demand, and (3) increases its prices in response to that surge (4) faster than the firm increases its supply violates the antitrust laws—in particular, Section 2 of the Sherman Act, which prohibits anticompetitive conduct by single firms.88

The first element ensures that the firm has taken an affirmative step to cause the speed with which the firm can change prices to outstrip the speed with which the firm can adjust output. It has probably always been true that in many business lines firms have some power to identify demand surges and react to them faster than they can increase output. It would not be anticompetitive for firms to exercise this power any more than it would be anticompetitive for a firm that obtains a monopoly position by accident to charge a monopoly price.89 What makes surge pricing anticompetitive is that the practitioner has used algorithms to augment whatever preexisting power the firm has had to increase prices faster than output. The first element captures this important distinction.

The final three elements establish the existence of consumer harm. The second element ensures that any price increase is not necessary to cover the costs, inclusive of fixed costs, of producing current inventory, because firms would have chosen their pre-surge prices to cover those costs, and now demand has increased, so they could sell their entire inventory at the pre-surge price. If, by contrast, demand were to fall unexpectedly, then a price increase might be necessary to cover costs, inclusive of fixed costs, on a smaller-than-expected volume of sales.90 The second element rules out this justification for a price increase. The third element establishes that a price increase has in fact occurred. And the fourth element establishes that the price increase could not have been necessary to pay for the production of additional, post-surge inventory because the price increase happened before output could be increased. It follows that the price increase was not necessary to cover the cost, inclusive of fixed costs, of either pre- or postsurge inventory and was therefore harmful to consumers.

#### Detection is necessary to optimal deterrence – fast responding algorithms necessitate certain action to detect price signals.

Beneke ’19 [Francisco; PhD, Senior Research Fellow in Intellectual Property and Competition Law @ Max Planck Institute for Innovation and Competition; and Mark-Oliver Mackenrodt; PhD, Senior Research Fellow in Intellectual Property and Competition Law @ Max Planck Institute for Innovation and Competition; “Artificial Intelligence and Collusion,” *IIC-International Review of Intellectual Property and Competition Law*, 50(1), p. 109-134; AS]

A necessary condition to achieve a reduction in social harm without unduly encumbering the beneficial use of AI pricing software is a rule that is able to pinpoint with reasonable accuracy instances in which oligopoly pricing has led to economic profits. Regarding this issue, fast price responses from algorithms may make oligopoly pricing patterns look more similar to competitive behavior. In addition, the availability of data and increasing accuracy of predictions regarding market conditions may also enable firms to better coordinate their responses. If firms’ prices are parallel and in response to market changes, it might be harder to distinguish instances of interdependent pricing from competitive interactions. One way in which Kaplow suggests that interdependent pricing can be identified is through sticky prices.99 Before the advent of AI-powered pricing software, coordinating changes was assumed to be costly. Therefore, in the presence of interdependent pricing one should have expected to see stickier prices that do not move according to changes in cost or demand. However, if algorithms can reduce information and coordination costs (by quickly predicting what the other competitors’ price response to a change will be), then competitive and interdependent pricing patterns will tend to look the same.

In addition, faster price changes may make price signals harder to detect. An invitation to raise prices can last merely seconds and therefore would not appear on the radar unless this is the unit of time monitored by the antitrust authority. This situation should raise the cost of identifying instances of social harm.

#### The rule of reason creates a patchwork of legal complexities. FTC rulemaking ensures predictable enforcement to remedy the harms of pricing algorithms.

Jarsulic ’22 [Marc; Senior Fellow and Chief Economist @ Center for American Progress; “Addressing the Competitive Harms of Opaque Online Surveillance and Recommendation Algorithms,” *The Antitrust Bulletin*, p. 1-13; AS]

VI. The Challenge for Antitrust Enforcement

The data reviewed so far suggest that Facebook and Alphabet have substantial pricing power in the online advertising market and that opaque surveillance and recommendation algorithms help maintain their market power in online advertising by diverting users from competing platforms. If an investigation by federal antitrust enforcers confirmed this conclusion, intervention to restore competition would be in order.

One enforcement option would be a claim for monopolization in violation of Section 2 of the Sherman Act.46 If the court accepted that the platforms have monopoly power and that their intentionally opaque business practices maintain and enhance it, the platforms would be able to argue that there are procompetitive justifications for their conduct. If the Department of Justice (DOJ) did not successfully rebut those justifications, then it would need to demonstrate that the anticompetitive effects of platform conduct outweigh the procompetitive effects.47 That is to say, the issue could be decided on what are essentially rule of reason grounds.

In this instance, the rule of reason analysis would involve highly uncertain evidence—including estimates of consumer surplus for services that have never been priced, estimates of economic rents in online advertising, and the likely effects of entry on the quality and price of consumer-facing services.48 The complexities would present any court with an extraordinarily difficult problem. This is not to say that a court would be unable to unravel all the issues. But it does suggest a court would have an unavoidably high level of discretion, which makes the outcome hard to anticipate, even when the monopoly power and entry barriers described above are acknowledged.49

Should a court decide that these practices amount to monopolization, the nature of equitable relief would need to be determined. Based on what is currently discernable about platform practices, which of course might be amended by a thorough investigation which provided access to proprietary information, the DOJ would need to ask for a complex conduct remedy, including fully and effectively disclosing to any user or nonuser what personal data are gathered by the platform or purchased from other sources, and how these data are processed and used; fully and effectively disclosing the manner in which machine learning techniques and algorithms are used to profile users and present information, and how this may influence user decisions, attitudes, or emotions; providing users with default options which block surveillance while they are on these platforms or other websites, prevent sharing their personal data (even if “anonymized”) with third parties, and block exposure to recommendation algorithms that operate to affect attitudes or behavior; and providing the DOJ necessary information, suitably protected from public disclosure, to allow independent expert study of platform practices and their effects.

Conduct remedies of this sort, which are essentially rulemakings for individual firms, require oversight. For online platforms this would be a nontrivial exercise, because innovations in platform operation are rapid. Suppose, for example, that a platform implements a new recommendation algorithm after relief is granted. What would the platform need to disclose to users about the algorithm before they are exposed to it? Or suppose that a version of the FLoC browser ID, described above, were to be implemented by Alphabet after relief were granted. Would the information gathered by FLoC be covered by a ban on surveillance, since it is only used to describe the behavior of groups? Matters like these could be addressed, but would require a high level of continuing engagement unusual for the DOJ.

There is, however, another avenue to address these issues. Section 5 of the Federal Trade Commission Act prohibits “unfair methods of competition.”50 This term is undefined in the statute, and several legal scholars have demonstrated that drafters of the Federal Trade Commission Act included this language deliberately to give the FTC authority to act as an expert body confronting competition problems not reached by other antitrust statutes.51 Moreover, the Supreme Court has affirmed the authority of the FTC to define what is meant by this term.52 So the FTC has the ability to determine whether platform behavior unfairly affects competition, without asking a court to engage in a rule of reason balancing.

Such a determination may be enforced by administrative orders that the platforms cease their unfair practices.53 These orders are subject to judicial review, and in the 1980s a handful of FTC orders were struck down by courts.54 Perhaps in response, the Commission has not issued any such orders since, choosing to bring competition claims under the Clayton and Sherman Acts. However, as several FTC Commissioners have argued in a recent statement, the outcomes in these cases reflect a failure to explain the competitive harms or provide sufficient supporting evidence, and do not limit the FTC’s authority to prohibit anticompetitive behavior that is not reached by other antitrust laws.55

The practices at issue are analogous to unfair methods of competition identified in Supreme Court precedent. In Keppel, a decision subsequently supported in Sperry & Hutchinson, the Court found that a marketing scheme that manipulated children to buy inferior candy by offering them chances to win prizes was an unfair method of competition.56 The practice was found to exploit consumers who are unable to protect themselves, while reducing the revenue of firms unwilling to engage in the same practice.57 Likewise, users of Facebook and Alphabet platforms are unable to protect themselves from surveillance and recommendation algorithms because those business practices are kept opaque. At the same time, these practices divert revenue from firms not engaged in surveillance or behavioral manipulation, since users cannot clearly identify platform practices and seek alternatives. Hence, an order prohibiting these platform practices would be consistent with Court precedent.

Since antitrust litigation can take years, and there is always uncertainty about outcomes, the FTC might consider creating rules to prohibit these practices by online platforms with market power. The plain language of Section 6(g) of the Federal Trade Commission Act gives the Commission the power to “make rules and regulations for the purpose of carrying out the provisions of [Section 5].” Moreover, National Petroleum Refiners confirmed that 6(g) grants the authority to make substantive rules. The case concerned a challenge to the Commission’s authority to make and enforce a rule which declared that “failure to post octane ratings on gasoline pumps at service stations was both an unfair method of competition and an unfair or deceptive act or practice.”58 The court held that under the terms of the statute “. . . the Federal Trade Commission is authorized to promulgate rules defining the meaning of the statutory standards of illegality the Commission is empowered to prevent.”59

It might be noted that the rule was directed at eliminating an information asymmetry, created by the omission of material information, which would harm competition by diverting sales from service stations accurately representing what they were selling.60

FTC rulemakings, like those of all federal agencies, are subject to judicial review. However, because of Chevron, any review is confined to a limited range of issues. As Justin Hurwitz summarizes them,

. . . Chevron offers a two-part test, colloquially referred to as the “Chevron two-step.” In the first step, the court asks whether the statute is unambiguous. If the court determines that it is, the agency is required to implement this unambiguous intent. If, however, the statute contains ambiguity, it is left to the agency to determine how to resolve that ambiguity; the court’s only task is to ensure that the agency’s interpretation is a reasonable construction of the statute. Adopted in 1984, this approach imposed a fundamental constraint on the courts. Previously, courts were free to impose their preferred understanding of ambiguous statutes upon agencies. They would take the agency’s views into consideration and give them weight as appropriate—but fundamentally, responsibility for interpreting statutes was given to the courts. Following Chevron, this responsibility is upon the agencies.61

Since Section 5(a) is quite general, evidence-based rules, created following procedural requirements, should receive Chevron deference. This could allow the Commission greater latitude in addressing these practices than it would have if it pursued administrative orders.

The monitoring and enforcement burdens of an FTC rulemaking would no less demanding than those associated with firm-specific equitable relief. But if the Commission decided to engage in rulemaking for online platforms with market power, it could establish the in-house expertise needed to monitor practices that are determined to harm competition, and to evaluate changed practices that may have anticompetitive implications.62 Such a step would have the added advantage of helping the Commission identify new competition issues as they arise, which could then be addressed through the relatively rapid process of rulemaking.

### 1AC – Smart Cities

#### Contention two: Smart Cities

#### Surge pricing incentives artificial, anomalous supply shortages – that endangers infrastructure and creates intermittency that stifles swarm intelligence.

Schroder ’20 [Malte et al; Center for Advancing Electronics Dresden @ Technical University of Dresden; David-Maximilian Storch; Institute for Theoretical Physics @ Technical University of Dresden; Philip Marszal; Center for Advancing Electronics Dresden @ Technical University of Dresden; Marc Timme; Center for Advancing Electronics Dresden @ Technical University of Dresden; “Anomalous Supply Shortages from Dynamic Pricing in On-Demand Mobility,” *Nature Communications*, 11(1), p. 1-8]

Complex engineered systems are known to exhibit unintended states in their collective dynamics that often disrupt their function1–5. In complex mobility systems, examples include the emergence of congestion6,7, anomalous random walks in human travel patterns8, and cascading failures of mobility networks9–11. As urban mobility becomes more and more self-organized and digitized, mobility services increasingly employ dynamic pricing12–16, in general serving two main purposes (Fig. 1a). First, dynamic pricing adjusts the price of a product or service to compensate for changes in its intrinsic base cost. Second, it creates incentives for all market participants to equilibrate demand–supply imbalances by increasing the price if demand exceeds supply and vice versa. A higher price both imposes higher costs to customers incentivizing them to decrease their demand and, at the same time, offers higher profit for identical service to suppliers, in turn motivating them to increase their supply. However, recent reports on on-demand ride-hailing17–19 indicate that dynamic pricing may have the opposite effect and instead cause demand–supply imbalances. Here, we quantitatively demonstrate the existence of these imbalances by comparing price time series and demand estimates for ride-hailing services. In a game theoretic analysis we reveal the incentive structure for drivers to induce anomalous supply shortages as a generic feature of dynamic pricing. This observation suggests that similar dynamics should emerge independent of the location or industry. Comparing price time series for 137 locations in 59 urban areas across six continents we find price dynamics reflecting anomalous supply shortages in several cities around the world. Results Dynamic pricing in on-demand mobility. Dynamic pricing schemes are commonly applied by on-demand mobility service providers, such as Lyft and Uber15,16. For Uber, the price p of the service (the total fare for a ride) decomposes into two parts16, base cost pbase and surge fee psurge, p ¼ pbase þ psurgeðD; SÞ ; ð1Þ as illustrated in Fig. 1b for trips from Reagan National Airport (DCA) to Union Station in Washington, DC (see “Methods” section and Supplementary Table 1 for more details). The first component (base cost) consists of regular fees for a ride pbase ¼ p0 þ pt Δt þ pl Δl ; ð2Þ including one-off fees p0 as well as trip fees pt and pl proportional to the duration Δt and distance Δl of the trip, similar to the fare for a typical taxi cab. These base cost increase, for example, during times of heavy traffic, such as morning and evening commuting hours (gray shading in Fig. 1b) when the trip duration Δt increases due to congestion. The second component (surge fee psurge) implements Uber’s surge pricing algorithm16,20 and reflects the time evolution of supply–demand imbalances. The surge fee increases due to persistent supply–demand imbalance during commuting hours. Longer trip duration means that drivers spend more time in traffic serving the same number of customers, which effectively reduces the supply of available drivers compared to the demand, and causes an increase of the surge fee. These price surges are meant to incentivize customers to delay their request, reducing the current demand, as well as to incentivize drivers to offer their service in areas or at times with high demand, increasing the supply. As illustrated in Fig. 1b, during the evening the system settles to constant base cost, reflecting constant trip duration in uncongested traffic. Yet, even under these apparent equilibrium conditions, the time evolution of the surge fee exhibits a series of short, repeated price surges (dashed box in Fig. 1b) that are not reflected in the demand dynamics (Fig. 1c). In fact, recent reports about driver behavior at DCA17–19 indicate that drivers collaboratively stimulate price surges in the evening hours by temporarily switching off their app. Thereby, they cause artificial supply shortages, implying supply-side-induced out-of-equilibrium price dynamics at this airport consistent with our observations. Using the observed price surges of confirmed anomalous supply shortages at DCA as a reference case, we address two key questions: First, what are the underlying incentives causing drivers to induce anomalous supply shortages and under which conditions do they emerge? Second, do these non-equilibrium dynamics emerge at other locations as well and how can we identify them without direct observation? Incentives promoting anomalous supply shortages. While the specific conditions promoting artificial price surges depend on local details and demand dynamics, a first principles game theoretic description captures fundamental incentives underlying the anomalous supply shortages: S = 2 drivers are competing for a fixed demand D aiming to maximize their expected profit (Fig. 2a). For illustration, we take a piecewise linear price function, representing the simplest possible demand-supply response, such that drivers earn the total fare p0 ðS;DÞ ¼ pbase if S ≥D pbase þ pmax surge DS D else ( ð3Þ when they serve a customer, where pbase denotes the (constant) base cost and pmax surge denotes the maximum possible surge fee when S = 0 (see “Methods” section, Supplementary Note 3 and Supplementary Fig. 16 for details). Each driver has the option to temporarily not offer their service, contributing to an artificial supply shortage, S < 2. As drivers turn off their app, the fare increases from plow ¼ p0 ð2;DÞ with both drivers online over pmid ¼ p0 ð1;DÞ ≥ plow as one driver goes offline to phigh ¼ p0 ð0;DÞ ≥ pmid when both drivers withhold their service. While drivers who do not offer their service would typically miss out on a customer, the use of online mobile applications in most ridehailing services enables them to quickly change their decision. Turning their app back on, they can capitalize on the additional surge fee and earn the higher total fare by quickly accepting a customer before the dynamic pricing algorithm reacts (Fig. 2a, see “Methods” section for details). Figure 2b illustrates the phase diagram of the resulting Nash equilibria. When the demand is inelastic and does not change as the price increases [Fig. 2b, panel (i)], at low demand and low surge fee the payoff structure of the game resembles a prisoner’s dilemma21, describing a conflict of interest between the drivers. While the socially optimal strategy for both drivers is to go offline, maximizing their total profit, each driver individually profits more from remaining online. Consequently, both drivers remain online due to the high risk of completely missing out on a customer if the other driver remains online (ON–ON equilibrium, green). The payoff structure changes to a stag hung22 with multiple Nash equilibria when the surge fee or the demand increases. If both drivers are online, neither profits individually from going offline, and vice-versa if both drivers are offline. Depending on the trust between the drivers, they settle into either an on–on (risk-averse) or an off–off (payoff-dominant and socially optimal) Nash equilibrium. In this regime, an additional mixed strategy Nash equilibrium also exists, where both drivers go offline with a certain probability. At high demand, the payoff structure becomes that of a trivial game without any conflict of interest between the drivers as both drivers always profit from inducing artificial supply shortages to earn the additional surge fee (OFF–OFF equilibrium, orange). As the demand becomes elastic [Fig. 2b, panels (ii) and (iii)], i.e. the demand decreases in response to an increase of the total fare as D0 ðp0 ;DÞ ¼ D ð1 δ ðp0 pbaseÞÞ ð4Þ governed by the price elasticity δ, the risk of missing out on a customer increases and profits due to surge fees are counteracted by the reduced demand. For a sufficiently strong demand response (high elasticity), the game setting effectively changes to low demand conditions when a single driver goes offline. The game becomes a prisoner’s dilemma or a trivial game where both drivers remain online (green). Consequently, the parameter region where drivers are incentivized to switch off their app (orange) shrinks. In particular, drivers are more strongly incentivized to create artificial price surges when the maximum surge fee is small. For intermediate conditions, a new state of partial supply shortages emerges, where only one of the two drivers goes offline (red-blue-hatched). This incentive structure is a generic property of the dynamic pricing, illustrated by its existence in this fundamental game-theoretic model and demonstrated for more than two players in Supplementary Fig. 20 and non-linear demand response in Supplementary Fig. 19. Moreover, these incentives are sufficient to explain anomalous supply shortages in a time-continuous game under constant conditions (constant demand, a constant number of drivers and a constant price elasticity of demand) where the ON–OFFdecisions of the drivers, reacting to the current conditions, are the only remaining dynamics (Fig. 2c). Drivers contribute to an artificial supply shortage if sufficiently many other idle drivers are willing to also participate, following their mean-field optimal strategy. To avoid never making profit, however, individual drivers remain offline only for a short amount of time, explicitly limiting the timescale of potential artificial price surges (see “Methods” section and Supplementary Note 3 for details). The simulations shown in Fig. 2c reproduce qualitatively the same non-equilibrium price dynamics as observed in the recorded price data (compare Fig. 1b): Increases of the trip duration during commuting hours (gray shading in Fig. 2c) are accompanied by a sustained supply–demand imbalance and surge fees without drivers turning off their app. At other times, the drivers create short, artificial price surges to maximize their profit. Identifying characteristic price dynamics. The fact that these incentives are generic to dynamic pricing schemes suggests that artificial supply shortages and non-equilibrium surge dynamics emerge independent of the location. However, direct observation of the supply dynamics, e.g. of the number and location of online drivers, is typically impossible as this information is not publicly available. Even with the above results, a bottom-up prediction is practically infeasible since the exact conditions under which these dynamics are promoted depend on the specific details of the trip, the local dynamics of demand and drivers, publicly unavailable details on the surge pricing algorithm as well as additional external influences such as local legislation. We overcome these obstacles by exploiting the characteristic temporal structure of the surge dynamics observed for confirmed anomalous supply shortages in DCA (compare Fig. 1b) to identify locations with similar dynamics. Based only on the price time series, we quantify the timescales of normalized price changes Δp for 137 different routes in 59 urban areas across six continents (Fig. 3a, see “Methods” section for details). The distribution of price changes separates into a slow and fast timescale and a contribution where the price does not change Pð Þ¼ Δp wbase Pbase Δp; σbase ð Þ þ wsurge PsurgeðΔp; σsurgeÞ þ w0 δðΔpÞ : ð5Þ The slow price changes Pbase Δp; σbase ð Þ describe changes of the base cost varying as slowly as traffic conditions change during the day. The fast price changes PsurgeðΔp; σsurgeÞ are associated with sudden changes of the surge fee. The last term w0 δ(Δp) describes times when the price remains constant and contributes only at Δp = 0, where δ represents the Dirac-Delta distribution and w0 the remaining weight w0 = 1−wbase−wsurge. Characterizing the contribution wsurge of the surge fee and the magnitude σsurge of the associated price changes with a maximum-likelihood Gaussian mixture model fit PxðΔp; σxÞ ¼ 1 ffiffiffiffiffiffiffiffiffiffi 2πσ2 x p e Δp2 2σ2 x ð6Þ with x 2 f g base;surge (see “Methods” section for details), we find locations without surge activity (Fig. 3b and c) as well as locations with strong but infrequent price surges (Fig. 3d). Importantly, we also identify several locations with price change characteristics similar to those observed at DCA, with a high magnitude and contribution of surge price changes, suggesting strong and frequent price surges potentially driven by anomalous supply dynamics (compare Fig. 3e). Indeed, all of the identified locations exhibit qualitatively similar non-equilibrium surge fee dynamics with a large number of repeated price surges, in particular during evening hours, demonstrating that the phenomenon is ubiquitous (Fig. 4, see Supplementary Figs. 14 and 15 for additional examples). While these results do not directly imply that all price surges at these locations are induced artificially, both the similarity of the timescale separation to confirmed artificial price surges and the universality of the incentives for drivers provide evidence supporting this conclusion. Discussion In summary, we quantitatively demonstrated the emergence of non-equilibrium price dynamics in on-demand mobility systems at various locations across the globe and explained the fundamental incentive structure ultimately giving rise to such nonequilibrium price dynamics. The exact conditions promoting anomalous supply shortages and artificial price surges depend on a multitude of factors at each location, such as users’ transportation preferences, working conditions for service providers, local legislation, and the availability of alternative transport options. Our methodology to classify the price dynamics based on the separation of timescales of price changes, without explicit knowledge about the timeresolved demand and supply evolution, enables a systematic search for supply anomalies based on price time series only. Although a direct observation of the supply dynamics may be required to confirm anomalous supply shortages, we identify a number of locations likely exhibiting anomalous supply shortages by combining confirmed reports and quantitative observations for reference cases, game-theoretically revealed generic incentive structures and large-scale time series analysis of recorded price estimates. Our theoretical model demonstrates that the underlying incentives are a generic property of dynamic pricing and should even apply across industries where prices are adapted to supply and demand fluctuations on short timescales. This is particularly relevant for applications where prices are prescribed by an external algorithm instead of market clearing prices of buy and sell offers. One contemporary example may be recently discussed smart pricing schemes in power grids14,23, especially since large parts of the demand are inelastic due to fixed daily routines. Our results demonstrate that a carefully designed pricing scheme is essential to avoid unintended incentives that potentially reduce power grid stability instead of enhancing it. For mobility systems in particular, characterizing the incentives and the conditions that promote artificially induced price surges suggests specific actions to suppress their emergence. This may include offering ride-sharing options24–27 (effectively lowering the demand, compare Fig. 2b) or providing more or alternative public transport options (effectively increasing the price elasticity of demand, compare Fig. 2b). The same incentives following a combination of few public transport options and a mismatch in driver availability and demand dynamics28 may also promote the emergence of supply anomalies particularly in the evening and at nighttime. Importantly, our results suggest that limiting the maximum surge fee, as done in response to the initial reports from DCA29 (see Fig. 1b) and frequently discussed as potential legislation30,31 (compare Chennai, Fig. 4), is not an effective response and may even result in the opposite effect if the demand is highly elastic. In general, with the emergence of digital platforms, sharing economies and autonomous vehicle fleets, mobility services and other industries are becoming increasingly self-organized and complex such that new, potentially unintended collective dynamics can emerge1,3–5,7,11,32. Our results provide conceptual insights into these dynamics and may thereby support the creation and regulation of fair, efficient and transparent publicly available mobility services24–27,33–3.

#### Productive algorithmic employment is key to smart city development – solves resource scarcity, intelligent transportation, smart infrastructure, and pollution.

Bozkurt ’21 [Yusuf; Department of Computer Science @ Reutlingen University; Fauser, J., Braun, R., Hertweck, D., & Rossmann, A; “Development of a smart city service catalogue for sensor-based digital services,” in *Proceedings of the IADIS International Conference Connected Smart Cities*, p. 87-96; AS]

1. INTRODUCTION

The shift of populations to cities and urban areas creates complex problems, for instance, environmental impacts, rapid urbanisation, traffic etc. (Alberti et al., 2019). Cities play a significant role in the social and economic development of any country. Digitalisation has a major impact on society and the economy nowadays and in the future. According to Stolterman & Fors (2004), digitalisation, or digital transformation, refers to "the changes associated with the application of digital technology in all aspects of human society". Digitisation enables a wide range of opportunities to develop new services in smart cities to address different challenges related, e.g., climate change or urbanisation. Harakal'ova (2018) defines a smart city as the main element of the smart city concept: the use of information technology to improve management efficiency and standard of living while reducing costs and use of resources and ensuring greater participation of citizens in matters of management and urban development. Many smart city services are available based on Internet of Things (IoT) technology (Perera et al., 2014; Zanella et al., 2014). For example, the monitoring of CO2 and NOx concentration in the cities with IoT sensors. That could provide city developers information regarding the identification of green areas that have a significant impact on air quality (OKLab Köln, 2021). According to Peng et al. (2017), little research has been done on the awareness of such smart city services and user participation. Government officials, policymakers or SMEs are often unaware of the existing large variety of smart city service solutions (Kramers et al., 2014). Additionally, another barrier in enterprises or cities is their uncertainty about which technologies exist or to choose from to address the requirements for a concrete use case. Another issue is implementing the service effectively and determining the maturity of available service (Rachinger et al., 2019). In addition, high implementation costs and lack of technical experts in municipalities and enterprises are often a barrier.

To address these problems, the paper at hand deals with developing a smart city services catalogue that documents best practice services to create a platform to bring citizens, city government, and businesses together. A smart city service catalogue platform structures and describes existing services, supports developing new ideas and identifying and implementing new smart city services. Such a service catalogue represents the first point of contact to the service. It facilitates the contact between interested parties and providers, and users/cities that have already implemented this service. Vice versa, this leads to time and cost savings when implementing smart city services (Yuaca et al., 2019). We formulated the following research question for this paper: What are the components to develop a smart city service catalogue platform?

To answer this research question, we developed a concrete implementation of the smart city service catalogue platform iteratively, described in this paper and available online at www.smartcity-services.de. The rest of this paper is structured as follows: In section 2, we will introduce some background information and discuss related work. Section 3 describes our development process for the smart city service catalogue platform, and in section 4, we present the implemented service catalogue platform. In the last section, we summarise the main findings and discuss future research.

2. BACKGROUND

The urban population today makes up 56 % of the world's population. By 2050, the population is expected to increase to 68 % (United Nations, Department of Economic and Social Affairs, 2018). This growth leads to multiple challenges in different areas of a city (e.g. waste management, traffic management, public transportation). The European Commission (Catriona et al., 2014) structures smart cities in following six dimensions: Smart governance, smart environment, smart mobility, smart living, smart people and smart economy (Bozkurt et al., 2020; Caragliu et al., 2011; Catriona et al., 2014; Giffinger & Gudrun, 2010). Bozkurt et al. (2020) analyse these six dimensions and rank them according to their popularity in the scientific literature. According to this work, smart environment represents the most studied dimension, while smart economy ranks last. According to Bozkurt et al. (2020), the dimensions cover the following topics: 1) Smart environment focuses on sustainable and environmentally friendly urban development using information and communications technology (ICT). Activities range from smart buildings to energy-saving measures for IoT services. 2) Smart governance deals with, e.g., smart city strategy development, transparency and necessary framework conditions for digitalisation projects and smart city initiatives. 3) Intelligent transport systems, optimisation and creation of mobility services are discussed in smart mobility. Citizen participation, social justice, education and co-creation are discussed in 4) smart people. Literature on 5) smart living deals mainly with e-health, but also with smart home topics. Finally, the last dimension, 6) smart economy deals with data-driven business models and business generation in different data life cycle layers.

Despite some dimensions of smart cities are already visible and studied, it is still difficult to give an all-accepted definition of smart cities. For example, Caragliu et al. (2011) emphasise economic growth and high quality of life through the combination of traditional urban infrastructure and ICT and the investment in human and social capital and participatory governance. Lombardi et al. (2012) share a similar view, linking social and environmental issues with the application of ICTs. Cretu (2012) emphasises integrating ICT into every aspect of human life and new thinking paradigms in governance and economy. Washburn & Sindhu (2010) supported a more technological perspective considering smart cities as a collection of ICTs applied to urban infrastructure and services. In contrast, Kourtit et al. (2012) advocate a knowledge-intensive and creative perspective on human and social capital, infrastructure and entrepreneurial capital. Despite numerous definitions and views, the role of ICT as an enabler of smart city activities appears as a common element.

Smart city applications and services are deployed across the city to address challenges such as pollution, ageing society and resource scarcity. Government agencies and businesses are interested in using ICT as an enabler of new smart services. Mainly discussed smart city service areas are transportation (e.g. smart parking, smart traffic lights), healthcare (e.g. patient monitoring systems), energy (e.g. smart grids), public safety services (e.g. smart surveillance), building management, waste management and education (Peng et al., 2017). There is a general understanding that the proper use of smart city services can sustainably improve a city's liveability (Lee & Lee, 2014; Peng et al., 2017; Piro et al., 2014; Yeh, 2017; Yigitcanlar & Lee, 2014). While these smart city services are being technologically studied and implemented, little research has been done on the awareness of such services and user participation (Peng et al., 2017). To better understand the users of smart city services, Lytras & Visvizi (2018) conducted a qualitative study and questioned 102 participants on the usage of smart city services. One of the aspects of the study addressed the main concerns of citizens when using smart city services. It resulted that 45% of the respondents were concerned about security and privacy. This concern was followed by data protection (25%), lack of transparency (8%), ethical concerns (6%), required soft skills (5%), third party awareness (5%) and complexity of services (4%). These concerns can be overcome through a high level of transparency of smart city services. Therefore, a smart city service catalogue platform with best practices worldwide is the first approach to bring citizens, city administration and businesses together.

The concept of a service catalogue is not new and has been addressed and discussed by companies for years as part of IT governance frameworks such as ITIL or COBIT. Many articles deal with this topic and state the necessity and the advantages of service catalogues for companies (e.g. transparent communication of existing IT services) (Horvat et al., 2013; Taconi et al., 2014; Xu et al., 2010). There is no standard design for a service catalogue. Still, the ITIL framework describes some mandatory components: 1) A general list of all services offered, 2) a sufficient description of each service, 3) the alignment between IT and business, 4) the operation level agreement, 5) the service level agreement and 6) the underlying contract (Sembiring & Surendro, 2016). Such a catalogue is primarily used to communicate services transparently and create a consistent picture of the service portfolio (Horvat et al., 2013; Meriwether, 2014; Sembiring & Surendro, 2016; Sipina, 2011; Taconi et al., 2014; Xu et al., 2010). Although first smart city service catalogues are already visible (IoT Collaborative, n.d.; OASCITIES, 2021; UNPARALLEL Innovation, 2021), the topic of smart city service catalogues has remained almost unaddressed in the scientific community.

3. DEVELOPMENT PROCESS

Although various publications already exist, there is no consensus on what a service catalogue should look like. These publications and guides are primarily for businesses to assist them in designing and creating service catalogues (Horvat et al., 2013). Hubbers et al. (2007), for example, emphasise the decomposition of all business processes and the analysis of the IT infrastructure as well as the business goals as a starting point of creating a service catalogue. Kieninger et al. (2011) propose an approach to classify IT services into ten groups (e.g. standard application services, intranet services, backup services). A similar approach is described by Arcilla et al. (2013) by grouping services into hardware, email, backup. Taconi et al. (2014) propose a framework for identifying services and creating service catalogues structured in 9 phases and provides a step by step workflow for identifying available IT services in the company. However, all this valuable work is not directly applicable to creating a smart city service catalogue platform. An enterprise service catalogue, for example, lists and describes the IT services available in the company and the connected business processes. Nevertheless, in the case of the smart city service catalogue platform, we intend to present best practices from different cities to provide ideas for implementing new services and enable an exchange of services between various stakeholders.

Fehling et al. (2015) describe a three-phase model for 1) identification, 2) authoring, and 3) application of patterns in different domains with multiple actors. They describe the approach by referring to patterns in cloud computing, cloud data, application management, costumes in films and green business process. These domains are characterised by their high diversity, making a homogenised general description of patterns complex (Fehling et al., 2015). The basic approach of this methodology proved to be suitable for our project, as the topic of smart cities is also a strongly interdisciplinary field with a multi-stakeholder structure (Albino et al., 2015; Bozkurt et al., 2020; Giffinger & Gudrun, 2010; Lombardi et al., 2012). We were able to adopt the approach of Fehling et al. (2015) to identify and describe smart city services and create the service catalogue platform with minor modifications. That led to the development framework shown in Figure 1, which is the foundation of our work. The framework's core is the agile work approach of the research team, which develops and synchronises the service catalogue in regular sprints. Theoretical findings from the literature represent the foundation of the framework. In addition, the entire work is supported by the "Best Practices" and "Requirements" pillars, which represent findings from existing references and potential user groups.

We needed to consider the fundamental question of who the potential users of the online smart city service catalogue platform are. Therefore, potential users were identified initially in a workshop with graduate students and experts from the smart city field. As a result, the following personas were developed: 1) City administration (decision-makers and employees), 2) citizens and communities, 3) companies, 4) teaching and research institutions. Besides developing the personas, the theoretical foundation was established by the scientific literature on smart cities, service catalogues and smart city services (see Chapter 2). These findings were continuously taken into account. A smart city service catalogue platform flourishes through its multitude of existing services and also stimulates the expansion of services through its abundance. Therefore, it was essential for us to offer many services in the very first version of the service catalogue.

For this reason, the research team conducted an extensive search for existing smart city services. That involved a detailed review of existing service catalogues, smart city IoT communities and smart city service providers (e.g. eco curious, 2021; element14, 2021; Smart City Solutions, 2021; TTN Ulm, 2021). Each research member recorded the services at a detailed level to create a collective pool of smart city services in a first step. In the subsequent step, the research group reviewed the collection of smart city services in a workshop to identify relevant and universal categories to describe smart city services. In the second iteration, missing information was completed, and new services were included. Subsequently, the services were categorised according to the six smart city dimensions and resulted in a first version of the service catalogue as an Excel file.

The service catalogue was supposed to be available as an online service catalogue platform from the beginning, easily accessible and transparent for different users. But before developing the service catalogue as a platform, we created mock-ups based on the previously created service catalogue (Excel file) and considering the personas. Mock-ups helped us understand at an early stage that categorising the service catalogue platform according to the six smart city dimensions is not the right design for our target group. Especially the dimensions smart economy, smart living and smart people are not intuitive for general readers. Therefore, we decided to adopt five easily understandable high-level dimensions for the service catalogue platform as the entry point, namely 1) mobility, 2) environment, 3) public, 4) living and 5) industry. These five dimensions are still based on Catriona et al. (2014), but the understanding is easier for the general readers. After this revision, a preliminary version of the online service catalogue platform was implemented and filled with the first pilot services. The insertion of these pilot services helped us to gain new insights for further improvements. After implementing these insights, the remaining services were uploaded.

4. SERVICE CATALOGUE

We used the content management system (CMS) Word Press 1to implement our smart city service catalogue platform. Word Press is one of the most used CMS worldwide (Schäferhoff & WebSiteSetup, 2021; W3Techs, 2021). The platform aims to provide open source and commercial available best practice examples of IoT network services to different actors. Moreover, the platform offers a service catalogue for sensor-based, digital services (IoT services) and enables the exchange of services. The implemented smart city service catalogue is available on www.smartcity-services.de.

In Chapter 3, we described the five main categories in which we structured the different services, which supports the navigation and identification of relevant services for different user groups. We defined the category "Environment" as services that are monitoring environmental changes and used in, e.g., agriculture, buildings and energy savings etc. "Mobility" is defined as services in public or private transportation and traffic management. The category "Public" describes services for optimising the management of public infrastructure, city administration, citizen participation or education. Services in health, society and home were categorised in the category Living. In the category Industry, services for industrial usage such as condition monitoring or predictive maintenance were assigned. A service can be assigned to more than one category. For instance, the service "Vehicle / Asset Tracking" (LoRa Alliance, 2021). It is a LoRaWAN-based (The Things Network, 2021) GPS tracker for tracking products or material of a company. It supports optimising (intra-) logistic processes in container and asset management, warehouse and inventory scenarios, outdoor tracking, theft protection. Another scenario of "Asset Tracking" can also be in the public area, such as tracking bicycles of a sharing provider. To strengthen the community and the platform idea, we implemented a form that allows everyone to add a service to the service catalogue platform in a predefined structure. After a successful review, the service will be published on the service catalogue platform. In Table 1, we have listed the 32 services, which are currently available on the service catalogue platform. In addition, each service has a short description, and the assigned categories of the service are shown.

We developed a standardised format for describing the services to increase comprehensibility and address the users' different requirements. Inspired by Alexander et al. (1977) pattern description, we developed a structure to describe the individual services. To identify the service, each service has a title. A visualisation of a service on our smart city service catalogue platform is shown in Figure 2 ("DIY Fine Dust Sensor"). For quick visual identification of a service, we use cover images, which we assigned to the different categories, for example, environment or mobility. In which category a service was assigned is listed under the title. For further filter and description purposes, we assigned tags to every service. This should enable users to search the service catalogue beyond the different categories, such as a specific technology or keyword. We used the following tags to describe further the service "DIY Fine Dust Sensor": #Air #citizenscience #sensor. Below the tag section is a short description of the service. A short description should not exceed 30 words and summarises the key value proposition of the service. The short description aims to communicate the main idea of the service effectively and efficiently to the reader. In order to better understand the service, especially readers with non-IT background, a video, if available, is embedded in the service description. The category "Abstract" offers a detailed explanation of the service, structured in use case, functionality and benefits. This is intended to achieve a deeper understanding of the service for a user. The category "Place of operation" shows the country or the city where the service is already in usage. This should enable the user to evaluate the implementation in the context of regional factors, especially regarding data protection laws, which differ significantly between different countries and impact the implementation of a service. The "Licensing Model" category describes how a service is licensed, such as commercial licensing or open source. This is a piece of relevant information for evaluating any costs incurred by implementing the service. In addition, open-source services may also have specific implementation requirements. For the category "Technological Architecture", we used a toolchain approach to visualise the architecture components and their relationships, such as hardware, software, and communication protocols. Additionally, we give a short description of the technological architecture. This provides the user with an overview of technical implementation details.

5. CONCLUSION

The goal of this work was to describe the development of a smart city service catalogue platform based on an actual implementation. Despite multiple perspectives on smart cities and different definitions, the application of ICT as an enabler of smart city services is visible. Existing city services are optimised through ICT by integrating sensors into the physical world. But also new and innovative services for cities are developed with the use of ICT. An online catalogue of such services and best practices from cities worldwide can foster innovation in other cities. Driven by this motivation, we developed a platform for smart city services that helps cities develop new ideas and identify and implement new smart city services. However, the service catalogue platform is not only addressed to the city government but also to businesses, individual interested citizens, communities, and educational and research institutions. Although the concept of IT service catalogues is not new and guidelines and recommendations for the design and development of service catalogues already exist in the corporate context, there is little work on smart city service catalogues. Therefore, we have adapted approaches from agile software development and pattern research to develop the smart city service catalogue platform. This systematic approach has made it possible to develop the service catalogue iteratively in a project team with several researchers and students.

The results of this work provide practical and theoretical contributions. Practitioners can use this paper and the developed service catalogue as a guideline for creating smart city service catalogues in their region or their specific domain. Furthermore, the service catalogue is a valuable opportunity to share services and use it as a platform with different stakeholders. In this way, interested parties and providers can easily find each other. We hope that this will lead to a high level of transparency, innovation and stimulation of smart city activities by making it easier to get started. The theoretical contribution is that researchers can use this work to enhance the methodology and conduct further research on smart city service catalogues. Service catalogues are discussed in science and practice, but only from a business perspective. This work shows that there is no framework or guideline for the creation of service catalogues for smart city services, although smart city services are often discussed, and service catalogues are an essential element for transparency and open exchange. Furthermore, the service catalogue provides a basis for developing patterns in the smart city domain by conducting the phases 2) and 3) described by (Fehling et al., 2015). In addition to patterns, reference architectures for ICT-supported smart city services can also be developed, and business models for smart city services can be analysed using the smart city service catalogue platform.

#### Surge pricing crushes intelligent transportation systems – key to EVS and smart cities.

Saharana ’20 [Sandeep et al; Department of Computer Science and Engineering @ Thapar Institute of Engineering and Technology; Seema Bawaa; Department of Computer Science and Engineering @ Thapar Institute of Engineering and Technology; Neeraj Kumar; Department of Computer Science and Engineering @ Thapar Institute of Engineering and Technology; “Dynamic Pricing Techniques for Intelligent Transportation System in Smart Cities: A Systematic Review,” Computer Communications, 150, p. 603–625; AS]

2.3. Demerits of dynamic pricing for ITS

(a)Dynamic fare pricing: Improper dynamic fare pricing sometimes leads to congestion on roads, promotes private transportation, consumes more energy, leads to more emissions [30], [31]. In competitive freight transportation environment, it may show biasness in revenue generated by the competitors.

(b)Dynamic charging/discharging pricing for EVs: Dynamic pricing can increase prices up to a certain level, which alone is not sufficient remedy to all problems. In case of uncontrolled EV charging [45] peak demand can increase during peak load time. While determining prices dynamically, the mismatch of parameter(s) with real scenario can lead to several power quality issues such as voltage drops, power unbalances, and voltage/current harmonics [4].

(c)Dynamic parking pricing: Spatial boundary effect, i.e., implementation of uncoordinated dynamic parking pricing among different parking lots, may result in higher cruising time, and more congestion outside parking lots [35]. Temporal boundary effect, i.e., parkers parks earlier or later than high charging period can neglect the advantage of dynamic pricing [37].

(d)Dynamic congestion pricing: Road pricing can sometimes creates undesired boundary effects. In ‘temporal boundary effect’, travelers depart earlier or later than a charging period to avoid paying full or part of the congestion charges. In ‘spatial boundary effect’, travelers would rather stay away from a charging zone than paying congestion charges. This causes undesired congestion on roads parallel to the edge of the charging zone [28], [46], [47]. Limitations of technology and other parameters such as drop offs in electricity can limit the advantages of dynamic congestion pricing. Thus, the poor coordination of dynamic toll pricing with equipments such as sensors and cameras can lead to low average speed or high congestion in some lanes. Wrongly implemented congestion pricing can over crowd the public transportation and places such as bus stops, railway stations, airports.

#### Urban mobility revolution key to sociotechnical city-transformation – independently solves extinction AND key to decarbonization, smart cities, SDGs, and EVs.

Schot ’18 [JohanSchotW., Science Policy Research Unit (SPRU), University of Sussex, UK, EdwardSteinmueller, Science Policy Research Unit (SPRU), University of Sussex, UK "Three frames for innovation policy: R&D, systems of innovation and transformative change," Research Policy Volume 47, Issue 9, November 2018, Pages 1554-1567; AS]

For a decade now governments have recognized they may need to align social and environmental challenges better with innovation objectives. Climate change, reduction of equality, poverty and pollution have been transformed into challenges and opportunities for science, technology and innovation policy. Through initiatives such as Horizon 2020, the EU expects innovation to address a number of well-chosen societal challenges and for example contribute to a transition to low-carbon and inclusive economy.24 The 2015 Lund Declaration explicitly prioritises training a new generation of researchers who will have the skills to address grand societal challenges underpinned by an excellent research base. 25 Also, the newly signed universal Paris climate change agreement has set the ambitious goal to reach zero net carbon emissions in the second half of the century, and the United Nations (2015) has formulated 17 Sustainable Development Goals (SDGs), calling for greener production, increased social justice, a fairer distribution of welfare, sustainable consumption patterns and new ways of producing economic growth.

Can we expect innovation to deliver on these challenges? Science, technology and innovation policies are based on the assumption that innovation is a force for creating a better world.26 The idea is that developing new technologies will lead to higher labour productivity and economic growth, and a better competitive position. It is expected that remaining externalities can be managed through regulation. Innovation policy focuses subsequently on stimulating R&D and building national systems of innovation. The assumption is that such a policy can lead to green growth in which governments are able to invest in clean technology missions, reducing pollution and cleaning up the environment. It is also assumed that inequality will be reduced through new job opportunities generated from growth and income redistribution. However, this is of course only so when we assume nation-states, despite globalisation, have the ability to invest in clean technologies in a persistent way for a longer time period, are in the position to organize the distribution function in an adequate way, confront tax avoidance, and are not captured and/or corrupted by other interests which favour investment and distribution in other directions. A main challenge is whether the State is indeed in the position to deliver on this.

The potential erosion of the power of nation-states, however, is not the main challenge. A more fundamental challenge is whether the externalities that are generated by growth such as such as climate change can indeed be managed ex-post through clean technology and distributional measures, even with a strong state in place. Our core proposition is that the existing R&D and national systems of innovation frames for science, technology and innovation policy are unfit for addressing the environmental and social challenges. An important reason is that both Frames 1 and 2 assume that stimulating innovation is positive, there is no deep engagement with the fact that innovation always represents a certain directionality. Of course, both framings recognize that technology development might lead to some bad outcomes in the short term, but it is claimed that the overall benefit compensates for this. For example, innovation may lead to unemployment in sectors experiencing rapid technical change; however, in the long term, everyone will benefit since new high quality jobs will be generated. It was for this reason that Schumpeter regarded technical change as a process of creative destruction. As Soete (2013), however, reminds us, innovation may also lead to destructive creation, benefiting the few at the expense of the many, leading to low quality jobs, and creating more problems than it solves. We think it is time to recognize in our framings for innovation policy that many technologies are deeply implicated in persistent environmental and social problems. Innovation contributes massively to the current resource-intensive, wasteful and fossil fuel-based paradigm of mass production and mass consumption (Meadows et al., 2004; Bardi, 2011; Steffen et al., 2015). It also contributes directly to inequality because current innovation trajectories favour high tech solutions which assume high quality and pervasive infrastructure, and produces mass-produced products aimed mainly for consumers with substantial purchasing power (Kaplinsky, 2011). Innovation policies in their current formats may lead to economic growth but often exacerbate inequalities. Even fast growth, such as China’s, is accompanied by growing inequality (Dutrénit and Sutz, 2014). The starting point of a new third frame for science, technology and innovation policy should be that innovation cannot be equated with social progress, even when corrective social policies are in place. After all, innovation itself may be causing a growing set of externalities. How then can science, technology and innovation policy address the double social and environmental challenge?

We argue that to meet the ambitious challenges expressed for example in the SDGs, we need a new framing for innovation policy. This is what we call Framing 3 aimed at transformative change. This raises the question -- what needs to be transformed? Based on the research in sustainability transitions studies we argue that transformation of socio-technical systems is needed in energy, mobility, food, water, healthcare, communication, backbone systems of modern societies (Grin et al., 2010; Markard et al., 2012; Steward, 2012; OECD, 2015). Socio-technical system transformation is very different from just developing new radical technological solutions. For example, science, technology and innovation policy can focus on the introduction of electric vehicles and its weak spot: overcoming the limited range through battery development. However, if the electric vehicle only is a substitute for the current car and we continue with a car dominated mobility system, the low carbon and inclusive economy will still be far away. Industry structures may be transformed but ambitious SDGs are not met. Therefore, we argue, it would be better to focus innovation policies supporting the emergence of new mobility systems in which for example private car ownership is less important, other mobility modalities such as small taxi vans, public transportation, walking and bicycling are more used in combination with for example electric vehicles provided by types of companies dedicated to the provision of mobility services using ICT capabilities. In this new system, mobility planning and thus also reduction of mobility has become an objective of all actors, and even a symbol of modern behaviour. This is what we call a socio-technical system transition, it implicates co-production of social, behavioural and technological change in an interrelated way. Socio-technical system transformation (or transition) is about changing skills, infrastructures, industry structures, products, regulations, user preferences and cultural predilections. It is about radical change in all elements of the configuration. This also makes system transitions difficult, because elements tend to be aligned and reinforce each other. It involves social innovation, since the focus is on many social elements and their relations with technological opportunities. It can include high tech solutions as well as innovation in old technologies (bicycles in the example above). System innovation always involves multiple actors, including civil society and users who can play a crucial innovative role – not just one of articulating a demand to be supplied by firm innovation (Oudshoorn and Pinch, 2003; Schot et al., 2016).

#### Infrastructure resilience is a non-linear, infinite systemic risk – extinction.

Pamlin ’15 [Dennis and Stuart Armstrong; February 2015; Executive Project Manager at the Global Challenges Foundation; James Martin Research Fellow at the Future of Humanity Institute and in the Oxford Martin School at the University of Oxford; Global Challenges Foundation, “12 Risks that threaten human civilization,” <https://www.pamlin.net/material/2017/10/10/without-us-progress-still-possible-article-in-china-daily-m9hnk>]

Global Challenges – Twelve risks that threaten human civilisation – The case for a new category of risks 89 3.1 Current risks 3.1.5 Global System Collapse Global system collapse is defined here as either an economic or societal collapse on the global scale. There is no precise definition of a system collapse. The term has been used to describe a broad range of bad economic conditions, ranging from a severe, prolonged depression with high bankruptcy rates and high unemployment, to a breakdown in normal commerce caused by hyperinflation, or even an economically-caused sharp increase in the death rate and perhaps even a decline in population. 310 Often economic collapse is accompanied by social chaos, civil unrest and sometimes a breakdown of law and order. Societal collapse usually refers to the fall or disintegration of human societies, often along with their life support systems. It broadly includes both quite abrupt societal failures typified by collapses, and more extended gradual declines of superpowers. Here only the former is included. 3.1.5.1 Expected impact The world economic and political system is made up of many actors with many objectives and many links between them. Such intricate, interconnected systems are subject to unexpected system-wide failures due to the structure of the network311 – even if each component of the network is reliable. This gives rise to systemic risk: systemic risk occurs when parts that individually may function well become vulnerable when connected as a system to a self-reinforcing joint risk that can spread from part to part (contagion), potentially affecting the entire system and possibly spilling over to related outside systems.312 Such effects have been observed in such diverse areas as ecology,313 finance314 and critical infrastructure315 (such as power grids). They are characterised by the possibility that a small internal or external disruption could cause a highly non-linear effect,316 including a cascading failure that infects the whole system,317 as in the 2008-2009 financial crisis. The possibility of collapse becomes more acute when several independent networks depend on each other, as is increasingly the case (water supply, transport, fuel and power stations are strongly coupled, for instance).318 This dependence links social and technological systems as well.319 This trend is likely to be intensified by continuing globalisation,320 while global governance and regulatory mechanisms seem inadequate to address the issue.321 This is possibly because the tension between resilience and efficiency 322 can even exacerbate the problem.323 Many triggers could start such a failure cascade, such as the infrastructure damage wrought by a coronal mass ejection,324 an ongoing cyber conflict, or a milder form of some of the risks presented in the rest of the paper. Indeed the main risk factor with global systems collapse is as something which may exacerbate some of the other risks in this paper, or as a trigger. But a simple global systems collapse still poses risks on its own. The productivity of modern societies is largely dependent on the careful matching of different types of capital 325 (social, technological, natural...) with each other. If this matching is disrupted, this could trigger a “social collapse” far out of proportion to the initial disruption.326 States and institutions have collapsed in the past for seemingly minor systemic reasons. 327 And institutional collapses can create knock-on effects, such as the descent of formerly prosperous states to much more impoverished and destabilising entities.328 Such processes could trigger damage on a large scale if they weaken global political and economic systems to such an extent that secondary effects (such as conflict or starvation) could cause great death and suffering. 3.1.5.2 Probability disaggregation Five important factors in estimating the probabilities of various impacts: 1. Whether global system collapse will trigger subsequent collapses or fragility in other areas. 2. What the true trade-off is between efficiency and resilience. 3. Whether effective regulation and resilience can be developed. 4. Whether an external disruption will trigger a collapse. 5. Whether an internal event will trigger a collapse. 1. Increased global coordination and cooperation may allow effective regulatory responses, but it also causes the integration of many different aspects of today’s world, likely increasing systemic risk. 2. Systemic risk is only gradually becoming understood, and further research is needed, especially when it comes to actually reducing systemic risk. 3. Since systemic risk is risk in the entire system, rather than in any individual component of it, only institutions with overall views and effects can tackle it. But regulating systemic risk is a new and uncertain task. 4. Building resilience – the ability of system components to survive shocks – should reduce systemic risk. 5. Fragile systems are often built because they are more efficient than robust systems, and hence more profitable. 6. General mitigation efforts should involve features that are disconnected from the standard system, and thus should remain able to continue being of use if the main system collapses 7. A system collapse could spread to other areas, infecting previously untouched systems (as the subprime mortgage crisis affected the world financial system, economy, and ultimately its political system). 8. The system collapse may lead to increased fragility in areas that it does not directly damage, making them vulnerable to subsequent shocks. 9. A collapse that spread to government institutions would undermine the possibilities of combating the collapse. 10. A natural ecosystem collapse could be a cause or consequence of a collapse in humanity’s institutions. 11. Economic collapse is an obvious and visible way in which system collapse could cause a lot of damage. 12. In order to cause mass casualties, a system collapse would need to cause major disruptions to the world’s political and economic system. 13. If the current world system collapses, there is a risk of casualties through loss of trade, poverty, wars and increased fragility. 14. It is not obvious that the world’s institutions and systems can be put together again after a collapse; they may be stuck in a suboptimal equilibrium. 15. Power grids are often analysed as possible candidates for system collapse, and they are becoming more integrated. 16. The world’s financial systems have already caused a system collapse, and they are still growing more integrated. 17. The world’s economies are also getting integrated, spreading recessions across national boundaries. 18. The world’s political and legal systems are becoming more closely integrated as well. Any risk has not been extensively researched yet, and there remain strong obstacles (mainly at the nation state level) slowing down this form of integration. 19. The politics of the post-system collapse world will be important in formulating an effective response instead of an indifferent or counterproductive one. 20. System collapses can be triggered internally by very small events, without an apparent cause. 21. External disruptions can trigger the collapse of an already fragile system. 22. The trade-off between efficiency and resilience is a key source of fragility in a world economy built around maximising efficiency. 23. Climate change, mass movements of animals and agricultural mono-cultures are interlinking ecosystems with each other and with human institutions. 24. There is a lot of uncertainty about systemic risk, especially in the interactions between different fragilities that would not be sufficient to cause a collapse on their own.

#### Megacity collapse causes extinction.

Cribb ’17 [Julian, Author, journalist, editor and science communicator, principal of Julian Cribb & Associates who provide specialist consultancy in the communication of science, agriculture, food, mining, energy and the environment, “The Urbanite (Homo Urbanus),” Surviving the 21st Century, Springer, p. 147-169]

By the mid-twenty-first century the world’s cities will be home to approaching eight billion inhabitants and will carpet an area of the planet’s surface the size of China. Several megacities will have 20, 30, and even 40 million people. The largest city on Earth will be Guangzhou-Shenzen, which already has an estimated 120 million citizens crowded into in its greater metropolitan area (Vidal 2010).

By the 2050s these colossal conurbations will absorb 4.5 trillion tonnes of fresh water for domestic, urban and industrial purposes, and consume around 75 billion tonnes of metals, materials and resources every year. Their very existence will depend on the preservation of a precarious balance between the essential resources they need for survival and growth—and the capacity of the Earth to supply them. Furthermore, they will generate equally phenomenal volumes of waste, reaching an alpine 2.2 billion tonnes by 2025 (World Bank)—an average of six million tonnes a day—and probably doubling again by the 2050s, in line with economic demand for material goods and food. In the words of the Global Footprint Network “The global effort for sustainability will be won, or lost, in the world’s cities” (Global Footprint Network 2015).

As we have seen in the case of food (Chap. 7), these giant cities exist on a razor’s edge, at risk of resource crises for which none of them are fully-prepared. They are potential targets for weapons of mass destruction (Chap. 4). They are humicribs for emerging pandemic diseases, breeding grounds for crime and hatcheries for unregulated advances in biotechnology, nanoscience, chemistry and artificial intelligence.

Beyond all this, however, they are also the places where human minds are joining at lightspeed to share knowledge, wisdom and craft solutions to the multiple challenges we face.

For good or ill, in cities is the future of civilisation written. They cradle both our hopes and fears.

Urban Perils

The Brazilian metropolis of Sao Paulo is a harbinger of the challenges which lie ahead for Homo urbanus, Urban Human. In a land which the New York Times once dubbed “the Saudi Arabia of water” because its rivers and lakes held an eighth of all the fresh water on the planet, Brazil’s largest and wealthiest city and its 20 million inhabitants were almost brought to their knees by a one-in-a-hundred-year drought (Romero 2015). It wasn’t simply a drought, however, but rather a complex interplay of factors driven by human overexploitation of the surrounding landscape, pollution of the planetary atmosphere and biosphere, corruption of officialdom, mismanagement and governance failure. In other words, the sort of mess that potentially confronts most of the world’s megacities.

In the case of Sao Paulo, climate change was implicated by scientists in making a bad drought worse. This was compounded by overclearing in the Amazon basin, which is thought to have reduced local hydrological cycling so that less water was respired by forests and less rain then fell locally. This reduced infiltration into the landscape and inflow to river systems which land-clearing had engorged with sediment and nutrients. Rivers running through the city were rendered undrinkable from the industrial pollutants and waste dumped in them. The Sao Paulo water network leaked badly, was subject to corruption, mismanagement and pilfering bordering on pillage. Government plans to build more dams arrived 20 years too late. “Only a deluge can save São Paulo,” Vicente Andreu, the chief of Brazil’s National Water Agency (ANA) told The Economist magazine (The Economist 2014). Depopulation, voluntary or forced, loomed as a stark option, officials admitted. Although the drought eased in 2016, water scarcity remained a shadow over the region’s future.

Sao Paulo is far from alone: many of the world’s great cities face the spectre of thirst. The same El Nino event also struck the great cities of California, leading urban planners—like others all over the world—to turn to desalination of seawater, using electricity and reverse osmosis filtration (Talbot 2014). This kneejerk response to unanticipated water scarcity echoed the Australian experience where, following the ‘Millennium Drought’ desalination plants were producing 460 gigalitres of water a year in four major cities (National Water Commission 2008)—only to be mothballed a few years later when the dry eased. By the early 2010s there were more than 17,000 desalination plants in 150 countries worldwide, churning out more than 80 gigalitres (21 billion US gallons) of water per day, according to the International Desalination Association (Brown 2015). Most of these plants were powered by fossil fuels which supply the immense amount of energy needed to push saline water through a membrane filter and remove the salt. Ironically, by releasing more carbon into the atmosphere, desalination exacerbates global warming and so helps to increase the probability of fiercer and more frequent droughts. It thus defeats its own purpose by reducing natural water supplies. A similar irony applies to the city of Los Angeles which attempted to protect its dwindling water storages from evaporation by covering them with millions of plastic balls (Howard 2015)—thus using petrochemicals in an attempt to solve a problem originally caused by … petrochemicals.

These examples illustrate the ‘wicked’ character of the complex challenges now facing the world’s cities—where poorly-conceived ‘solutions’ may only land the metropolis, and the planet, in deeper trouble that it was before. This is a direct consequence of the pressure of demands from our swollen population outrunning the natural capacity of the Earth to supply them, and short-sighted or corrupt local politics leading to ‘bandaid’ solutions that don’t work or cause more trouble in the long run.

Other forms of increasing urban vulnerability include: storm damage, sea level rise, flooding and fire resulting from climate change or geotectonic forces; governance failure, civic unrest and civil war exemplified in Lebanon, Iraq and Syria over the 2010s; disruption of oil supplies and consequent failure of food supplies; worsening urban health problems due to the rapid spread of pandemic diseases and industrial pollution and still ill-defined but real threats posed by the rise of machine intelligence and nanoscience (Gencer 2013). The issue was highlighted early in the present millennium by UN Secretary General Kofi Annan, who wrote:

Communities will always face natural hazards, but today’s disasters are often generated by, or at least exacerbated by, human activities… At no time in human history have so many people lived in cities clustered around seismically active areas. Destitution and demographic pressure have led more people than ever before to live in flood plains or in areas prone to landslides. Poor land-use planning; environmental management; and a lack of regulatory mechanisms both increase the risk and exacerbate the effects of disasters (Annan 2003).

These factors are a warning sign for the real possibility of megacity collapses within coming decades. With the universal spread of smart phones, the consequences will be vividly displayed in real time on news bulletins and social media. Unlike historic calamities, the whole world will have a virtual ringside seat as future urban nightmares unfold.

#### Dynamic pricing generates administrative costs that lock in supply shortages – the plan is key to algorithmic innovations that enable smart urban planning.

Woodcock ’20 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “The Efficient Queue and the Case against Dynamic Pricing,” *Iowa Law Review*, 105(4), p. 1759-1798; AS]

Today, ration pricing may well be more expensive to administer than queuing, because ration pricing requires investment in the acquisition of a piece of information that queuing does not require: the particular price that only a group of consumers sufficiently small to be satisfied by existing supply are willing to pay.,8 9 To use willingness to pay as a proxy for value, it is necessary to know enough about the distribution of willingness to pay among consumers to pick the cutoff price that separates the wealthy few who should take from those who should not. Queuing does not have this information requirement. With queuing, the seller simply sells until supply runs out.,9o The problem of acquiring new information about demand with which to recalibrate price, which is the heart of dynamic pricing, is eliminated. The price-rationer can try to minimize information costs by starting to sell at a very high price, and then lowering price bit by bit until all inventory has sold, but unless those increments are very small, and all potential buyers are ready to purchase at the same time, the possibility remains that the owner may overshoot, reducing price by too far, leading to an excess of demand that must be resolved in the end by queuing. Thus the additional information requirement for ration pricing in fact causes ration pricing to shade into the simpler queuing system.191 The information age has, of course, reduced the information cost of ration pricing, but it has not yet sent that cost to zero.'92

Instantaneous queuing is just the first of many consumer-friendly alternatives to ration pricing that the information age is likely to create, because information does not only make it easier to identify and charge a ration price. It also makes it easier directly to identify desire and route supply to satisfy it. Consider, for example, the downtown parking problem that a San Francisco startup tried to solve by occupying parking spots and then selling them at ration prices. Studies show that perhaps 30 percent of downtown driving involves searching for parking spaces.193 That is the cost of queuing, and ration pricing would no doubt have reduced that cost, but at the expense of consumers.'94 The information age will, however, soon make it possible to eliminate the cost of queuing for parking without embracing ration pricing. Networked parking meters will guide drivers to available spaces, eliminating the need for wasteful circling of downtown blocks, and perhaps also prioritize drivers with special needs. 195 Just as Google Maps has reduced congestion by routing drivers through unused roads, cities may turn to driving software dynamically to allocate access to downtown streets to drivers on the most important business, in lieu of using price to ration access through congestion pricing schemes. 196 With each new allocative innovation, the argument for the efficiency of ration pricing will weaken even further, and the argument for the prohibition of dynamic pricing in response to surges in demand will strengthen.

#### Broad literature reviews establish complex and counterintutive consumer responses to price surging, not demand relocation.

Jalas ’21 [Mikka; "Prime-time access for whom? Rhythms fairness and the dynamic pricing of infrastructure services,"; 5-3-2021; Taylor & Francis, <https://www.tandfonline.com/doi/full/10.1080/13549839.2022.2040468>]

6.3. Dynamic pricing, sharing and the circular economy

We have argued that rhythmicity should be recognised as an aspect of promoting the sharing of products and the overall narrowing and streamlining of resource use. There are a number of ways to take this suggestion further. The facilitation of alternative rhythms of consumption could, for example, be added to the recent conceptualisations of the strategies of cities to promote the sharing of resources (e.g. Zvolska et al. 2019; Palm, Södergren, and Bocken 2019). Through institutional attention to synchronisation and the diversity of rhythms, off-peak consumption could foster a fair transition to a circular economy and avoid the threat of new forms of marginalisation and segregation.

The ways in which the sharing of products and other capital assets could and should be organised to pursue the goals of the circular economy are diverse, and result from different political priorities. The sharing economy appears to evolve more from commercial ownership and organisation, and less from communities of sharing (Martin 2016; Hobson and Lynch 2016). The dynamic pricing models that we have discussed obviously relate to the business and management aspects of private ownership and to operating a “fleet of products”, but they also involve public control of demand management. As mentioned above, companies engaging in dynamic pricing in ways that resonate with circular economy pursuits would probably benefit from greater transparency in pricing schemes.

The rhythmic aspects of circular economy offerings also resonate with the calls to alter and complement the prevailing rationalising, ecomodernist discourses of the circular economy and sharing (e.g. Hobson and Lynch 2016). Dynamic pricing may be approached as a question of optimisation of delivery and a rational approach to matching supply and demand. However, evidence suggests that people are diversely capable of responding, and actually respond in unexpected ways to the economic incentives created by dynamic pricing. A fair transition to a circular economy should recognise the limits of techno-economic rationalities and the practical obstacles for demand flexibility, exemplified e.g. by the COVID-19 restrictions. Insofar as flexibility is a norm, those who are attached to rigid schedules or are otherwise not flexible, face a double burden: the financial cost of inflexibility, and the social cost of breaching the norm. To mitigate such negative distributional impacts of the circular economy, we highlight the need to consider the flexibility of demand as a socially stratified and broadly constituted institutional arrangement. Digging even deeper, circular economy design and realisation need to have plural understandings of the constituting role of rhythms for identities and social groups. This is not to say that new identities cannot form around the new shifts of consumption that occur at the fringe of peak consumption and make use of excess infrastructure capacity during the idle periods of the dominating rhythms.

For consumption scholars, circular economy discourses highlight resource scarcity as an organising principle. The scarcity of resources implies strict limits on capacity and on consumption which depend on shared infrastructures. These scarcities or bottlenecks can be thought of as consumption prisms. They do not necessarily imply a mirror image or a transposition of everyday life patterns, but rather a more fine-grained redistribution of the timing of activities. Moreover, it is unclear whether and how economic capital will be reflected in temporal reorganisation. There are many reasons to assume that a lack of economic resources may coincide with a lack of flexibility. These include non-flexible working hours, limited abilities for remote work, a lack of capital to invest in automation, and a lack of training and experience in economic rationality. From the viewpoint of a fair transition to a circular economy, dynamic pricing and the transparency of capacity limits should prompt critical examination of overall demand as well as novel and fair ways to organise sharing and practice alternate rhythms.

7 Conclusions

In this paper, we have suggested that the discourses and practical outcomes of the circular economy should be viewed from the perspective of shared social rhythms and the timing of everyday practices. The environmental benefits of the sharing economy depend on whether sharing can be organised in a streamlined manner and whether resource pools can be narrowed down. Yet this implies that access to products and services needs to be regulated, and consequent questions over fairness. Dynamic, time-varying pricing schemes are a dominant model to forge demand response. Using the electricity grid and road network as case examples, we reviewed documented demand management practices and their rhythmic consequences. The evidence suggests that both service providers and consumers hesitate to engage in the dynamic pricing of services. Thus, both the environmental and social benefits as well as the justice outcomes are only pending.

The reviewed literature points out that the trials of the dynamic pricing of infrastructure services have mostly rested on technological means and economic incentives. This, we suggest, is a failure of recognition justice. Thus, we introduced the concepts of shift consumption and rhythm transposition to offer descriptive tools which we also hope signal pending issues of social justice. Reshuffling consumption opportunities to reduce the need for infrastructure capacity will intervene in the functioning of individuals, cause temporal dislocations, and alter social relations much in the way of shift work. The key precondition for social justice in such arrangements is to account for the broad constituency of flexibility and social rhythms.

We aimed to create a more transformative understanding of the circular economy, and to signal issues that require attention in order to capture the social conditions and consequences of such transformations. Whether the circular economy discourses and politics should promote shift consumption and how best to account for the heterogeneous effects of such schemes on the participating people will be a perennial question, as scarce environmental means are organised to meet a legitimate need for services.

#### Dynamic pricing models rely on economics that has been debunked over 20 years.

Ballouz ’21 [Hala Joel Mathias; Sean Meyn, Robert Moye, and Joseph Warrington; President, Electric Power Engineers, Austin, Texas Department of Electrical and Computer Engineering, University of Florida; “Reliable Power Grid: Long Overdue Alternatives to Surge Pricing,” arXiv preprint arXiv:2103.06355]

3.3 Summary & Reality Check

Prop. 3.1 makes clear how dynamics can impact markets: if it is assumed that the preferences of the consumer can be approximated by a concave function of power consumption, then we arrive at the dynamic pricing models that have been advocated for the past two decades. We come to an entirely different conclusion upon recognizing that this model does not come close to reflecting user preferences for the majority of electric loads. It might be possible for a reader to see Fig. 6, and declare that power pricing is solved by Prop. 3.1. This would be a misreading of the proposition, which is meant to show that our conclusions are highly sensitive to modeling assumptions. How do we know that aggregators and consumers will behave exactly as our rationality assumptions predict? Moreover, a core ingredient of the theory of efficient markets is that prices must be discovered via some mechanism. We feel it would be prohibitively difficult to design a real-time market that could discover the dynamic price described in the proposition. Competitive equilibrium pricing models also make the fatal mistake of assuming that fixed costs are “sunk” and therefore not needed in the problem formulation. This is a simplification imposed in Prop. 3.1 for tractability, and to compare our conclusions with all of the other papers on marginal cost pricing that impose the same simplification. This is in fact far more than a simplification: it is a gross distortion of reality.

Evidence of this is that in these models, standard arguments show that average price is approximately average marginal cost [15, 62, 44]. Obviously, generation companies are not simply optimizing over a 24-hour period based on cost of energy and ancillary services, and it should also be obvious that their average marginal cost is only a fraction of the revenue required to maintain a healthy business [43]. The proposition ignores the important impact of risk and uncertainty. Soon after the February 2021 crisis at ERCOT, a panel consisting of many architects of marginal cost pricing for power systems met to discuss the outcome 6 . All agreed that the actors (including consumers) should have hedged to avoid financial crisis. This may be true, but the architects of these markets did not account for risk in their market designs. Competitive equilibrium theory falls flat with the introduction of risk, as made clear in [27] and the references therein.

Moreover, our goals go far beyond efficiency. Given the enormous value of reliability, we need planning and reliable control mechanisms that do not depend on our assumptions about the rationality of all of the competing agents. Reliability requires control loops, just as in telecommunications. The cost of failure is far higher in the case of our power grids, in part because the recovery process is much more complex and time-consuming. Finally, our energy grid is an interconnection of overlapping complex networks, built on a myriad of dynamical systems. It is difficult to envision marginal cost pricing as an effective control strategy in such a complex network.

#### The plan enables digital queueing that generate efficient smart cities.

Woodcock ’21 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “The Efficient Queue and the Case Against Surge Pricing,” SocArXiv; AS]

Today, that advantage is gone. The information age has all but eliminated the need to wait in lines, or suffer most of the other frictions associated with selling out, for today few firms can avoid telling the Internet when a good has sold out.149 Firms sell online and, unless they wish to discontinue a product, marketing requires that they maintain product pages when goods are temporarily out of stock; but to do that, those pages must make clear to customers who reach them that there is no inventory on hand to sell. Because this information is displayed online, no customer today need go down to a physical store in order to learn that a product is unavailable. And no customer today need rush down to a physical store for fear that a product might sell out.

And no crowd of customers need ever overwhelm the ability of a physical store to process orders quickly, creating a line. For now a buyer can simply log into the seller’s website and either buy or face the sold-out sign.150 The seller’s computer can process thousands of order requests per second, so order processing capacity, the bottleneck that drove preinformation-age lines, is gone other than for the very largest crowds. Every time a consumer logs into an ecommerce website only to find a “sold out” sign, the consumer has in effect waited on an instantaneously-clearing line.151 The time required to learn that a good has sold out has fallen to the same amount of time required to learn that a price has risen—the time required to communicate—eliminating the advantage of the high price.152 Economists once characterized selling out as “rationing by waiting;” today it is merely rationing by antecedence. 153

The newfound efficiency of the queue is one of the quieter revolutions of the information age. But it is everywhere, even in Uber, which seems to sell out—giving users a “no drivers available” message—as often as it engages in surge pricing.154 Travelers once waited in line at airport taxi stands to determine whether they would be able to take a cab home. Now they log into Uber and either book a ride or learn immediately that there are no cars available in the area.155 One used to wait in line for groceries during natural disasters. No longer. Today one just logs into the supermarket website and arranges for curbside pickup. 156 One either finds an available timeslot or one does not; there is no wait involved. 157 To find out whether a good is sold out on Amazon, one spends no more than the seconds it takes to visit the retailer’s website.158 The closest equivalent to the line today is the website refresh that is sometimes required when trying to get tickets to a hot sporting event or concert.159 But that is nothing like waiting in line for hours at the ticket window. Even the famous Black Friday lines for Thanksgiving sales have gone virtual, and so clear instantaneously.160

### 1AC – Plan

#### The United States federal government should substantially increase prohibitions on algorithmic dynamic pricing.

#### Resource scarcity causes extinction.

Wray ’19 [Britt; 8/13/19; PhD in Science Communication @ University of Copenhagen; “We Need Tech — and Even More So Wisdom — to Solve the Extinction Crisis.” <https://onezero.medium.com/we-need-tech-and-even-more-so-wisdom-to-solve-the-extinction-crisis-e8bd476133a9>]

Dwindling biodiversity and escalating climate change are powerful disturbances to life on Earth that shake the human soul. There are lots of reasons to be hopeful that technology will be a force for good in this crisis. But we need to reorient our identities toward protecting the planet with our full humanity if we’re going to stand a chance. Having studied conservation biology, philosophy of science, [written a book on de-extinction](https://www.amazon.com/Rise-Necrofauna-Science-Ethics-Extinction-ebook/dp/B074D62DS7/ref=sr_1_1?keywords=britt+wray&qid=1564410616&s=gateway&sr=8-1), and interviewed hundreds of scientists, ethicists, and ecological thinkers, I can offer an introductory guide to how we might unleash a radical reset in our technological culture. Expecting surprises We need to acknowledge the severity of the ecological crisis, the enormous amount of both human and nonhuman life at stake, and the deeply inequitable impacts that are already being felt around the globe. The World Bank [predicts](https://www.worldbank.org/en/news/press-release/2018/03/19/climate-change-could-force-over-140-million-to-migrate-within-countries-by-2050-world-bank-report) that by 2050, there will be 140 million climate refugees within Latin America, sub-Saharan Africa, and South Asia while [other estimates](https://unu.edu/media-relations/media-coverage/climate-migrants-might-reach-one-billion-by-2050.html) put the number at over one billion. Mass migrations and resource scarcity increase the risk for violence and war. Meanwhile, the UN-backed Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [reports](https://onezero.medium.com/the-great-dying-has-begun-only-transforming-the-economy-can-stop-it-4eadd8f7ccf8) that humans are driving up to one million species to extinction. The seeds of our ecological destruction were sown by a false sense of division between humans and nature. The development of a suite of extractive practices, from fracking to deep-sea drilling, enabled us to keep taking from the Earth — and convinced us we could do so without paying painfully for it. But our awakening has come, and it may be our last chance to take genuine care of this planet. Throughout history, we’ve faced many rude surprises when we’ve used technology to take from the Earth. Now we must gather the wisdom to use tech to give back to it. “Nature is emergent. Things are going to surprise us.” Science historian Andrew Pickering argues that Western civilization’s biggest mistake has been to think that the world is fixed and fully knowable and that humans are its only true agents. It is an asymmetrical belief system, one where humans make decisions that shape the world, and all other things exist passively, without agency. So far, we’ve gotten away with the idea that we can control nature, grab it by the throat, and make it do what we want for us. But Pickering points out the gravity of this mistake: “I got hung up on the Deepwater Horizon disaster when they were drilling for oil in the Gulf of Mexico and it spilled for 87 days in 2010,” [he says](http://www.methodquarterly.com/2015/11/what-is-the-world-really-like/). “Does it make sense to think that we can drill for oil a mile below the surface of the sea and control that? I think the answer has to be no. There might have been a few engineering mistakes, as one would say, but we should expect things to go wrong, and the more and more desperate we become in trying to dominate the planet, the more dangerous these things become. Nature is emergent. Things are going to surprise us.” Attunement to grief When I was writing my book [Rise of the Necrofauna: The Science, Ethics and Risks of De-Extinction](https://www.amazon.com/Rise-Necrofauna-Science-Ethics-Extinction-ebook/dp/B074D62DS7/ref=sr_1_1?keywords=britt+wray&qid=1564411215&s=gateway&sr=8-1), de-extinction advocate Stewart Brand gave a [TED Talk](https://www.ted.com/talks/stewart_brand_the_dawn_of_de_extinction_are_you_ready?language=en) in which he told the audience why we ought to use gene editing, cloning, and other biotechnologies to re-create close versions of extinct species in the name of conservation. When a species disappears, he said, “Don’t mourn — organize!” In other words, instead of getting sad, get down to work and get the species back. It’s a great slogan, but it’s far too simple. Nothing about de-extinction — or any pressing ecological problem — should be decided in haste. Thom van Dooren, a philosopher of extinction, [argues](https://publications.rzsnsw.org.au/doi/10.7882/AZ.2014.048) that we should not skip over any ecological grieving or mourning process because that is what allows us to re-learn the world and how it has changed after an extinction. Mourning is a transformative process of coming to terms with how the world is now forever different. This allows us to consider how we can adapt to it and not repeat the same mistakes. Rushing to fix the problem with technology masks this need. But the role of emotions in technology need not be black and white. One can take technological action while also demonstrating our full humanity. If we learn to embrace more nuance in how we apply tech, using not only science but also our passions, intuitions, and deeply held feelings, we might create a more ethically attuned way of intervening in the world. Honoring multi-species life Donna Haraway, the biologist and feminist philosopher, [argued](http://people.oregonstate.edu/~vanlondp/wgss320/articles/haraway-cyborg-manifesto.pdf) in her 1985 essay “A Cyborg Manifesto” that it no longer made sense to think of boundaries between humans and machines. Today she applies a similar logic to our relationship with the environment. “Environmental justice or ecological reworlding,” [she writes](https://journals.sagepub.com/doi/pdf/10.1177/2043820617739208), requires “nurturing and inventing enduring multispecies — human and nonhuman — kindreds.” Biotech is exploding with new possibilities for what it means to be human, animal, and something in between. We’re shaping the course of evolution. No longer at the whims of natural selection, we can directly intervene in the heritable traits of any species. Haraway believes that this can be used to beneficially multiply the diversity of life on Earth — if we think of other life-forms as part of our same clan. “This kin making,” she writes, “is crucial for imagining and crafting with each other still possible — barely possible — flourishing worlds, now and to come.” If we are to responsibly manage our powerful biotech tools like CRISPR and induced pluripotent stem cells, we have to see ourselves as just one tinkerer among many. If we take into account the agency of other living creatures, we might find ways to creatively amplify and strengthen multispecies dynamics. Slowing down while still going fast Philosopher Isabelle Stengers argues that a vital part of scientific and technological culture must change if we are to avoid rushing blindly off a cliff out of competition with other nations or for capitalistic gain. [Her work](https://www.tandfonline.com/doi/abs/10.1080/00141844.2018.1457703) has observed how scientific culture often says, “‘Leave us alone, we are scientists, and science must advance.’ Everything that complicates it, makes obstacles, and brings back the mess of the world is an enemy.” But we cannot afford to let any single perspective guide something so important as the relationship between science and society. We have a small window in which we can act effectively on climate and biodiversity, so we do need to act fast. But Stengers reminds us we shouldn’t just use tech everywhere simply because we can. Sometimes responding ethically requires a social solution and no tech at all. We will be in a better position to restore our environments and create new ones if the solutions we seek come from diverse sources of wisdom. Technology has always been our savior as well as our downfall, but it doesn’t have to be both of those things in equal measure. We can thrive in the future if we stop ravaging the Earth immediately while seeding new values in our embrace of tech with a focus on compassion, equity, and humility. The roadmap I offer here is just one way to think about doing this work. Building a culture of technological maturity to meet our greatest planetary challenges may not look likely, but it is within reach. Whatever comes of these next decades is up to us, so let’s start building.

#### Pollution cause extinction – toxins makes the Earth uninhabitable.

Litecky ’16 [Dr. Ahnie, Adjunct Instructor at The American University in Cairo, MA in History from the University, BA in Journalism from Humboldt State University, Former Historical Researcher at Heritage Research, Freelance Writer for Egypt Oil & Gas Newspaper, “Fading Environmentally Destructive Flames”, Egypt Oil & Gas Newspaper, 5/4/2016, http://egyptoil-gas.com/features/fading-environmentally-destructive-flames/9529/]

Gas flaring, a long-standing practice in the oil and gas industry, has come under harsh criticism. It not only wastes valuable resources and billions of dollars annually, it also has a severe impact on the environment. Efforts to curb gas flaring around the world are slowly gaining support, and if pursued efficiently, the end of this practice, harmful to our health, may come true by the envisioned 2030.

Gas flaring is the burning of unwanted gas that is extracted as part of oil/gas exploration, production, and processing operations. Sometimes non-waste gases are also flared to protect processing equipments in exceedingly high-pressure conditions. The industry also relies on gas venting, which is the direct release of gases into the atmosphere and it usually occurs for safety reasons. However, flaring is preferred over venting, because less methane is released by burning the gas. Gas flaring and venting are common practices among oil companies because capturing and using the natural gas is often expensive and appears impractical. As the reasoning stands, financial practicalities seem to have been taken priority over destructive effects that gas flaring has on the environment.

Roasting the Sky, Poisoning the Air

“Gas flares are nothing short of crimes against humanity,” NnimmoBassey, the then-Director of Lagos-based Environmental Rights Action and Chair of Friends of the Earth International, told The Guardian in 2011. “They roast the skies, kill crops and poison the air. These gas stacks pump up greenhouse gases into the atmosphere, impacting the climate, placing everyone at risk.”

Flaring can create five forms of pollution: noise, light, thermal radiation, particulates (soot), and emissions. If flaring is conducted properly, with a complete burn of the emitted natural gas, then particulate and emissions are minimized. However, variable environmental conditions mean that the gas is rarely fully combusted and instead releases a plethora of toxic substances into the air.

Gas flaring thus contributes dramatically to climate change. Gas venting releases methane and gas flaring emits both carbon dioxide and methane. These two major greenhouse gases have contributed to about 80% of global warming to date. Annually, gas flaring releases about 350 million tons of CO2 into the atmosphere worldwide. The oil and gas industry is also responsible for about 20% of global methane emissions.

Flaring also produces black carbon particles which strongly absorb sunlight and generate atmospheric heat. These particles can warm the air, and influence regional cloud formation and precipitation patterns. If black carbon particles fall onto snow or ice, it can absorb sunlight and accelerate melting, which further negatively contributes to global warming. According to environmental reports, the Arctic region is warming twice as fast as the rest of the world, which can be partly attributed to the increased presence of black carbon. A. Stohl led a study, published in 2013 in Atmospheric Chemistry and Physics, which showed that gas flaring contributed 42% to the annual mean black carbon surface concentrations in the Arctic.

Scientific research on the environmental effects of gas flaring is further supported by a wealth of research on the specific compounds that are released in the process. The exact combination of emissions depends on several factors, including the burning temperature, the composition of the waste gases, and wind speed. As O. Saheed Ismail, and G. EzainaUmukoro demonstrated in a 2014 article from the Journal of King Saud University, gas flares contaminate the atmosphere with a range of harmful contaminants such as nitrogen dioxide, carbon dioxide, carbon monoxide, sulphur dioxide, particulate matter, hydrocarbons, ash, photochemical oxidants, and hydrogen sulphide. All of these compounds are shown to harm human health. In total, there have been over 250 identified toxins associated with flaring.

People breathe in these contaminants, but the toxic mixtures also make their way into water and soil. Drinking water and agricultural soil are affected, making areas near gas flare sites sometimes uninhabitable.

Water bodies in gas-flared environments have been shown to contain increased levels of heavy metals, such as lead, cadmium, copper, manganese, and nitrates. C. N. Nwankwo and D. O. Ogagarue demonstrated the presence of such heavy metals in a 2011 study published in the Journal of Geology and Mining Research. According to their research, the heat generated from gas flaring can kill nearby vegetation, destroy swamps and marshes, suppress the growth and flowering of some plants, degrade soil, and decrease agricultural productivity.

Crops located near gas flare sites have reduced nutritional value. In a 2013 study published in Journal of Environment Pollution and Human Health, author Anslem O. Ajugwo compiled data and information from a variety of research sources to craft a case study of Nigeria. He argued that gas flaring has “impoverished the communities where it is practiced, with attendant environmental, economic and health challenges.”

Acid rain has also been linked to gas flares, as AkobunduAmadi demonstrated in a 2014 Journal of Geosciences and Geomatics article. Acid rain makes water bodies such as lakes and streams more acidic, damages vegetation, causes roof erosion, and kills aquatic animals, harms local populations. In effect, soils near gas flaring sites become more acidic from acid rain and cannot support agriculture.

Health Diseases on Display

The environmental issues are further exacerbated by the direct impact that gas flaring has on population’s health, and not exclusively of those living in proximity to gas flares.

Most scholarly research about the health effects of living near gas flare sites has been conducted in Nigeria, where the gas flaring has been in widespread use for decades. For example, A.E. Gobo, G. Richard, and I.U. Ubong from Rivers State University of Science and Technology in Nigeria demonstrated in a 2009 paper published in the Journal of Applied Sciences and Environmental Management that certain respiratory diseases were more prevalent in gas flaring areas than in areas without gas flaring. In a 2013 study published in the International Research Journal of Medical Sciences, J.N. Egwuruwu, et.al. showed that rates of kidney disease increased near gas flaring sites. Two years later, T.E. Ogbija, A.O. Atubi, and V.N. Ojeh used questionnaires, oil spill records, and gas flare data to argue that environmental degradation of air, water, and land in the Nigerian Delta caused a variety of health, economic, and agricultural problems. Their research was published in the Journal of Environment and Earth Science.

These three studies are just a sample of the extensive research demonstrating an alarming link between gas flaring and a myriad of health problems. Lung damage, anemia, nausea, headache, fatigue, leukemia, birth defects, wake-sleep disturbances, respiratory problems, skin/eye irritation, cancer, skin disorders, and kidney disease, are merely some of the health issues associated with gas flaring emissions. People who live near gas flaring sites also deal with loud noise from the gas emissions and bright lights given off by the flames.

People in other countries with high rates of gas flaring have also complained of negative health effects from gas flares. Iraqis who live near gas flare sites have complained of infected skin, allergies, asthma, and other respiratory problems. Similarly, in 2013, residents of a Canadian town reported an increase in hair loss, skin rashes, and respiratory issues such as coughing after several years of increased gas flaring nearby.

Furthermore, flaring negatively affects animals as well. Several instances of mass bird deaths at gas flare sites have been reported in Canada, Nigeria, and the North Sea. In 2013, approximately 7,500 migrating birds were killed at a gas plant in Canada. Of course, livestock and domesticated animals that live near gas flare sites ingest the same harmful contaminants that people do through the air, crops, and water. Scientific studies concerning the specific effects of gas flaring on animals are still scarce, but a 2000 Canadian study, led by C. L. Waldner and published in Preventative Veterinary Medicine, showed an increase in the risk of stillbirth and mortality in Canadian cattle near gas flaring locations.

There is a lot of anecdotal evidence that animals who live near gas flaring sites suffer from a variety of reproductive and health problems, while scientific studies support the findings about the negative health consequences for animals ingesting toxic chemicals.

Common Flaring Rationale

Gas flaring is bad. Everybody agrees. Scientists have produced a wealth of research that shows gas flaring is harmful. People who live near gas flaring sites can attest to the toxic air and scorched earth. Gas flaring contributes to climate change. The practice wastes huge amounts of a non-renewable resource. Worst of all, gas flaring is not necessary. The technology to reduce gas flaring is available, so why is gas flaring still so common?

The short answer is that gas flaring is cheap and easy. The long answer is, of course, much more complicated.

“Flaring continues because there are prevailing barriers that hinder investments in flare reduction,” TorleifHaugland, Senior Partner at Carbon Limits, a Norwegian-based climate change consulting firm, told Egypt Oil & Gas. “Some are technical and economical and would need economic incentives or regulatory pressures and measures to be eliminated, while others are caused by lack of awareness and/or priority by corporate managers. Finally, distortive policies and regulations (e.g. pricing policies, and license terms) hinder many flare reduction projects which are profitable from a socio-economic perspective.”

One important issue that Haugland raised is economics. Gas flaring is often considered the most economical thing to do with natural gas. Oil can be transported to refineries in trucks, even from very small and remote fields. However, gas requires pipelines to be moved to market and building pipeline infrastructure is costly. Companies do not want to invest lots of money to extract small amounts of gas from far-flung fields. Russia, who currently holds the unfortunate distinction of top natural gas flaring nation in the world, is an excellent example of the geographic reasons that flaring occurs. In Russia, most oil field are spread out across remote areas that are difficult to access, therefore building pipelines to move the associated natural gas is extremely costly and makes little economic sense for Russian oil companies.

Another significant reason why gas flaring continues is that many governments have not done enough to effectively regulate the practice. For instance, the Nigerian government outlawed gas flaring in 1984, but the country remains at the top of the gas flaring lists. Over the past few decades the government has struggled to enforce gas flaring laws, yet instead routinely succumbed to pressure from oil companies to push back deadlines and amend legislation.

The low price of natural gas also contributes to gas flaring. In the US, another major gas flaring country, natural gas prices remain low, despite a huge market for the resource. As in the case of Russia, American oil companies have little economic incentive to build costly infrastructure to capture and sell natural gas and instead routinely flare the gas.

Beyond the environmental impact of gas flaring, there are further huge economic ramifications. According to the World Bank, gas flares at oil production sites burn approximately 140 billion cubic meters of natural gas annually, which is about 4% of world production that remains unrecoverable amid growing global demand of gas.

Several countries have meanwhile set on a path towards ending gas flaring, yet only Norway seems to present a flaring reduction success story. The country has formulated a clear and detailed gas flaring and venting policy and the government works closely with oil companies to ensure compliance.

Efforts to Reduce Flaring

Despite the dire facts and statistics surrounding gas flaring, there are also plenty of reasons to hope that the practice will soon end globally. The World Bank has led global efforts to reduce gas flaring, most recently by introducing a Zero Routine Flaring by 2030 initiative last year. Governments, oil companies, and development institutions are signing on to support the legal, regulatory, and economic changes necessary to put an end to routine gas flaring.

Haugland argues that the World Bank initiative is both realistic and achievable. “The target is for avoiding flaring at new production sites and seeking flare elimination from existing flare sites when such investments are economically viable,” he said. Further, “the rise of climate change on the international policy agenda implies that there will be much more attention and action directed toward the resource waste which flaring represents. Given that 2030 still is more than 10 years away seen from a planning and project implementation perspective this target should be achievable and realistic.”

“The oil and gas industry has a responsibility to cut routine gas flaring to zero,” said Anita Marangoly George, World Bank Senior Director for Energy and Extractive Industries, in a statement in December 2015. She added that “ending routine gas flaring not only stops millions of tons of CO2 going into the atmosphere every year, it can contribute to improving the life of the people who live around gas flare sites.”

Unlike the existing practice, destructive to the life on earth, a straightforward rationale should instead be advocated for in line with people’s rights to clean environment, corporate and governmental obligations and global urgent demand for clean energy.

#### Energy disruptions goes nuclear – extinction.

Holstein ’20 [Alex; 2020; Managing Partner at Holstein-Gray, M.Sc. in Russian and Post-Soviet Studies from the London School of Economics; Geopolitical Monitor, “Invisible Warfare: NATO and the Geopolitical Storm on the Market Economy Horizon,” <https://www.geopoliticalmonitor.com/invisible-warfare-nato-and-the-geopolitical-storm-on-the-market-economy-horizon/>]

But before we even get to that very worst of the worst-case scenarios of a direct collision between a NATO ally and Russia, even the slightest escalation in the region, considering its vital energy resources, could have a devastating impact on global markets, which in itself would kick off a wave of instability and eventual warfare.

As market economies evolve and integrate by engaging commerce and leveraging technology, the blend between national security and socio-economic imperatives becomes even more prescient. This carries with it both advantages and disadvantages. Traditionally, NATO military forces have relied on critical civilian infrastructure such as communications, food and water, industrial capacity, civil transport and energy supplies to conduct operations. The additional rise of non-kinetic asymmetric threats – cyberwarfare, information warfare, EMP attack – against non-traditional targets, such as banks or major multinational corporations that comprise key components of this critical infrastructure, adds an entirely new dimension to the defense requirements of the 21st century. In addition to dealing with more conventional kinetic threats from traditional and emerging adversaries, NATO must prepare itself for this new era of invisible warfare through deeper strategic cooperation with the private sector and corporate entities.

Great Powers and non-state actors alike can now conduct non-kinetic attacks just as devastating as any nuclear, biological or chemical WMD, resulting in millions of deaths and the mass breakdown of societies, while in turn undermining the doctrine of Mutually Assured Destruction and other deterrents against nuclear war. But even contained instability within specific regions could still disrupt markets on a global scale, whether directly targeting infrastructure or as a knock-on effect of a conventional engagement, as in the case of Nargono-Karabakh and the threat to Europe’s energy supplies. A European energy crisis alone could prove the tipping point toward a wider war, or a societal breakdown, without a single shot fired.

#### Failed urban planning snowballs – extinction.

Tipson ’13 [Frederick; 2013; Ph.D. and J.D. from the University of Virginia, M.A. in International Relations from Stanford University, advisor to the United States Institute of Peace in the Center of Innovation on Science, Technology, and Peacebuilding, experience in the UN Development Programme, the Markle Foundation, and the Senate Foreign Relations Committee; United States Institute of Peace, “Natural Disasters as Threats to Peace,” <https://www.usip.org/sites/default/files/resources/Natural%20Disasters%20as%20Threats%20to%20Peace%20SR324.pdf>]

Heroic Relief

Increased resilience must be matched with enhanced capabilities for effective relief. Improving the scale and effectiveness of assistance to the victims of disasters is an essential priority not only for limiting immediate effects but also for containing political fallout. In the United States, specialized national agencies, such as the Federal Emergency Management Agency (FEMA) and the American Red Cross, are the principal organizers of emergency support, supplemented by state-level agencies, the National Guard, and countless local and national non-governmental organizations (NGOs).38 Since Hurricane Katrina in 2005, all these actors have demonstrated improved capacities to deal with storms, even as available resources for future crises are in decline. Most other developed countries have similar, though mainly national, agencies to lead relief operations. In poorer countries, capacities are more variable, often either completely localized or highly dependent on national military agencies, as evidenced during the 2004 tsunami in the Indian Ocean. The National Disaster Management Authority of Pakistan, in its response to the massive floods of 2010 and 2011, has been one of the notable civilian exceptions. Assistance to the most at-risk countries to increase their own capacity for humanitarian relief should be a donor priority.

Resources for humanitarian assistance from national donor agencies have seen major growth in the past twenty years. In the United States, funding for foreign disaster assistance has had strong bipartisan support in Congress for many years, and humanitarian relief resonates strongly with large portions of the U.S. electorate. The Office of Foreign Disaster Assistance (OFDA) within USAID has had a record of operational excellence and effectiveness. Other governments also have made international humanitarian assistance a high priority. Scandinavian ministries, the United Kingdom’s Department for International Development (DFID), and the European Commission’s Solidarity Fund have been especially generous contributors to relief operations in recent times, both directly and through UN agencies. The role of major international NGOs, corporate philanthropy, and foundations has also grown, with resources that sometimes exceed those from official sources. With the expansion of heroic generosity, the delivery of disaster assistance has become a major international industry. Large companies and suppliers sell their goods and services in the wake of each major event. NGOs similarly follow devastation and suffering from place to place. Many take advantage of public attention and sympathy for disaster victims to raise large amounts of money for relief.

However, the effectiveness of relief operations, and especially the transition from relief to recovery, often has been less than optimal. Repeated proposals have been made to create a more centrally coordinated system, and UN agency leaders have made major advances over the past two decades in coordinating and funding major international relief operations. In 1991, the General Assembly created an Inter-Agency Standing Committee (IASC) of UN agencies, a Central Emergency Revolving Fund (CERF), and an Emergency Relief Coordinator (ERC) within the UN secretariat. The latter evolved by the end of the 1990s into the Office for the Coordination of Humanitarian Affairs (OCHA), headed by the ERC with the rank of under-secretary-general. In 2005, following the Indian Ocean tsunami, IASC members agreed on an intensified approach to collaboration, dubbed the “cluster system,” which divided relief operations into major functional components and designated lead agencies in each sector to coordinate the work of both international organizations and NGOs. The current ERC, Valerie Amos from the United Kingdom, has undertaken further efforts to improve the performance of the relief community, in the process raising billions of dollars through consolidated appeals, including urgent “flash appeals” to donors.

The January 2010 earthquake in Haiti, which received huge publicity and donations, highlighted both the best and worst features of the international cluster system—and of heroic relief efforts in general.39 Assistance followed a familiar pattern of initial energy and compassion that dissipated once the atmosphere of emergency and improvisation shifted to the long-term demands for major reconstruction and local government control. The influx of supplies and aid workers during the first year of relief was overwhelming. One year later, agencies reluctantly faced the need to shift their promises from “building back better” (as former President Clinton likes to put it)40 to the harsher choices involved in satisfying donors that their resources were accomplishing more immediate concrete effects. Addressing short-term basic human needs for water, food, and shelter—often to people living in large tent cities—is a different task from that of rebuilding basic infrastructure, restarting large and small businesses, and forging political institutions that endure after agencies depart. As all too often happens, the initial humanitarian response to Haiti was overly romantic, inconsistent, and insufficiently attuned to the unique features of the local culture, economy, and political system.41 With intense economic pressures on virtually all major donors, disillusionment with relief operations may result in political pressures to reduce assistance. Popular support for even the most sympathetic causes may begin to wither, including among generous Americans, especially if foreign crises multiply, or if the U.S. homeland itself is struck by major natural disasters that divert attention and resources to domestic priorities.

The multilateral institutional cushions needed to mitigate the social, economic, and political fallout from extreme events remain ad hoc and undeveloped. G-8 and G-20 summit agendas pay some attention to these issues but with little evident follow-through from national governments.42 The UN Security Council, despite one famous session to address the security implications of HIV/AIDs in early 2000, has been erratic and unfocused in dealing with the broader security challenges of disease and disasters. As the council is the principal global institution responsible for addressing international “threats to the peace,” such neglect will need to be remedied. International financial institutions have standard approaches for assisting with disaster recovery, such as the emergency response programs of regional development banks, as well as the World Bank’s Emergency Recovery Loan program, Hazard Management Unit, and Global Facility for Disaster Reduction and Recovery (GFDRR). The International Monetary Fund has an emergency assistance facility designed to ease the fiscal effects of major disasters.43 But these economic mechanisms are not scaled for the size of the challenges ahead, and the international diplomatic and intelligence channels needed to address urgent political and security risks are relatively undeveloped. Even the example of the successful global efforts led by the World Health Organization in responding to pandemic threats from the SARS and avian flu viruses may not prevent national budget cuts in preventive and public health capacity.44 The same budgetary fate could befall otherwise promising initiatives to reduce food insecurities, such as those which the G-20 governments have endorsed. The international community deserves great credit for its recent heroic efforts to aid societies affected by natural disasters. But it is highly unlikely that multilateral relief operations are prepared to work at the necessary scale when disaster incidents multiply. As with future investments in resilience, some form of priority setting or triage may become the imposed standard for major international relief as well.

Ecozoic Relocation Even the most effective combination of stoic and heroic efforts will not sustain vulnerable populations indefinitely. As sea levels and storm surges continue to rise, as key fisheries are contaminated or extinguished, as certain regions become inhospitable to agriculture, or as earthquakes or epidemics degrade the capacity of megacities to provide for their citizens, some currently inhabited parts of the planet will have to be scaled back, or even abandoned, for large-scale settlement. Particularly if global warming trends fulfill some scientific projections, the planet may impose wholesale and dramatic adjustments to the locations, dimensions, and lifestyles of human settlements on a scale akin to the major migrations imposed by ancient ice ages. Anticipating future adaptations of this magnitude, some scientists and philosophers have begun to refer to a coming “ecozoic” age of human adaptation.45

In the United States, such speculation will likely surface initially as more intense versions of familiar controversies over development or rebuilding in coastal areas or floodplains. These issues involve decisions about zoning, taxes, subsidized flood insurance,46 and the various publicly funded programs that promote or sustain coastal growth, such as beach reclamation or the building of wave barriers and dikes.47 Developers and local politicians often downplay disaster risks and the pressures from local citizens are almost always to rebuild rather than to abandon or relocate. Yet even the most stoic impulses must confront difficult choices. New Orleans is a prominent case in point regarding resettlement and reconstruction in areas prone to further flooding, such as the lower Ninth Ward. Hurricane Isaac demonstrated that the huge post-Katrina investments in floodwalls and levies involved decisions to protect certain areas at the expense of others. Such choices now confront officials and citizens on the Jersey Shore, Staten Island, and Long Island in the wake of Tropical Storm Sandy.

The same issues will be replicated around the world. Government subsidies for hazard insurance or expensive engineering for stopgap measures, such as dikes, imported water supplies, or beach reclamation, will at some point no longer protect exposed populations enough to justify the resources needed to maintain them. As media coverage and public discussion increasingly focus on the most exposed areas, many people will begin to vote with their feet and look to resettle their families and businesses in areas less exposed to the hazards they witness across the globe. Real estate prices and infrastructure investments will increasingly reflect the realities of that new marketplace. Obvious areas of special exposure already justify “exit strategies” or migratory transitions. The former president of the Maldives, Mohamed Nasheed, has become a prominent spokesman for the fundamental threats of sea level increases to small island states.48 In other exposed areas—such as low-lying estuaries of Bangladesh, Burma, and Vietnam, as well as large areas of Africa—desertification, erosion, or salinization could render agriculture or adequate supplies of potable water infeasible. Water shortages may make areas of Central Asia and the Middle East impractical for continued settlement. On an even larger scale, some experts suggest that the expected growth of certain megacities will reach practical ceilings because of the physical and economic limitations of distributing food and water.49 Major epidemics could accelerate these pressures to limit or reduce some urban populations.

The political and social dimensions of massive shifts in environment and population are difficult to predict, but the likelihood is that over time large groups of people will become ecologically displaced persons or “environmental refugees,” forced from their historic homelands and needing relocation to more hospitable places within or beyond national boundaries.50 Such transitions will present large political and economic challenges, both for long-term humanitarian support and for immigration laws and enforcement. If these movements involve millions of desperate people, geographic and political boundaries will become increasingly problematic.

Recommendations: National Security and Global Solidarity

The incidence of military conflicts between states is at a historic low; even the number of conflicts within states has declined steeply since the twentieth century.51 However, both trends could be slowed or reversed by increased vulnerabilities to natural disasters and the limits of political and economic capacity to deal with them. How should the challenges ahead be framed in terms of U.S. national security and the larger “threats to the peace”?

Citizen Safety

Most governments place their highest priority on national security, which begins with ensuring the physical safety of their citizens, or as John Jay famously put it in The Federalist: “Among the many objects to which a wise and free people find it necessary to direct their attention, that of providing for their safety seems to be the first.”52 While they are used to thinking of such safety in terms of protection from attacks by military or terrorist adversaries, Americans also regard their fundamental security as dependent on access to reliable supplies of air, water, food, medicine, and shelter.53 All would likely place these subsistence needs above any threat currently on the horizon, foreign or domestic. However, it is leaders—thought leaders as well as political leaders—who define the priorities for government policy and expenditures in dealing with what they perceive as the greatest threats to the country and its citizens. Such definitions of national security generally arise as narratives developed in the course or aftermath of major international attacks or threats of attack. Historical turning points in these narratives over the last hundred years include, for example, the German attacks on U.S. shipping that provoked the country into World War I; the Japanese attack on Pearl Harbor that plunged the United States into World War II; the Berlin crisis, Korean War, and Soviet nuclear tests that intensified the Cold War; and the September 11, 2001, attacks that provoked the U.S. War on Terror. Whether or not all Americans agreed with the security rationales their leaders offered at those times, they provided bold assessments of the threats confronting the country, which gained wide acceptance. Each narrative was a necessary, and apparently sufficient, political basis to enlist political support for executive orders, policies, legislation, appropriations, treaties, and other international commitments that were consistent with the leaders’ justifications.

At present there is no reasonable prospect that U.S. leaders would create a national security narrative focused on the cumulative threats from an overstressed planet.54 To mobilize popular support for the major initiatives necessary to reduce foreseeable risks, U.S. leaders would eventually have to shift their characterizations of such threats from environmental to existential and from futuristic (after 2050) to imminent (before 2020). That shift is unlikely until Americans experience a pattern of severe crises that would shift popular perceptions and political attitudes in decisively different directions. No one wants to contemplate the horrific disasters that might drive such a shift in attitudes, especially when the destruction from Katrina and Sandy seem not to have had such an effect on most political leaders.

Political resistance to the recognition of these likely threats is reinforced by a suspicion that those who highlight them are also seeking to justify major government interventions and expenditures, involving severe changes in lifestyles. References to global warming, or even to obvious climate changes, sound to some audiences as code words to justify carbon caps and oil taxes. Therefore this report assumes that such mitigation programs are not foreseeable in time to avoid the climatic, economic, and demographic consequences of current trends. Indeed, it is because these trends will not be changed in time that steps must be taken to adapt to their likely effects. U.S. political and thought leaders need to fulfill their highest responsibility—for the safety of citizens—by beginning to consider a range of risk reduction policies, infrastructure investments, and preparedness strategies, including the necessary legislative and budgetary changes, that might constitute an approach to national security aimed at reducing the direct and secondary consequences of natural disasters. Whether or not the necessary stoic and heroic steps are all politically palatable, the larger arguments for them should at least be actively under current debate. As Stephen Flynn has emphasized, most of these steps would not only reduce U.S. vulnerability to extreme natural events but would also reduce the opportunities for terrorists to exploit the same vulnerabilities.55

How these competing political pressures will play out depends not only on the timing and locations of disasters but also on how soon the growing public perception of our vulnerabilities becomes a political reality. The combination in 2012 of major tornados, midwestern drought, Texas floods, Hurricane Isaac, western wildfires, Arctic ice depletion, and Tropical Storm Sandy could mark the beginning of a sea change in the electorate’s expectations of present and future exposure to natural disasters. In that event, the hardest challenge for U.S. leaders may well be to prevent the country from turning inward to focus on domestic priorities and resisting involvement in the crises of other countries or regions. Such isolationism could be expressed through intensified calls for energy independence, food self-sufficiency, foreign assistance cutoffs, and even military retrenchment. Reversing decades of generosity and pragmatism, donor fatigue and domestic needs could generate a new version of an “America First” constituency that opposes all such international engagement and punishes at the polls any politician who supports it.

Collective Containment

U.S. leaders also cannot ignore the national security implications of the most serious risks of disaster beyond our borders. The safety of U.S. citizens is inextricably bound through the global economy with the course of environmental events in other parts of the world. Disasters or extreme conditions that degrade major agricultural areas (Russian, Australian, or Argentinean wheat fields, Japanese, Burmese, Philippine rice), disrupt for prolonged periods key manufacturing, transportation, or communications infrastructure (greater Bangkok, Bosporus, European airspace), or create immense casualties among large stressed populations (pandemics in Pakistan, Brazil, Nigeria) could affect the stability of entire regions. The severe degradation of a megacity could snowball into wider instability and conflict if not managed collaboratively. The sooner and more deliberately U.S. leaders can articulate geographic, cultural, or economic justifications for targeting scarce assistance, the sooner they are to be persuasive to U.S. citizens.

Political preparation is equally required of other governments and populations. If disasters multiply, U.S. influence with these countries will likely depend on the level of U.S. engagement, generosity, and leadership in promoting a sense of global solidarity through an agenda for collaboration on resilience, relief, and relocation options. For this purpose, the U.S. government will need to complement its domestic security rationale with a compelling diplomatic narrative that advocates the needs and priorities for dealing with events that might otherwise spark major confrontations. The alternative could well be aggressive measures by governments, desperate for necessities, to bypass market allocations or seize supplies by intercepting transports, deploying covert operations, or even initiating outright invasions. A series of functionally focused collaborations to identify and manage key risks could be indispensable to contain the political consequences of future extreme events. Whether the Security Council, the G-20, the World Health Organization, or some new or combined political coalition would be the locus for such negotiated understandings is unclear. But the likelihood is that all international institutions will have to elevate their focus and resources to address disaster scenarios and environmental vulnerabilities.

The security agendas of politicians, policymakers, and intelligence personnel will likely be distracted, for the time being, by perceived dangers from rogue states armed with nuclear weapons, failed states and ungoverned areas as safe havens for terrorists, and economic criminals, such as cyberburglars, unfair traders, and intellectual property thieves. Meanwhile, the safety and prosperity of the United States, as well as peace throughout the world, increasingly will be endangered by unaddressed vulnerabilities to natural disasters and extreme environmental crises. Contention and conflict could also result from the sudden realization—or opportunistic exaggeration—among large groups of alarmed citizens that such vulnerabilities are both existential and irreversible. Given demographic and environmental trends, and the increasing vulnerabilities and probable shortages to be expected within this decade—and certainly before 2030—the threats to the peace from Mother Nature may soon come to dwarf any of the threats posed by mere mortals.

# 2AC

## Supply Chains

#### Antitrust doesn’t reduce inflation.

Van Dorpe 2-8 – Competition Reporter · POLITICO Europe (Simon, Europe wary of following US in using antitrust to fight inflation, PoliticoPro, <https://www.politico.eu/article/europe-wary-us-antitrust-fight-inflation/> 2-8-22)//gcd

Economic evidence

A big issue is the idea of using a traditionally microeconomic tool — antitrust enforcement — to combat the macroeconomic problem of inflation. Inflation is typically the study of macroeconomists focused on monetary policy at the U.S. Fed or the ECB, while antitrust belongs to the realm of the Federal Trade Commission and the Justice Department in the U.S. and the European Commission's competition department in Brussels.

One economist who has sought to bridge the gap between macro and micro in the past years is Jan De Loecker, who has looked into soaring profit margins for companies in increasingly concentrated sectors. The Leuven University scholar said his [research](https://www.janeeckhout.com/wp-content/uploads/26.pdf), published with Jan Eeckhout and Gabriel Unger, showed that "a strong increase in profits and concentration has put competition policy back in focus when it comes to macroeconomic indicators such as wages and productivity."

But escalating market power doesn't always immediately translate into inflation, he explains. "A profit margin or a 'mark-up' is a ratio between a price and a cost. So when your market power and profit increase, that may perfectly happen without a price increase," De Loecker explained. Companies like Amazon or Google, for instance, have been able to reduce their costs due to improved technology or because increases in scale allowed efficiency gains or negotiating better conditions from suppliers.

But the pandemic brought a perfect storm.

Uncertainty about the restart of the economy from the coronavirus shock, short-term capacity constraints and the energy crisis impacted an economy with large concentrations of market power in different sectors, he said. "All of these elements combined will lead to inflation," De Loecker said. "We don't know the weight of each of these factors, but we do know it is plausible that they are all connected and mutually reinforcing."

As he sees it, antitrust traditionally has not been in the mix of responses to inflation, which is usually considered to be a short-term phenomenon. By contrast, an intervention in something like an ownership structure is seen as a longer-term fix. However, recent evidence shows that concentrations of market power play a role in generating inflation, he said. Some examples he cited were energy prices in Belgium and, more specifically, diapers.

A lot of skepticism remains, however.

"The emerging claim that antitrust can combat inflation reflects 'science denial'," former U.S. Treasury Secretary Larry Summers [said on Twitter](https://twitter.com/LHSummers/status/1475230223985786889?s=20). The Washington Post's editorial board similarly [called](https://www.washingtonpost.com/opinions/2022/01/10/white-house-again-offers-bizarre-message-inflation/) the message from the White House "bizarre."

"Lack of competition explains high prices but not a sudden surge in inflation," [said](https://twitter.com/pdegrauwe/status/1489548800200953860?s=20&t=NK3Mv_NDDU8vWTxReveq6g) Paul De Grauwe, a professor in political economy at the London School of Economics.

The European Commission follows this mainstream analysis, but also said in its late January statement that "competition policy can contribute to fighting price increases, to the extent that they are due to anticompetitive conduct." A recent example was the surge in natural-gas prices that began last year, which compelled Brussels in October to [start](https://www.politico.eu/?p=1870754) gathering evidence to see whether gas suppliers, including Russia's Gazprom, were manipulating the market during the ongoing energy price emergency.

For her part, Competition Commissioner Margrethe Vestager often stresses that her interventions will keep prices down for the customers of the specific firms investigated. That narrative certainly didn't fade as price increases accelerated over the past months. When blocking a deal between South Korean shipbuilders this month, Vestager warned that the merger "would have created a dominant position in the market for the construction of large LNG carriers."

"This would have led to less choice, higher prices and ultimately less innovation for European customers," she added.

But the EU executive remains reluctant to follow the U.S. example of proactively pursuing those cases that could most contribute to tackling inflation.

Container shipping, which has seen prices soar by over 700 percent in the past two years, is a prime example. The U.S. Federal Maritime Commission in August followed the White House's advice to [investigate](https://www.fmc.gov/commission-questions-shipping-lines-about-surcharges/) excessive fees charged by a handful of ocean shipping carriers. Despite repeated calls from companies in the maritime logistics supply chain — and a U.N. [report](https://unctad.org/press-material/high-freight-rates-cast-shadow-over-economic-recovery) that the rate increases could drive up consumer prices by 1.5 percent over the next year — the European Commission has yet to open an investigation.

## Smart Cities

## AT: New Affs

## AT: T-Exemptions

### 2AC – AT: T-Exemptions

#### W/M – patents are an exemption, plan narrows it.

Tejas Narechania 15. Julius Silver Research Fellow, Columbia Law School. “Patent Conflicts”. 103 Geo. L.J. 1483. August 2015. Lexis.

The intersection of patent and antitrust provides familiar terrain for the exploration of patent conflicts. The competing scopes of intellectual property rights and antitrust laws have proved to be fertile grounds for research and legal development, 17 as scholars have long wrestled with the scope of a patent's exception to the antitrust laws. Some have argued that the monopoly grant of a patent is absolute, while others have suggested exclusions that may be enforceable in antitrust. 18 In an important work on this relationship, Louis Kaplow hypothesized the effect of two "extreme doctrinal regimes" that could dictate the resolution of conflict between patent and antitrust. 19 In one, antitrust might "reign supreme," with the practical effect of rendering any action by a patentee that violates antitrust law illegal, regardless of whether the action might be authorized by the patent's right to exclude. 20 Alternatively, patent might be thought to have absolute priority over antitrust, thereby granting a patentee permission to use her patent to engage in anticompetitive behavior, so long as such behavior is within the patent's scope. 21

#### W/M – Surge pricing falls outside the scope of antitrust law.

Woodcock ’20 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “Toward a Per Se Rule against Price Gouging,” CPI Antitrust Chronicle; AS]

A. No Antitrust Liability for Price Gouging under Current Law

Do the antitrust laws have the power to punish firms that choose to ration with price, instead of place in line? Price gouging during shortages is an exercise of market power, satisfying one of the two elements required for antitrust liability.34 Price gouging is not driven by cost increases. The only reason sellers can gouge is that neither they nor their competitors can increase supply in the short run, reducing competition and creating power over price. But the anticompetitive conduct element is missing in price gouging.35 A genuine shortage is unexpected, meaning not created by sellers, whether through anticompetitive conduct or otherwise.36 If demand were to outstrip supply because the seller were affirmatively to restrict supply by producing less and taking steps to prevent competitors from filling the gap, then there would be anticompetitive conduct.37 But that is not the context of price gouging.

#### C/I – expand means to make greater.

Terry J. Hatter, Jr. 90, Judge, US District Court, California Central, “In re Eastport Assoc.,” 114 B.R. 686, Lexis

[\*\*10] Second, Eastport asserts that the presumption against retroactivity does not apply because the amendment was intended only as a clarification of existing law. HN7 Where an amendment to a statute is remedial in nature and merely serves to clarify existing law, no question of retroactivity is involved and the law will be applied to pending cases. City of Redlands v. Sorensen, 176 Cal. App. 3d 202, 211, 221 Cal. Rptr. 728, 732 (1985). The evidence in this case, however, does not support the conclusion that the amendment to section 66452.6(f) was simply a clarification of preexisting law. The Legislative Counsel's Digest specifically states that "the bill would expand the definition of development moratorium." Senate Bill 186, Stats. 1988, ch. 1330, at 3375 (emphasis added). Since the Legislative Counsel is a state official required by law to analyze pending legislation, it is reasonable to presume that the Legislature amended the statute with the intent and meaning expressed in the Counsel's digest. People v. Martinez, 194 Cal. App. 3d 15, 22, 239 Cal. Rptr. 272, 276 (1987). By its ordinary meaning, the term "expand" indicates a change in the law, rather than a restatement of existing [\*\*11] law. In light of the Counsel's comment, Eastport's argument is unpersuasive.

#### The “scope” of antitrust law refers to number of types of conductprohibited by antitrust law.

Keith N. Hylton, Professor of Law, Boston University, and Fei Deng, and Consultant, NERA Economic Consulting, ‘7, “ANTITRUST AROUND THE WORLD: AN EMPIRICAL ANALYSIS OF THE SCOPE OF COMPETITION LAWS AND THEIR EFFECTS” Antitrust Law Journal [Vol. 74 2007] https://www.jstor.org/stable/pdf/27897550.pdf?refreqid=excelsior%3A424f12ccaeba1aa8d4150377ebe7192d

We turn our attention now to dominance law – or, in the language of American antitrust specialists, monopolization law. The Dominance Score is an attempt to measure the number of types of conduct specified in a country's competition law as unlawful abuse of a dominant position. For those familiar with American law, the dominance measure is an attempt to measure the scope of laws equivalent to Section 2 of the Sherman Act. One can think of the Dominance Score as the size of the net specifically designed to capture dominant firms that engage in anticompetitive conduct.3

#### Intent to define – this is a table of contents nicety with zero legal meaning. Arbitrary interps move the goal post and are unfair.

Christopher Sagers and Anthony Trufanov 21. Sagers is JD and MPP, Michigan. James A. Thomas Distinguished Professor of Law at Cleveland State University. Truf is Truf. “Antitrust Question.” ADT NU Debate. Dec 6 2021. https://nudebateadt.blogspot.com/2021/12/antitrust-question.html

A. What I Really Think

To me, the problem is that this idea of the "scope" of antitrust has no established legal meaning and very little practical significance. It isn't really used in actual practice and it would rarely have any legal significance in an actual antitrust case. It was a convenient shorthand that I came up with for organizing the materials in that book, and it also had one theoretical value to me, but that's pretty much it. Most antitrust lawyers I've worked with understand it what I meant by it, but it doesn't have any precise meaning or doctrinal significance. I don't think the term was even really used before that book. I almost literally made it up.

So, it sounds like participants in this competition are getting hung up on whether particular exclusions from antitrust liability are issues of "scope" or issues of something else, but I don't believe there is any good reason to worry about it. It almost literally doesn't matter, except maybe in the one theoretical sense that I mentioned. (I'll say something about that in a second.) For example, you mentioned this issue of zero-price products, and your students are evidently asking whether the legality of those things should be thought of as involving "limits" on the "scope" of antitrust. But I find myself asking . . . so what? What difference would it make if that is a matter of "scope" or it is something else?

## AT: K

## AT: States CP

### 2AC – AT: States CP

#### Intellectual property preemption – they’re federal defenses to algorithmic practices that state law can’t circumvent.

Richard Samp 14. Chief Counsel, Washington Legal Foundation. JD from M\*chigan. “The Role of State Antitrust Law in the Aftermath of Actavis”. 15 Minn. J.L. Sci. & Tech. 149. Winter 2014. Lexis, accessed thru Dartmouth.

On the other hand, state antitrust laws--like all state laws--are subject to the restrictions imposed by the Supremacy Clause of the U.S. Constitution, 15 and are impliedly preempted [\*153] to the extent that they conflict with federal law. 16 Such a conflict arises when "compliance with both federal and state regulations is a physical impossibility," 17 or when a state law "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress." 18 On a number of occasions, the Supreme Court has concluded that state antitrust law is preempted because it conflicts with a federal statute other than federal antitrust law. 19

The Court has been particularly quick to find preemption when state antitrust law has an impact on labor law, an area in which federal law is pervasive. 20 Indeed, on at least one occasion, the Court found that a claim arising under state antitrust law was preempted by federal labor law even though the Court concluded that the conduct that gave rise to the state claim could proceed as a claim under federal antitrust law. 21 The Court explained that "Congress and this Court have carefully tailored the antitrust statutes to avoid conflict with the labor policy favoring lawful employee organization, not only by delineating exemptions from antitrust coverage but also by adjusting the scope of the antitrust remedies themselves." 22 The Court said that state antitrust laws "generally have not been subjected to this process of accommodation" and thus that "[t]he use of state antitrust law . . . [must] be pre-empted because it creates a substantial risk of conflict with policies central to federal labor law." 23

Accordingly, in any challenge to a "reverse payment" patent settlement arising under state antitrust law, a court will likely be required to address whether the claim conflicts with the "balance" between federal antitrust law and federal patent law established by the Supreme Court's Actavis [\*154] decision. If such state-law antitrust claims stand as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress in adopting the patent laws, it will be preempted by federal law.

#### IP protections mean firms will refuse to disclose algorithmic details.

Azzutti ’21 [Alessio et al; PhD Candidate in Law, Research Associate at the Institute of Law & Economics @ University of Hamburg; Wolf-Georg Ringe; Professor of Law and Finance; Director of the Institute of Law & Economics @ University of Hamburg; Visiting Professor @ University of Oxford; and H. Siegfried Stiehl; Senior Professor at the Department of Informatics @ University of Hamburg; “Machine Learning, Market Manipulation and Collusion on Capital Markets: Why the 'Black Box' matters,” *University of Pennsylvania Journal of International Law*, 43(1), p. 79-135; AS]

Since AI can help investment firms to optimize their business operations, delegating financial trading decision-making to AI systems can arguably lead to optimized algorithmic manipulation strategies and result in very profitable trading solutions.66 Of course, manipulation can involve significant costs and risks before any profit can materialize.67 Consequently, investing enormous resources to train AI trading systems to learn manipulative strategies, either from historical or simulated examples or through an online observation of market dynamics, might not be worth the financial commitment, given all involved risks at stake (e.g., market, operational, legal, and reputational risks). However, thanks to continuous progress being made in the optimization capabilities of specific ML methods (i.e., deep learning), increasingly autonomous AI trading systems could lead to even trickier manipulative scenarios. Autonomous AI agents could learn and discover both old and new ways to exploit market rules while pursuing their profit-maximizing objectives as an optimal and rational strategy , irrespective of the prior intent of the human developers or users.68 Yet, cases of prosecution for liability for algorithmic market manipulation do not shed much light on the actual degree of autonomy and sophistication of the algorithms employed by malicious actors. As intellectual propriety rights generally protect algorithms’ codes, we cannot expect proprietary trading firms to disclose precious details about the inner functioning of their “black box” ML algorithms and trading techniques. Nevertheless, it seems reasonable to believe that AI can offer malicious actors a broader spectrum of opportunistic strategies with which to game markets. For only this reason, market conduct authorities should start to identify and assess new risks arising from the use of increasingly capable and autonomous AI solutions for financial trading.

#### The CP’s 50 rules results in conflicting standards that permit anticompetitive conduct and overdeter beneficial algorithmic conduct.

Grosso ’21 [Jacob; JD Candidate @ University of Richmond School of Law; “The Preemption of Collective State Antitrust Enforcement in Telecommunications,” *University of Richmond Law Review* 55(2), p. 615-656; AS]

Preemption would address the effects of the growth of federal regulators in the telecommunications market, particularly CFIUS, as well as the resulting changes to the regulatory landscape. If the states act as another national regulator in telecommunications, then innovation, competition, and the ability of federal enforcers to pursue policy goals will be stifled. To solve this problem, collective state antitrust action should be preempted by federal law in the telecommunications market. States likely remain better plaintiffs than consumers in many situations and therefore should litigate on behalf of their citizens. This litigation should be conducted individually, with federal regulatory enforcement generally left to federal regulators.

States should not be prevented from enforcing antitrust law; instead, states should focus exclusively on violations of their own state laws and on protecting their citizens as individual enforcers, not as a collective body. Federal agencies are the proper regulators of national industries such as telecommunications, while state enforcement prevents federal nonenforcement policies which may benefit social welfare overall.253 With respect to policy goals, CFIUS's interventions in recent years showcase the federal government's focus on national security concerns in the telecommunications market. Agendas balancing broader policy goals-such as national security-with competition are only possible under a more centralized enforcement system and by specialized agencies.254

Specialized agencies are therefore the best regulators of the telecommunications market. 25 5 The requirement that "[a]ntitrust analysis must always be attuned to the particular structure and circumstances of the industry at issue" leads to efficiencies from the use of specialized enforcers. 256 The inelasticity of the market and the significant barriers to entry require oversight by specialized expert regulators to maintain a competitive environment, and interference from other government regulators will only impede the ability of the federal regulators to direct this market. Nonenforcement policies, used when the agencies determine doing so is in the best interests of competition, cannot be enforced without a monopoly on enforcement. 257

Placing control in the hands of more centralized regulators reduces uncertainty for competitors due to the inherent inconsistencies in court proceedings and allows for better market functioning. 258 The inability to pursue nonenforcement agendas and reduce litigation will cause unnecessary false positives. False positives can discourage competition and innovation. 25 9 Too many false positives will cause competitors to restrict their behavior drastically to comply with enforcers at the cost of innovative business practices.26 0 Overenforcement and the resulting false positives reduce competition, inviting harm to both the consumer and the aggregate social welfare.26 1 Reduction in states' ability to conduct collective antitrust litigation will naturally decrease the overall amount of litigation, which provides several benefits to competition and to regulators. These benefits include reduced compliance costs, legal fees, and the redistribution of resources. 26 2 Reduced costs will benefit administrative costs, particularly those resulting from the coordination of state agencies. The result is a leaner, specialized enforcement system; increased market freedom due to clear regulations; and the opportunity for regulators to balance broader policy goals with antitrust.

## AT: Civil RICO

### 2AC – AT: Civil RICO

#### Price detection – only the FTC has the expertise to capture price signals to deter and prosecute surge pricing algorithms. The CP generates false positives and negatives that cause supply chains shocks and prevent smart cities development – that’s Beneke, Jarsulic, and

Harrington ’19 [Joseph; Professor in Department of Business Economics & Public Policy @ Wharton School; “Developing Competition Law for Collusion by Autonomous Artificial Agents,” *Journal of Competition Law & Economics*, 14(3), p. 331-363; AS]

The FTC may then have a legal mandate and, in terms of expertise, the FTC could well be the agency most qualified to identify and prosecute collusion in online markets by AAs. In pursuing consumer protection, the FTC has had many cases involving online practices regarding privacy and data security. As noted in its 2016 Privacy & Data Security Update, the FTC has brought enforcement actions relating to “spam, social networking, behavioral advertising, pretexting, spyware, peer-to-peer file sharing, and mobile.”54 Given this developed expertise for online markets and automated processes, the FTC is in a good position to build on that base of knowledge so as to define and enforce a prohibition of collusive pricing algorithms.

#### Other enforcers are useless.

Neil Chilson 20. J.D., GW Law; M.S., computer science, UIUC; B.S., computer science, Harding University. “Does Big Tech Need Its Own Regulator?”. GAI Digital Report. Aug 25 2020. https://gaidigitalreport.com/2020/08/25/does-big-tech-need-its-own-regulator/

B. A New Regulator Would Be Unnecessarily Expensive

Creating an entirely new agency would also be costly in practical dollar terms. Many of these are straightforward administrative costs. Compared to enhancing an existing agency, creating a new agency would have significant start-up costs as well as duplicative ongoing expenses. These costs can be substantial. Money that could be allocated to substantive roles would instead pay for staff and resources that support the substantive work at the new agency. (For example, around 20% of Federal Trade Commission employees are support or management.[120]) And the flip side of starting with a clean slate is that a new agency has little or no experience to draw upon. To the extent the experience that is missing is related to the specific new problems the agency is intended to solve, the new agency is not disadvantaged relative to other agencies. Yet there are many other types of experience, including administrative procedures, human relations, press relations, litigation, and others where a new agency will need to build institutional competencies.

More substantively, creating a new agency with a mission and jurisdiction that overlaps with one or more existing agencies will incur several other types of costs. If both agencies retain jurisdiction, there will be coordination costs on future investigation, enforcement, and regulation. If the new agency displaces the old agency’s jurisdiction, there will be the cost to transfer knowledge and talent from the old agency to the new one.

This overlap cost is highest for the broad proposals like Feld’s and the Stigler Center, which envision a new agency that comprehensively regulates the subject companies on everything from privacy to antitrust to content moderation. Given that there are already agencies that specialize in many of those issues, the overlap will be significant and eliminating or accommodating it will be costly.

For example, the Federal Trade Commission has for twenty years been the primary federal protector of consumer privacy, bringing hundreds of enforcement actions, including against many of the biggest tech companies.[121] If, as the Stigler Center report suggests, a new regulator would address these issues for the biggest tech platforms, there would be a complicated series of negotiations necessary to hand off governance from the FTC to the new agency. Transferring personnel from the FTC to a new agency would create its own problems. For example, because the FTC is responsible for enforcing privacy across the entire economy, cannibalizing its staff to create an agency focused only on the privacy of some subset of internet companies would leave the FTC shorthanded as it protects privacy in every other sphere of the economy.

Conclusion

I noted early on in this chapter that these proposals were generally ambivalent about creating a new agency. It turns out this is for good reason: there are few benefits and significant risks. A new agency may have a mild comparative advantage in procedural expertise if an entirely new regulatory approach is adopted. Still, it will be very difficult to find that expertise and establish a focused mission for a regulator of such a diverse and dynamic collection of companies. To the extent additional expertise is needed for regulation, it can more easily and more efficiently be placed in existing agencies, especially generalist agencies. Perhaps most importantly, a new agency specialized on big tech would be more vulnerable to capture than existing generalist agencies. And finally, the practical costs of creating and maintaining a new agency would be higher than enhancing existing agencies.

In short, “big tech” might need new regulation; but it does not need a new regulator

## AT: Adv CP

## AT: Stocks DA

### 2AC – AT: Stock Market

#### Surge pricing profits aren’t being used for investment and innovation – economy-wide and international comparative data proves.

Philippon ’20 [Thomas et al; Max L. Heine Professor of Finance @ Stern School of Business NYU; Additional Authors: Germán Gutiérrez Matias Covarrubias “From Good to Bad Concentration? US Industries over the Past 30 Years” NBER Marcoeconomics Annual 34 p. 1-5]

We analyze the evolution of concentration in US industries over the past 40 years. Figure 1 summarizes the four stylized facts that motivate our work. Concentration and profits have increased, while the labor share and investment have decreased (fig. 1a–1d, respectively).1 This is true across most US industries as shown by Autor et al. (2017a; labor shares), Gutiérrez and Philippon (2016; investment and profits), and Grullon, Larkin, and Michaely (2019; concentration and profits). Although these stylized facts are well established, we are still far from consensus on what is causing them and what they tell us about the health of the US economy. The most prominent explanations can be organized in two groups:

• Good concentration: The observed trends may be explained by good sources of concentration, such as increases in the elasticity of substitution (henceforth j) or technological change leading to increasing returns to scale and intangible capital deepening (henceforth g). Autor et al. (2017a, 180) argue for j, noting that concentration reflects “a winner take most feature” explained by the fact that consumers have become more sensitive to price and quality due to greater product market competi- tion. Haskel and Westlake (2017) argue for g, emphasizing how scal- ability and synergies of intangible capital can lead to increasing returns to scale. Under j and g, concentration is good news: more productive firms expand yet competition remains stable or increases.

• Bad concentration: Alternatively, the trends may reflect bad sources of *concentration*, which we summarize as rising barriers to competition (henceforth k).2 Furman (2015, 12), for example, shows that “the dis- tribution of returns to capital has grown increasingly skewed and the high returns increasingly persistent” and argues that it “potentially re- flects the rising influence of economic rents and barriers to competition.”3

According to k, concentration is bad news: it increases economic rents and decreases innovation.

The goal of this paper is to differentiate between these explanations at the aggregate and industry level. Before discussing our approach and re- sults, however, it is important to clarify three points. First, these hypoth- eses are not mutually exclusive. Leaders can become more efficient and more entrenched at the same time—which can explain their growth but also the rise of barriers to entry (Crouzet and Eberly 2018). Indeed, a com- bination of these explanations is often heard in the discussion of internet giants Google, Amazon, Facebook, or Apple.

Second, intangibles can play a role in all theories. They may increase the elasticity of substitution (e.g., through online price comparison), in- crease returns to scale (e.g., organizational capital), and also create bar- riers to entry (e.g., through patents and/or the compilation of Big Data).

Third, these specific patterns are unique to the US. Figure 2a shows that profits margins have increased in the US, but they have remained stable or decreased in Europe, Japan, and South Korea. Figure 2b shows that concentration has increased in the US but it has remained roughly stable in Europe and Asia.4 Last, figure 2c shows that the labor share has declined in the US, but it has remained stable in Europe since 2000.5 Assuming that all advanced economies use similar technologies, the unique- ness of US trends suggests that technology alone cannot explain the trends.

Approach. We begin by using a sequence of simple models to clarify the theories of good and bad concentration. We derive a broad set of predictions regarding the joint evolution of competition, concentration, productivity, prices, and investment under each theory. We then evaluate these predictions empirically, first at the aggregate level, then at the industry level. Although some of these predictions have been studied by the literature, we contribute new facts/results for each of them. We also clarify several measurement issues and, perhaps more important, we show how the combination of all the facts helps us differentiate good and bad concentration.

Aggregate results. Table 1 summarizes our aggregate results. It contrasts the theoretical prediction of theories of good and bad concentration against the observed evolution of each measure.6 Predictions in the right column are consistent with the data after 2000. Predictions in the middle column are not.

According to theories of good concentration, the growth of large firms is an efficient response to technological change. Under j, competition in- creases as consumers become more price elastic. More productive firms expand to capture a larger share of the market, while less productive firms either shrink or exit. Economic activity reallocates toward more productive firms, increasing industry-level productivity and decreasing prices. Under g, technological change leads to increasing returns to scale. Large firms again respond by expanding, which increases concentration and productivity while decreasing prices. The productivity gap between small and large firms grows.

If the economy experiences good concentration, we should observe: (i) concentration driven in part by exit; (ii) concentration associated with higher productivity and lower prices; and (iii) stable or increasing investment rates relative to Tobin’s Q—particularly for leaders. If the in- crease is driven by j, we should also find higher volatility of market shares as demand responds more strongly to cost shocks. If the increase is driven by g, however, the prediction could flip: volatility of market shares could fall as leaders’ comparative advantages become (potentially) more persistent (e.g., Aghion et al. 2019).

We already know that j and g are important for certain industries during certain periods. For instance, they describe well the evolution of the retail industry from 1990 to 2005 (Basu et al. 2003; Blanchard 2003). The rise of superstores and e-commerce led to more price competition, higher concentration, higher productivity, and the exit of inefficient retailers (Hortacsu and Syverson 2015). The question is whether these theories explain the evolution of the economy as a whole over the past 30 years. We test these predictions in the data and find some support for them during the 1990s. During this period, concentration is correlated with ris- ing productivity, falling prices, and high investment, particularly in in- tangibles. Since 2000, however, these predictions are rejected by the data. The correlation between concentration and productivity growth has become negative, while the correlation between concentration and price growth has become positive; exit rates have remained stable; investment relative to Q has fallen; and market shares have become more persistent. Estimates of returns to scale based on the methodology of Basu, Fernald, and Kimball (2006) have remained stable, as have other estimates in the recent literature (Ho and Ruzic 2018; Diez, Fan, and Villegas-Sanchez 2019). All these predictions are consistent with the k theory.

Barriers to competition therefore emerge as the most relevant explanation over the past 15 years. It correctly predicts the evolution of prof- its, entry, exit, turnover, prices, productivity, and investment in most industries.

#### Stock market valuation is completely detached from the real economy. Their impact doesn’t access inequality or the larger economy, it reflects it.

Phillips ’20 [Matt; Covers Financial Markets for NYT; https://www.nytimes.com/2020/05/10/business/stock-market-economy-coronavirus.html]

The stock market looks increasingly divorced from economic reality.

The United States is on the brink of the worst economic collapse since the Hoover administration. Corporate profits have crumpled. More than a million Americans have contracted the coronavirus, and hundreds are dying each day. There is no turnaround in sight.

Yet stocks keep climbing. Even as 20.5 million people lost their jobs in April, the S&P 500 stock index logged its best month in 33 years. After a few weeks of wild swings, the market is down a mere 9.3 percent this year and 13.5 percent from its peak — what most investors would consider a correction. On Friday, after the government released the staggering unemployment figures, the S&P 500 closed up 1.7 percent.

Conventional wisdom would explain the market’s comparatively modest losses this way: Since markets tend to be forward-looking, investors have already accounted for what’s expected to be a cataclysmic drop in second-quarter activity and are forecasting a relatively rapid economic recovery afterward. The Federal Reserve’s actions have also bolstered investors’ confidence that the bottom won’t fall out of the market.

But the pandemic has also highlighted a deeper trend. For decades, the market has been growing increasingly detached from the mainstream of American life, mirroring broad changes in the economy.

“Wall Street has very little to do with Main Street,” said Joachim Klement, a market analyst at Liberum Capital in London. “And less and less so.”

Still, the market retains its grip on the collective imagination. From politicians and corporate executives to mom-and-pop investors, Americans have long relied on the stock market as a proxy for the U.S. economy — for reasons that are partly historical. Its crests suggested bright days ahead, while its troughs suggested a darkening outlook. The current economic fallout, however, could snap any illusions that the logic of the market is derived, in any consistent way, from real-world events.

Part of the reason is the makeup of the stock market, and the fact that the giant companies that make up the S&P 500 operate under very different circumstances than the nation’s small businesses, workers and cities and states. They are highly profitable, hold significant sums of cash and have regular access to public bond markets. They’re far more global than the typical American family firm. (Roughly 40 percent of the revenues of S&P 500 companies come from abroad.)

In 2015, about 600,000 U.S. companies counted at least 20 employees, and only 3,600 of those — or less than 1 percent — were publicly listed, said René Stulz, a professor of finance at Ohio State University, who has studied the changing composition of publicly traded markets.

Because the financial strength of big companies makes them more likely to survive the downturn, their share prices tend to underplay the impact of a widespread economic collapse. In fact, market indexes like the S&P 500 are weighted to reflect the performance of the largest and most profitable companies. In recent weeks, the stocks of such companies have not only veered in the opposite direction of the outlook for the U.S. economy, but from the rest of the stock market itself.

The five largest listed companies — Microsoft, Apple, Amazon, Alphabet and Facebook — have continued to climb this year, as investors bet these behemoths will emerge in an even more dominant position after the crisis. Through the end of April, these companies were up roughly 10 percent this year, while the 495 other companies in the S&P were down 13 percent, according to Goldman Sachs analysts. These highly valued firms — Microsoft, Amazon and Apple are each worth more than $1 trillion — now account for one-fifth of the market value of the index, the highest level in 30 years.

“It’s very easy to get confused by looking at the S&P doing well and that being driven by a relatively small subset of firms which aren’t really affected by this virus and actually gain from it,” said Mr. Stulz.

Nor does the mood of the market necessarily reflect the sentiment of a broad swathe of Americans. While U.S. stock markets are more democratic than most, with more than half of American households owning shares or investment funds like mutual funds, the overwhelming majority of stock accounts are relatively modest. Rather, stock ownership is heavily skewed to the richest segments of the population, who are least likely to feel the pain of an economic downturn**.**

“Stock ownership among the middle class is pretty minimal,” said Ed Wolff, an economist at New York University who studies the net worth of American families. He added: “The fluctuations in the stock market don’t have much effect on the net worth of middle-class families.”

In fact, a relatively small number of wealthy families own the vast majority of the shares controlled by U.S. households.

The most recent data from the Federal Reserve shows that the wealthiest top 10 percent of American households own about 84 percent of the value of all household stock ownership, according to an analysis by Mr. Wolff. The top 1 percent controlled 40 percent of household stock holdings.

Economists who have studied the performance of stock markets over time say there’s relatively little evidence that economic growth matters to the outcome of the market at all.

“The linkage is actually pretty weak,” said Jay Ritter, a finance professor at the University of Florida who has studied the long-run relationship between economic growth and market returns in world markets. “In the longer run, the relationship is, empirically, it’s not there.”

#### Market power doesn’t benefit shareholders.

Lande ’20 [Robert; Professor of Law @ University of Baltimore School of Law and Sandeep Vaheesan; Legal Director @ Open Markets Institute, JD @ Duke; “Preventing the Curse of Bigness Through Conglomerate Merger Legislation,” *Ariz. St. LJ* 52; AS]

B. Shareholders of the Resulting Firm Often Suffer Significant Losses

A final basis for rejecting any general claims that mergers are generally desirable is that many empirical examinations of the results for shareholders show that on average the buyer and its investors suffer losses, not gains. In 1992, a major study, covering more than thirty years of mergers among publicly traded companies, reported that the surviving firm on average lost about ten percent of its value over a period of five years.150 Another group of researchers reported that the acquired businesses tended to suffer reduced profitability and loss of market position. 151 In 2012 alone, publicly held companies wrote off $51 billion dollars because of bad mergers.152

Other research is consistent with these findings. A comparison of successful buyers to the losing bidder in a corporate buyout found that the buyers had worse results over time than the unsuccessful bidders.153 In 2010 McKinsey reported: “Anyone who has researched merger success rates knows that roughly 70% of mergers fail.” 154 An article in the Harvard Business Review observed that “study after study puts the failure rate of mergers and acquisitions somewhere between 70% and 90%.”155 The basic point being that buyers have a tendency to overpay and not to realize the gains that they claimed to expect. Even the co-author of a leading article claiming acquisitions resulted in significant premiums for the buyer subsequently recanted and conceded that there were “significant negative returns . . . following a merger.”156

Thus, measured by stock market results most large mergers are not in fact very helpful to the development of economic efficiency, innovation, or other consequences that are desirable from the perspective of the public interest. It follows that stronger anti-merger legislation does not create a significant risk of substantial loss of desirable economic outcomes.

Mergers’ “disappointing results are . . . consistent with the repeated observation that many motivations for merger are largely disconnected from achieving economic efficiency despite what the promoters may assert in securities filings and press briefings.”157 A “publicly held corporation faces very substantial agency problems.”158

The shareholders are largely powerless when ownership is widely dispersed. The board of directors, the agent of the shareholders, is usually under the control of management, which in turn can shape both buying and selling decisions to serve its strategic interests. Moreover, third parties, takeover funds, legal and financial advisers, can and do reap benefits from promoting such transactions even when the result for the enterprise is negative. Hence, many major mergers arise from motivations unrelated to increased efficiency.159

For all these reasons the purchase and sale of large corporations does not consistently advance desirable economic results. These results should encourage Congress to seriously consider new anti-merger legislation.

#### Turn – competition increases stock value.

Van Loo ’20 [Rory; Associate Professor of Law @ Boston University; “In Defense of Breakups: Administering a "Radical" Remedy,” *Cornell Law Review* 105(7), p. 1955-2022; AS]

How might breakups fail to harm shareholders even while improving competition? Maintaining a monopoly can be expensive. 230 Instead of focusing on defensive protection of a dominant market position, firms in a competitive industry pursue greater adaptability and innovation. 23 1 That renewal has the potential to grow the industry at a faster rate than in an industry dominated by a monopolist. Faster-moving companies may be even more important in light of the increasing pace with which technologies are requiring companies to adapt.232

Agency theory and organizational psychology help to explain this conundrum of effective antitrust breakups still increasing shareholder value. Senior managers have often pursued growth, especially through mergers and acquisitions, even when growth would not improve the company's value. 233 Yet many companies hold those acquisitions even after it is clear that they were failures, only divesting them when forced to do so by shareholders. 2 34 Agency theory helps explain how these divestitures demonstrate a misalignment of incentives: managers' compensation may depend on the size of the company, whereas owners care more about profit. 235 Or executives may direct a large share of the monopoly rents toward salaries while the shareholders' portion does not offset the corresponding costs.236

Because the design of executive compensation structures has improved, CEOs' motivation to grow counterproductively is presumably lessened today compared to decades ago. 237 Moreover, increasing external pressures on managers-including from activist shareholders 238-have presumably made it more likely managers will pursue value-creating divestitures. Nonetheless, the agency problem persists.239 There is also some evidence that organizational inertia and emotional factors may cause companies to hold onto assets that they would economically benefit from divesting. 240

Another way of conceptualizing the potential benefits to shareholders is to view antitrust breakups as a tool of corporate governance to push executives away from self-serving acquisitions. 24 1 A primary goal of corporate law is to align the incentives of shareholders and managers by, for instance, imposing a fiduciary duty on managers. 242 Yet it is costly for shareholders to monitor and influence their agents in the firm-managers and directors-which helps explain why "[t]he problem of managerial agency costs dominates debates in corporate law."243 By discouraging managers from pursuing growth that harms shareholders, or by encouraging beneficial divestitures, antitrust enforcers may benefit shareholders by addressing some harmful effects of high agency costs.

It is unclear what percentage of breakups would add value to shareholders by solving agency costs or otherwise improving the firm's performance. But recent empirical evidence indicates that when CEOs propose mergers, "there is a very large thumb on the scale that pushes all deals toward approval." 2 4 4 It is plausible that a substantial portion of antitrust breakups would not harm shareholders, and many may even benefit them. Of course, it is not, and should not be, the goal of antitrust to break up a company to bring shareholders unrealized gains. Still, the evidence available suggests that any resistance to breakups out of concern for significant harm to shareholders rests on weak foundations.

Despite the absence of evidence of extreme harm to shareholders in the past, to the extent that a monopoly is earning considerable profits from its market dominance, lower stock value would be expected following at least some effective breakups. Putting aside for now the questions surrounding deterrence and fairness, 245 what does the private sector literature on divestitures add to this issue?

As the primary tool for assessing corporate law and antitrust, efficiency would presumably weigh heavily in the comparison of shareholder interests to consumer welfare. 2 4 6 Antitrust laws arguably already prioritize consumer welfare over the monopoly owners' interests.247 To that preexisting hierarchy, this Article has illuminated another efficiency contributor omitted from those analyses: Breakups can help ensure that managers only retain "assets for which [their firms] have a comparative advantage and sell assets as soon as another party can manage them more efficiently." 248 That additional efficiency consideration further weakens the argument for letting shareholder harm obstruct breakups.

## AT: Axon DA

### 2AC – AT: Axon DA

#### Avalanche of rulemaking now

Conley 22 – Stephen Conley, Wiley Rein LLP attorney, “‘An Avalanche of Rulemakings’ – The FTC Gears Up for an Active 2022,” 1/19/22, https://www.jdsupra.com/legalnews/an-avalanche-of-rulemakings-the-ftc-1324181/

On December 10, 2021, the Federal Trade Commission (FTC) published its Annual Regulatory Plan for 2022 – the first under FTC Chair Lina Khan – noting that it “will consider developing both unfair-methods-of-competition rulemakings as well as rulemakings to define with specificity unfair or deceptive acts or practices.”[1] Among other rulemakings, the Annual Regulatory Plan notes that the FTC is considering a Trade Regulation Rule on Commercial Surveillance to stop “lax security practices,” limit “intrusive surveillance,” and ensure “that algorithmic decision-making does not result in unlawful discrimination.”[2]

The release of an expansive agenda comes just months after the agency streamlined its Rules of Practice under Section 18 of the FTC Act and created a new rulemaking group within the FTC’s Office of General Counsel, to expedite otherwise cumbersome rulemaking requirements under the Magnusson-Moss Act. While these procedural maneuvers will allow the FTC to increase the pace of the rulemaking process, many of these measures will likely require the support of three Democratic Commissioners, and the agency is currently in a 2-2 partisan deadlock pending the confirmation of nominee Alvaro Bedoya.

The FTC Cites ‘Changed Circumstances’ as a Catalyst for Rulemaking

The FTC’s Annual Regulatory Plan identifies “changed circumstances” in 2021 as the impetus for the agency to promulgate new competition and consumer protection rules. Specifically, the FTC identifies the U.S. Supreme Court’s decision in AMG Capital Mgmt., LLC v. FTC as a key turning point that has hampered the agency’s enforcement capabilities. As we discussed in greater detail here, that decision interpreted Section 13(b) of the FTC Act to not provide the FTC with the authority to seek restitution or disgorgement in federal court. The agency had historically relied on Section 13(b) to seek monetary penalties in a wide range of cases involving unfair or deceptive practices. However, if the FTC adopts a rule outlawing certain practices, it can still seek monetary penalties for violations of the rule under a separate part of the FTC Act.

Another key catalyst mentioned by the FTC in the Annual Regulatory agenda was a “case-by-case approach to promoting competition,” which has purportedly proven “insufficient.”[3] According to the FTC, this approach has resulted in “a hyper-concentrated economy whose harms to American workers, consumers, and small businesses demand new approaches.”[4]

FTC Plans to Initiate Consumer Protection and Competition Rulemakings

To address perceived market concentration across the economy, the FTC under Chair Khan plans to examine how to define “unfair methods of competition” under Section 5 of the FTC Act in an attempt to root out perceived anticompetitive practices. In addition to the proposed Trade Regulation Rule on Commercial Surveillance, the FTC is also actively seeking comment on the following:

A rule targeting business and government impersonation fraud – as discussed in another article in this issue, the FTC recently released an Advanced Notice of Proposed Rulemaking (ANPRM) targeting rising government and business impersonation fraud committed via telephone calls, text messages, and other forms of communication. Comments on the ANPRM are due February 22.

A rule requiring reporting of security incidents by covered financial institutions – as described in greater detail here, the FTC is seeking comment on a Supplemental Notice of Proposed Rulemaking (SNPRM) that would require covered financial institutions to report certain security incidents to the FTC within 30 days of the date of discovery. The rulemaking would further amend the FTC’s Safeguards Rule under the Gramm-Leach-Bliley Act. Comments on the SNPRM are due February 7.

A petition from Accountable Tech proposing that the FTC promulgate rules to prevent “surveillance advertising,” or the practice of displaying ads to individual consumers based on inferences about their interests, demographics, or other characteristics inferred from their activities over time. Comments on the Accountable Tech Petition are due January 26.

A petition from the Institute for Policy Integrity asking the FTC to regulate “drip pricing.” The petition describes “drip pricing” as “the practice of advertising only part of a product’s price upfront and revealing additional charges later as consumers go through the buying process.”

Importantly, the Annual Regulatory Plan also took note of President Biden’s Executive Order on Promoting Competition in the American Economy. As we discussed in greater detail here, the Executive Order encouraged the FTC to exercise its statutory authority to address a number of competition issues. In the Annual Regulatory Plan, the FTC stated that it will “explore the benefits and costs” of several of the Executive Order’s rulemaking proposals for the agency, including “surveillance, the right to repair, pay-for-delay pharmaceutical agreements, unfair competition in online marketplaces, occupational licensing, real-estate listing and brokerage, and industry-specific practices that substantially inhibit competition.”[5]

FTC Commissioner Christine Wilson dissented from the Annual Regulatory Plan, arguing that it “extends far beyond” the agency’s routine review of existing rules and that many of the existing rules “should be abolished in any event.”[6] She further characterized the Annual Regulatory Plan as ushering in “an avalanche of rulemakings” and rejected Chair Khan’s depiction of the economy as being “hyper-concentrated.”[7] Indeed, in a subsequent statement made at the agency’s December 16 Open Meeting, Commissioner Wilson referred to the FTC’s 2022 agenda as a “Rule-a-Palooza.”[8] Commissioner Wilson’s dissent signals likely uniform Republican Commissioner opposition to most of the agency’s planned rulemakings, leaving the body in a 2-2 Democrat-Republican split on many of the proposals. That said, proposals like the Safeguards Rule SNPRM have drawn some bipartisan support and may point to some additional rulemaking even without a fifth Commissioner.

#### Challenges to rulemaking would be swiftly struck down.

Kades & Morton ’21 [Michael; Washington Center for Equitable Growth; and Fiona; Yale University; “Interoperability as a Competition Remedy for Digital Networks”; *Washington Center for Equitable Growth Working Paper Series*; AS]

C. Rule-Making Process

It is unlikely that the rule could be challenged until it was applied in a specific case because no one would have standing. To challenge an agency rule, the plaintiff must allege it has suffered injury in fact that is “(a) concrete and particularized, and (b) actual or imminent, not conjectural or hypothetical.”96 Until the Commission determines a company has violated the Federal Trade Commission Act, it has not suffered any harm. Nor is a company likely to argue that it is in imminent danger because its current behavior violates the law.

When the rule has been applied in a specific case, it will likely have been tailored to the specific circumstances. The review would focus on the actual order issued in the case, which would depend on the record in the specific case. Nevertheless, we consider whether the rule would be upheld on its own, which could occur in two situations. First, if a court found standing. Second, in a particular litigation, a party might challenge the default order under the Administrative Procedure Act (APA) and argue that because the default order is inappropriate, the specific remedy must be vacated. In our view, in either situation a court would likely uphold the rule.

The validity of the proposed rule would depend on whether it satisfies the requirements of the APA. Notice and Comment rulemaking is well established under the APA and gives the Commission flexibility in developing a rule. At a minimum, the Commission would need to issue a Notice of Proposed Rule Making, take comments, and issue a final rule that includes a statement of the rule’s purpose and the basis for the rule.97 The Commission could hold workshops or even a hearing if it felt that would be helpful.

A court can vacate the rule if it is “arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with the law,”98 “is in excess of statutory jurisdiction, or authority, or limitation, or short of statutory rights”99 or “without observance of procedure required by law.”100 These concerns are unlikely to be valid in our setting. Although there is dispute as to how stringent judicial review under the APA is, courts do not second guess the agency’s determination. As long as the FTC’s rule reflects the evidence in the record, employs acceptable reasoning, addresses concerns, and considers alternatives, the rule should not be found to be arbitrary and capricious. As the discussion above illustrates, there is already a rich academic and policy discussion on the types of anticompetitive harms that can occur in digital markets and how to address them.101

#### No Korea war.

Post ’21 [Daniel; 1/29/21; PhD Candidate in IR @ Brown University; “Deterring North Korea,” <https://warontherocks.com/2021/01/deterring-north-korea/>]

With these principles in mind, can deterrence continue to work vis-a-vis North Korea? In short, yes. Throughout the evolution of the U.S-North Korean deterrence relationship, vulnerability has played an important role in the nuclear strategies and policies of both sides. The vulnerability of U.S. allies and assets in the region to North Korea’s intermediate-range missile and artillery barrages has almost certainly been a check on a more aggressive U.S. strategy, whether geared toward nonproliferation or regime change. It is certainly plausible that in the absence of this vulnerability the chances of the U.S. preventively attacking North during the Trump administration would have been higher, especially considering the extremely hawkish views of his national security adviser in 2017. As a result of this vulnerability, the U.S. routinely demonstrates its dedication to security agreements with allies in word and deed. Strategic bomber flights and military exercises, for example, demonstrate to North Korea their own vulnerability to U.S. and allied power in the region. Conversely, although the Kim regime would like nothing more than to unify the Korean Peninsula under North Korean leadership (dubbed the “holy grail of North Korean statecraft” in a recent report), it has refrained from overt and aggressive military action in pursuit of this goal. There is no doubt that Kim, like his predecessors, is wary of such behavior in the face of U.S. and allied military capabilities. Today, North Korea remains vulnerable to U.S. nuclear attacks, while the United States and its regional partners remain vulnerable to nuclear attack or retaliation from North Korea. This mutual vulnerability necessitates caution on both sides.

Recent progress in North Korean missile technology have made portions of the U.S. mainland vulnerable, giving the U.S. further reason to avoid unnecessary provocation. In 2017, North Korea conducted several tests of intercontinental ballistic missiles, two of which demonstrated the capability to potentially reach the continental United States. More recently, North Korea has successfully tested a submarine-launched ballistic missile and has showcased a new and larger submarine-launched ballistic missile at a recent parade. As a result, the United States continues to invest significantly in homeland missile defense, as well as to deploy missile defenses to defend allies and assets in the region. Missile defenses likely contribute to increased feelings of vulnerability among Kim’s regime, which may see the build-up as a prelude to a military offensive. Though imperfect, these attempts to reduce vulnerability enhance deterrence by potentially denying North Korea the expected military gains from a limited missile attack, even as fully effective missile defenses might contribute to strategic instability. Regardless of their effectiveness, Kim will have to factor in these defensive capabilities when assessing the success of engaging in conflict and will question the ability to achieve even limited goals through limited means. For example, in order to ensure the success of a missile attack, Kim would have to increase the size of the salvo in order to compensate for missiles likely to be shot down by U.S. and allied defenses. But knowing that a larger initial attack would be perceived as particularly aggressive and would likely invite a larger counter-attack, he might be deterred from pursuing whatever limited gains a smaller attack might have achieved. From Kim’s perspective, U.S. military capabilities are more than sufficient to make military success for North Korea in any conflict appear difficult and costly. Vulnerability to severe retaliation and punishment from U.S. strategic forces is also currently unavoidable for Kim. In fact, this very vulnerability has driven the North Korean nuclear program toward a capability to directly threaten the U.S., thereby demonstrating its own acknowledgement of vulnerability. In sum, both sides are vulnerable to each other. Most importantly for U.S. decision-makers, there is no likely development in the near to medium term that might remove this sense of vulnerability from Kim’s mind.

There is also great uncertainty in the nuclear capabilities and red lines of each side, in particular concerns about what might cause Kim to feel existentially threatened, and concerns over what might trigger the United States to exercise nuclear defense on behalf of its allies in the region. Kim consistently expresses concerns about regime survival and fear of a U.S. attack, and recent U.S. regime change operations in other states only strengthen this fear. While the United States should be careful not to inadvertently increase this threat level to a point where Kim believes he must start a major war, the threat of nuclear retaliation should be maintained. Such a scenario is far from implausible (nuclear scholar Jeffrey Lewis sketches out a hypothetical nuclear war between North Korea and the United States in a recent novel). Missile defenses also add an important element of uncertainty to the relationship. Uncertainty about the effectiveness of these systems should induce caution on both sides because neither can be completely sure about how effective the systems will be (though these systems may also strengthen resolve on the part of the U.S. if deemed very effective, as Robert Powell suggests). Although the United States has been clear in its statements regarding North Korean nuclear use, for example stating in the 2018 Nuclear Posture Review that “there is no scenario in which the Kim regime could employ nuclear weapons and survive,” uncertainty remains about which actions beneath the nuclear threshold might trigger a larger response. This uncertainty will undoubtedly induce caution in even lower-level conflict behavior. The U.S. explicitly includes some level of ambiguity and uncertainty in its declaratory statements, such as when describing possible conditions for nuclear use, saying, “Significant non-nuclear strategic attacks include, but are not limited to, attacks on the U.S., allied, or partner civilian population or infrastructure, and attacks on U.S. or allied nuclear forces, their command and control, or warning and attack assessment capabilities.” This type of statement leaves plenty of room for adversaries to question what might trigger a response and makes any aggression against the U.S. or its allies a risky proposition.

Last, both Kim and leaders in the United States and its allies appear to remain rational actors despite recent bombastic behavior and inflammatory rhetoric (which may be plausibly attributed to clumsy signaling attempts). Kim may be a cold and brutal oppressor, but his behavior should be seen as quite rational if you make the very supportable assumption that, like most political leaders, his primary goal is keeping his regime alive and keeping himself in power. As others have noted, “Kim is a tyrant, but I don’t think he is suicidal.” Kim continues to build and enhance his nuclear weapons capability in reaction to real and proximate threats to his very survival. The United States frequently conducts exercises with South Korea and Japan, and North Korea frequently decries these exercises as hostile and reckless. Kim sees these exercises as practice events for an eventual attack on North Korea. The United States has also stationed missile defense capabilities in South Korea and Japan, as well as on ships in the region. Kim’s continued pursuit of enhanced nuclear capabilities in response is as rational as it is for the U.S. to want to mitigate its own vulnerability. Frequent military deployments to the region, and overflights of U.S. strategic (nuclear capable) bombers also serve to enhance the perception of threat on behalf of Kim. These security dilemma dynamics have certainly contributed to Kim’s rational pursuit of an enhanced nuclear weapons capability. On top of these very visible military measures, recent dramatic increases in hostile rhetoric from former President Donald Trump, such as his “fire and fury” remarks, have only served to solidify Kim’s perceived need for a nuclear deterrent to potential U.S.-backed regime change. Of course, deterrence requires clear communication and credibility, which includes demonstrating capability. Kim is well aware that if he were to engage in any sort of large scale aggressive military behavior against his neighbors, this could spell the end of his regime. He also has no reason to doubt the U.S. capability and opportunity to respond to threats from North Korea. Assuming, as I do above, that Kim desires to remain the leader of his country and to preserve his regime, he has little incentive to test the U.S. nuclear deterrent. Whether his eccentric and brutal behavior leads to some other inadvertent escalation is a different question. As far as U.S. leaders are concerned, assuming Kim is rational enough to know what he wants and to recognize how he can lose it seems to be a safe bet.

## Extra

### 2AC – Electricity

#### Surge pricing lets arsonists run the fire brigade – Texas blackout proves. Incentives to rapidly inject supply occur only after supply has been intentionally restricted to create an artificial shortage.

Ballouz ’21 [Hala Joel Mathias; Sean Meyn, Robert Moye, and Joseph Warrington; President, Electric Power Engineers, Austin, Texas Department of Electrical and Computer Engineering, University of Florida; “Reliable Power Grid: Long Overdue Alternatives to Surge Pricing,” arXiv preprint arXiv:2103.06355]

The term surge pricing is a synonym for critical peak pricing (CPP) at the distribution level, and real time prices at the transmission level (such as those that made headlines in February of this year during the crisis at ERCOT). The article [1] presents analysis and evidence from prior literature to explain why dynamic prices do not achieve the goals claimed by power economists. Some influential academics and some in industry believe that dynamic prices will incentive investment by generators, and also curtailment by consumers when required. The Energy Policy Act of 2005 promoted this idea and made the case for real time prices to consumers. The arguments are compelling and convincing to anyone who has taken an introductory economics course, covering supply-demand curves and the theory of marginal cost pricing. These arguments have permeated the power sector. One example is from ten years ago in Texas: after a sequence of near blackout conditions at ERCOT in 2011, the PUCT determined that increasing the price caps in the wholesale market would incentivize investment by generation companies, and thereby enhance reliability. Over the years that followed, the price cap was gradually raised from $3,000/MWh to its current $9,000/MWh.

The belief that price-signals will solve our infrastructure challenges is fundamentally flawed:

• Incentive requires crisis: the generation companies will receive rewards only during a crisis. This year, the causes of the crisis at ERCOT were multi-fold, including lack of fuel supply. What value was a rise in payments from $30/MWh to $9,000/MWh? Even if the generation companies could have predicted the crisis, their best response will be based on maximizing profits based on their own business plan. How can we be sure that these decisions will lead to an acceptable outcome for Texans?

• The promotors of surge pricing confuse two fundamentally different concepts: operating reserves and installed reserves. The former is used (in part) to determine surge prices under scarcity conditions, but these reserves are based largely on decisions made by the grid operator; a miscalculation can result in massive transfers of wealth.

• Sufficient installed reserves and supporting infrastructure is essential for a resilient power grid. This requires longterm planning and coordination with all stakeholders.

• Consumers do not value power: a major flaw in supply-demand curve analysis is that the relationship between electric power and the ultimate use of electricity are only loosely related for the majority of electric loads. The use of surge pricing will eventually destabilize the grid with increased participation.

• There is also a long literature that refutes the value of surge pricing in both power systems and telecommunications, where in the latter case it was promoted and then dismissed as early as the 1980s [2].

The authors understand the value (and genius) of the market, but also make clear that this genius is a two-edged sword. In the case of critical infrastructure, we do not want the uncertainty that comes with self-interested agents that seek to maximize profits, without motivation to maintain reliability. We appreciate all the innovations that come with the marketplace, but we know from examples of successful companies (such as Apple or Tesco) that the term market is not synonymous with marginal cost pricing.

#### Smart grids solve extinction and systemic risk.

Weiss ’19 [Matthew; and Martin Weiss; American Jewish University; UCLA-Olive View Medical Center, “An Assessment of Threats to the American Power Grid,” *Energy, Sustainability and Society*, 9(1), p. 18]

In testimony before a Congressional Committee, it has been asserted that a prolonged collapse of this nation’s electrical grid—through starvation, disease, and societal collapse—could result in the death of up to 90% of the American population [1].

There is no published model disclosing how these numbers were arrived at, nor are we able to validate a primary source for this claim. Testimony given by the Chairman of the Congressional EMP Commission, while expressing similar concerns, gave no estimate of the deaths that would accrue from a prolonged nationwide grid collapse [2].

The power grid is posited to be vulnerable to geomagnetic storms generated by solar activity, electromagnetic pulses (EMP, also referred to as HEMP) produced by high altitude nuclear detonations, cyberattack, and kinetic (physical) attack. Evidence for and against the validity of each of these threats follows below. Much of the knowledge on these matters is classified. The studies for and against EMP, other than for limited testing of a few components of the infrastructure by the EMP commission, are based not on physical demonstrations but mathematical models and simulations. Moreover, the underlying physics and technology involved—the electrical engineering and materials science—is likely beyond the understanding of the reader, and certainly beyond that of these writers. With these limitations in mind, we proceed.

The electrical grid

HV (high voltage) transformers—transmitting voltages of greater than 100 kV—are what make it possible to send electricity over great distances to thousands of substations, where smaller transformers reduce the voltage.

HV transformers are the weak link in the system, and the Federal Energy Regulatory Commission (FERC) has identified 30 of these as being critical. The simultaneous loss of just 9, in various combinations, could cripple the network and lead to a cascading failure, resulting in a “coast-to coast blackout” [3].

If the HV transformers are irreparably damaged it is problematic whether they can be replaced. The great majority of these units are custom built. The lead time between order and delivery for a domestically manufactured HV transformer is between 12 and 24 months [4], and this is under benign, low demand conditions.

The first practical application of the transformer was invented in the USA by William Stanley, but largely as a consequence of American trade policy (“It doesn’t make any difference whether a country makes potato chips or computer chips”- attributed to Michael Boskin, Chairman of President George H W Bush’s Council of Economic Advisors) [5] there is little manufacturing capability remaining in the USA. Worldwide production is less than 100 per year and serves the rapidly growing markets of China and India. Only Germany and South Korea produce for export.

Ordered today, delivery of a unit from overseas (responsible for 85% of current American purchasing) would take nearly 3 years [6]. The factory price for an HV transformer can be in excess of $10 million—too expensive to maintain an inventory solely as spares for emergency replacement.

Potential mechanisms of collapse

Geomagnetic storms

Geomagnetic storms are due to coronal mass ejections (CMEs)—massive eruptions of plasma expelled from the sun’s corona. Plasma is the fourth fundamental state of matter, consisting of free electrons and positively charged ions. The sun, like all stars, is plasma.

Coronal mass ejections often occur with solar flares, but each can also take place in the absence of the other. The latter emits radiation in all bands of the electromagnetic spectrum (e.g., white light, ultraviolet light, X-rays, and gamma rays) and unlike CMEs, affect little more than radio communications.

CME’s take several days to reach the Earth. The radiation generated by solar flares on the other hand arrives in 8 min.

Coronal mass ejections carry an intense magnetic field. If a storm enters the earth’s magnetosphere, it causes rapid changes in the configuration of the earth’s magnetic field. Electric current is generated in the magnetosphere and ionosphere, generating electromagnetic fields at ground level. The movement of magnetic fields around a conductor, i.e., a wire or pipe, induces an electric current. The longer the wire, the greater the amplification. The current induced is akin to DC (direct current), which the electrical system poorly tolerates. Our grid is based on AC. The excess current can cause voltage collapse, or worse, cause permanent damage to large transformers.

The current flowing through HV transformers during a geomagnetic disturbance can be estimated using storm simulation and transmission grid data [7]. From these results, transformer vulnerability to internal heating can be assessed.

The largest recorded geomagnetic storm occurred Sept 1–2, 1859—the Carrington event, named after the English amateur astronomer, Richard Carrington. Auroras were seen as far south as the Caribbean. Campers in the Rocky Mountains were awakened shortly after midnight by “an auroral light so bright that one could easily read common print. Some of the party insisted it was daylight and began preparation for breakfast” [8]. Telegraph wires transmitted electric shocks to operators and ignited fires.

In May 1921, there was another great geomagnetic disturbance (GMD), the railroad storm. The National Academy of Sciences estimates that if that storm occurred today, it could cause 1–2 trillion dollars damage and full recovery could take 4–10 years [9].

The basis for this assertion is a presentation made by J Kappenman of Metatech, the Goleta California engineering consulting firm, given as part of the NAS Space weather workshop titled “Future Solutions, Vulnerabilities and Risks”, on May 23, 2008. The simulation asserts that a 1921 intensity storm could damage or destroy over 300 transformers in the US, and leave 130 million people without power [10]. Elsewhere, Kappenman states that in a worst case situation, geomagnetic disturbances could instantly create loss of over 70% of the nation’s electrical service [11].

In March 1989, a geomagnetic storm caused collapse of the power grid in Quebec, leaving 6 million without power for 9 h. NERC (the North American Electric Reliability Council), a self-regulated trade organization formed by the electric utility industry, asserts that the blackout was not due to overheating of transformers from geomagnetically induced current, but to the near-simultaneous tripping of seven relays, and this is correct [12]. The rapid voltage collapse (within 93 s) likely prevented transformer thermal damage. The same storm, however, destroyed a major transformer at the Salem nuclear plant in New Jersey [13]. The 1989 Hydro-Quebec storm was 1/10th the intensity of the 1921 Railroad Storm [14].

A report for Lloyd’s in 2013 states a Carrington-level extreme geomagnetic storm is almost inevitable in the future. Using its own models and simulations, it puts the US population at risk at between 20 and 40 million, with the outages lasting up to 1–2 years [15].

Because of geography and ground conductivity, the risk of a transformer sustaining damage is 1000 times greater in some US counties than in others. The highest risk is to the counties along the corridor between Washington DC and New York [16].

The first written account of a solar storm is possibly in the book of Joshua. Written reports of aural sightings by Greeks and Romans begin in 371 BC.

A Carrington-level storm narrowly missed the earth in 2012 [17]. NASA has produced a video on the CME [18]. Formerly considered a 1 in 100-year event, the likelihood of a Carrington intensity storm striking the earth has most recently been placed at 12% per decade [19].

Mitigation

The EMP Commission, in its 2008 report, found that it is not practical to try to protect the entire electrical power system or even all high-value components. It called however for a plan designed to reduce recovery and restoration times and minimize the net impact of an event [20]. This would be accomplished by “hardening” the grid, i.e., actions to protect the nation’s electrical system from disruption and collapse, either natural or man-made [21]. The shielding is accomplished through surge arrestors and similar devices [22]. The cost to harden the grid, from our tabulation of Congressional EMP figures, is $3.8 billion.

There has been no hardening of the grid

The commission and organization that are responsible for public policy on grid protection are FERC and NERC. FERC (The Federal Energy Regulatory Commission) is an independent agency within the Department of Energy. NERC, the self-regulatory agency formed by the electric utility industry, was renamed the North American Electric Reliability Corporation in 2006.

In June of 2007, FERC granted NERC the legal authority to enforce reliability standards for the bulk power system in the USA. FERC cannot mandate any standards. FERC only has the authority to ask NERC to propose standards for protecting the grid.

NERC’s position on GMD is that the threat is exaggerated.

A report by NERC in 2012 asserts that geomagnetic storms will not cause widespread destruction of transformers, but only a short-term (temporary) grid instability [23]. The NERC report did not use a model that was validated against past storms, and their work was not peer-reviewed.

The NERC report has been criticized by members of the Congressional EMP commission. Dr. Peter Pry asserts that the final draft was “written in secret by a small group of NERC employees and electric utility insiders….. The report relied on meetings of industry employees in lieu of data collection or event investigation” [22].

NERC, in turn, criticizes Kappenman’s work. NERC states that the Metatech work cannot be independently confirmed [24]. NERC reliability manager Mark Lauby criticized the report for being based on proprietary code [24]. Kappenman’s report, however, received no negative comments in peer review [24].

The NERC standards

The reliability standards and operational procedures established by NERC, and approved by FERC, are disputed [25]. Among the points are these:

1. The standards against GMD do not include Carrington storm class levels. The NERC standards were arrived at studying only the storms of the immediate prior 30 years, the largest of which was the Quebec storm. The GMD “benchmark event”, i.e., the strongest storm which the system is expected to withstand, is set by NERC as 8 V/km [26]. NERC asserts this figure defines the upper limit intensity of a 1 in 100-year storm [26]. The Los Alamos National Laboratory, however, puts the intensity of a Carrington-type event at a median of 13.6 V/km, ranging up to 16.6 V/km [27]. Another analysis finds the intensity of a 100-year storm could be higher than 21 V/km [28].

2. The 15–45 min warning time of a geomagnetic storm provided by space satellites (ACE and DSCOVR) will be insufficient for operators to confer, coordinate, and execute actions to prevent grid damage and collapse.

Testimony of Edison Electric Institute official Scott Aaronson under questioning by Senator Ron Johnson in a hearing before the Senate Homeland Security and Governmental Affairs Committee in 2016 encapsulates some of the issues. Video of the exchange is available on the web [29]. The Edison Electric Institute (EEI) is the trade association that represents all US investor-owned electric companies.

Johnson: Mr. Aaronson, I just have to ask you – the protocol of warning 15–30 min – who is going to make that call? I mean, who is going to make that for a massive geomagnetic disturbance, that nobody knows how many of these transformers are going to be affected. Who is going to make that call to shut them off line – to take them off line – so those effects do not go through those wires and destroy those large transformers that cannot be replaced?

Aaronson: So, the grid operators are tightly aligned. We talked about the fact that there are 1900 entities that make up the bulk electric system. There are transmission operators and so on…

Johnson (interrupting): Who makes the call? Who makes the call – we are going to shut them all down in 30 min, in 15 min?

Aaronson: It’s not as simple as cutting the power. That’s not how this is going to work but there is again, there is this shared responsibility among the sector.

Johnson: Who makes the call?

Aaronson: I do not know the answer to that question [29].

Mr. Aaronson’s is Managing Director for Cyber and Infrastructure Security at EEI.

Congressman Trent Franks, R Az introduced HR 2417, the SHEILD Act, on 6/18/2013. The bill would give FERC the authority to require owners and operators of the bulk power system to take measures to protect the grid from GMD or EMP attack. The costs would be recovered by raising regulated rates.

Franks states he had been led to believe that his bill would be brought to the House floor for a vote. But he states House Energy and Commerce Committee Chairman Fred Upton R, Mich., let it die in committee. He has been unable to get an explanation from Upton [30].

Between 2011 and 2016, Mr. Upton has received $1,180,000 in campaign contributions from the electric utility industry [31].

The electric utility industry is heavily involved in campaign donations. During the 2014 federal election cycle, the electric utility industry made $21.6 million in campaign contributions [32]. The electrical utility industry is particularly involved in state politics. For instance, in Florida, between 2004 and 2012 electric utility companies donated $18 million into legislative and state political campaigns. In that state, the electric utilities employ one lobbyist for every two legislators [33].

Electric utility revenue in 2015 was 391 billion dollars [34].

Electromagnetic pulse

Of the scenarios that might lead to electrical network collapse, EMP has received the widest public attention. It has been the subject of television series, films, and novels. HEMP (for high altitude) is the more accurate acronym, but as media and the public use EMP, we will use both interchangeably.

The issue has become highly politicized. The most prominent article in the media against EMP as a threat is by Patrick Disney, “The Campaign to Terrify You about EMP” published in the Atlantic in 2011. “From Newt Gingrich to a Congressional ‘EMP Caucus’, some conservatives warn the electronic frying blast could pose gravely underestimated dangers on the U.S…..Ballistic missile defense seems to be the panacea for this groups concern, though a generous dose of preemption and war on terror are often prescribed as well” [35].

As of 2009, Mr. Disney was acting Policy Director for the National Iranian American Council (NIAC). NIAC has been accused of acting as a lobby for the Islamic Republic of Iran [36].

Mr. Disney is quoted as stating his strategy, in advancing an Iranian interest, is to “create a media controversy” [36].

The campaign to discredit EMP has been largely successful. To a very large part of the body politic EMP is identified as a cause limited to the far right.

A high-altitude electromagnetic pulse (EMP) is produced when a nuclear device is detonated above the atmosphere. No radiation, blast, or shock wave is felt on the ground, nor are there any adverse health effects, but electromagnetic fields reach the surface.

An EMP has three components, E1 through E3, defined by speed of the pulse. Each has specific characteristics, and specific potential effects on the grid. E1, the first and fastest component, affects primarily microelectronics. E3, the later and slower component, affects devices attached to long conductive wires and cables, especially high-voltage transformers.

A single nuclear blast will generate an EMP encompassing half the continental USA [37]. Two or three explosions, over different areas, would blanket the entire continental USA.

The potential impact of an EMP is determined by the altitude of the nuclear detonation, the gamma yield of the device, the distance from the detonation point, the strength and direction of the earth’s magnetic field at locations within the blast zone and the vulnerability of the infrastructures exposed. The E1 gamma signal is greatest for bursts between 50 and 100 km altitude. E3 signals are optimized at busts between 130 and 500 km altitude, much greater heights than for E1 [38]. Higher altitude widens the area covered, but at the expense of field levels. The 1963 atmospheric test ban has prevented further testing.

E1 and its effects

The E1 pulse (“fast pulse”) is due to gamma radiation (photons), generated by a nuclear detonation at high altitude, colliding with atoms in the upper atmosphere. The collisions cause electrons to be stripped from the atoms, with the resultant flow of electrons traveling downward to earth at near the speed of light. The interaction of the electrons with the earth’s magnetic field turns the flow into a transverse current that radiates forward as an intense electromagnetic wave. The field generates extremely high voltages and current in electrical conductors that can exceed the voltage tolerance of many electronic devices. All this occurs within a few tens of nanoseconds.

The Congressional EMP Commission postulated that E1 would have its primary impact on microelectronics, especially SCADAs (Supervisory Control and Data Acquisition), DCSs (digital control systems), and PLCs (programmable logic controllers). These are the small computers, numbering now in the millions, that allow for the unmanned operation of our infrastructure.

To assess the vulnerability of SCADAs to EMP, and therefore the vulnerability of our infrastructure, the EMP Commission funded a series of tests, exposing SCADA components to both radiated electric fields and injected voltages on cables connected to the components. The intent was to observe the response of the equipment, when in an operational mode, to electromagnetic energy simulating an EMP. “The bottom line observation at the end of the testing was that every system tested failed when exposed to the simulated EMP environment” [6].

E1 can generate voltages of 50,000 V. Normal operating voltages of today’s miniaturized electronics tend to be only a few (3-4) volts. States the EMP Commission: “The large number and widespread reliance on such systems by all the nation’s critical infrastructures represent a systemic threat to their continued operation following an EMP event” [39]. A scenario seen in films is all automobiles and trucks being rendered inoperable. This would not be the case. Modern automobiles have as many as 100 microprocessors that control virtually all functions, but the vulnerability has been reduced by the increased application of electromagnetic compatibility standards. The EMP Commission found that only minor damage occurred at an E1 field level of 50 kV/m, but there were minor disruptions of normal operations at lower peak levels as well [40].

There is a self-published post (J. Steinberger, Nobel laureate physics, 1988) disputing the potential effects of E1 [41]. This is an isolated opinion.

Shielding against E1 could theoretically be accomplished through the construction of a Faraday cage around specific components or an entire facility. The cage is composed of conductive materials and an insulation barrier that absorbs pulse energy and channels it directly into the ground. The cage shields out the EM signals by “shorting out” the electric field and reflecting it.

To be an effective Faraday cage, the conductive case must totally enclose the system. Any aperture, even microscopic seams between metal plates, can compromise the protection. To be useful, however, a device must have some connection with the outside world and not be completely isolated. Surge protective devices can be used on metallic cables to prevent large currents from entering a device, or the metallic cables can be replaced by fiber optic cables without any accompanying metal. The US Military has taken extensive measures to protect (“harden”) its equipment against E1. “On the civilian side, the problem has not really been addressed” [42].

E3 and its effects

E3 is caused by the motion of ionized bomb debris and atmosphere relative to the geomagnetic field, resulting in a perturbation of that field. This induces currents of thousands of amperes in long conductors such as transmission lines that are several kilometers or greater in length. Direct currents of hundreds to thousands of amperes will flow into transformers. As the length of the conductor increases, the amperage amplifies.

The physics of E3 are similar to that of a GMD, but not identical. GMD comes from charged particles showering down from space creating current flow in the ionosphere. These currents create magnetic fields on the ground. A nuclear burst on the other hand generates particles which create a magnetic bubble that pushes on the earth’s magnetic field producing a changing magnetic field at the Earth’s surface. A geomagnetic storm will have substorms that can move over the Earth for more than 1 day, while the E3 HEMP occurs only immediately following a nuclear burst.

There are three studies on the potential effects of a HEMP E3 on the power grid.

The first study, published in 1991, found there would be little damage [43]. Although supporting the utility industry’s position, it has not been subsequently cited by either NERC or the industry. The study is criticized for expressing a smaller threat intensity [44]. The second, published in 2010 by Metatech, calculated that a nuclear detonation 170 km over the USA would collapse the entire US power grid [45]. The third study, by EPRI (an organization funded by the electric utility industry) published in February 2017, asserts that a single high-altitude burst over the continental USA would damage only a few, widely scattered transformers [46]. The study is disputed for underestimating threat levels and using erroneous models [44].

These results are incompatible. One’s interpretation of the studies on E3 (and GMD) is based largely on the credibility one gives to the underlying Commission or Institute, and not the published calculations.

FERC has decided not to proceed with a GMD standard that includes EMP [47]. It will be recalled the GMD standard is 8 V/km. The EMP Commission, utilizing unclassified measured data from the Soviet era nuclear tests, found an expected peak level for E3 HEMP for a detonation over the continental USA would be 85 V/km [48].

The position of the electric utility industry is that E3 from a nuclear detonation is not a critical threat [49]. Others have come to a different conclusion. Israel has hardened her grid [50]. She perceives herself to face an existential threat, and it is not the Sun.

The electric utility industry states the cost of hardening the grid against EMP is the government’s responsibility, not the industry’s [51].

Cyberattack

The vulnerability from a cyberattack is exponentially magnified by our dependence on SCADAs.

In 2010, a computer worm attacking SCADA systems was detected. Although widely spread, it was designed to only attack SCADA systems manufactured by Siemens for P-1 centrifuges of the Iranian nuclear enrichment program. The attack destroyed between 10 and 20% of Iranian centrifuges. Iran’s program was likely only briefly disrupted [52]. In December 2015, a cyberattack was directed against the Ukrainian power grid. It caused little damage as the grid was not fully automated.

There is an argument that the cyber threat is exaggerated. Thomas Rid states that viruses and malware cannot at present collapse the electric grid. “(The world has) never seen a cyber- attack kill a single human being or destroy a building” [53]. The electric utility industry offers a similar perspective. In testimony on cybersecurity before the Senate Homeland Security and Governmental Affairs Committee, its representative states that “There are a lot of threats to the grid…..from squirrels to nation states, and frankly, there have been more blackouts as a result of squirrels (gnawing wire insulation) then there are from nation states” [54].

Others however express concern [55]. Moreover, in a report by the Department of Defense in 2017, it is noted that “the cyber threat to critical US infrastructure is outpacing efforts to reduce pervasive vulnerabilities.” [56] That report notes that “due to our extreme dependence on vulnerable information systems, the United States today lives in a virtual glass house” [57].

On March 15, 2018, the Department of Homeland Security issued an alert that the Russian government had engineered a series of cyberattacks targeting American and European nuclear power plants and water and electric systems [58]. It is reported these attacks could allow Russia to sabotage or shut down power plants at will [59].

The ability to operate a system in the absence of computer-driven actions is fast disappearing. The electric power industry spends over $1.4 billion dollars annually to replace electromechanical systems and devices that involve manual operation with new SCADA equipment [60]. With modest increases in efficiency come exponential increases in vulnerability. The extent to which reduced labor costs (and perhaps reduced energy costs) are passed on to the public is uncertain.

Kinetic attack

An internal FERC memo obtained by the press in March 2012 states that “destroy nine interconnector substations and a transformer manufacturer and the entire United States grid would be down for 18 months, possibly longer” [61]. The mechanism is through the megawatts of voltage that would be dumped onto other transformers, causing them to overheat and in cascading fashion cause the entire system overload and fail.

At Metcalf California (outside of San Jose) on April 16, 2013, a HV Transformer owned by PG&E sustained what NERC and PG&E claimed was merely an act of vandalism [1]. Footprints suggested as many as 6 men executed the attack. They left no fingerprints, not even on the expended shell casings [1]. US FERC Chairman Wellinghoff concluded that the attack was a dry run for future operations [62].

Information on how to sabotage transformers has been available online [63].

There is a disincentive for management to invest in security. As stated in a report by the Electric Research Power Institute: “Security measures, in themselves, are cost items, with no direct monetary return. The benefits are in the avoided costs of potential attacks whose probability is generally not known. This makes cost-justification very difficult” [64].

CEO pay at large American companies is based on the Harvard Business School theory that the best measure of managerial performance is a company’s stock price. This does not necessarily align the interests of CEOs with shareholders, let alone the public. It “encourages short-term boosts to profits rather than investing for long term growth” [65].

In 2014, the CEO of PG&E, Anthony Early Jr., had a compensation of $11.6 million dollars. Over 90% was from bonuses based on stock performance. The President of PG&E, Christopher Johns, had a compensation of $6 million dollars [66]. There is no evidence, however, that any of this is in play in the positions of the electric utility industry vis-à-vis securing the grid. States PG&E spokesman Jonathan Marshall, “The majority of compensation for senior executives is shareholder funded and dependent on achieving targets related to safety, reliability and other results” [66].

Consequences of a sustained power outage

The EMP Commission states “Should significant parts of the electrical power infrastructure be lost for any substantial period of time, the Commission believes that the consequences are likely to be catastrophic, and many people will die for the lack of the basic elements necessary to sustain life in dense urban and suburban communities.” [67].

Space constraints preclude discussion on how the loss of the grid would render synthesis and distribution of oil and gas inoperative. Telecommunications would collapse, as would finance and banking. Virtually all technology, infrastructure, and services require electricity.

An EMP attack that collapses the electric power grid will collapse the water infrastructure—the delivery and purification of water and the removal and treatment of wastewater and sewage. Outbreaks that would result from the failure of these systems include cholera. It is problematic if fuel will be available to boil water. Lack of water will cause death in 3 to 4 days [68].

Food production would also collapse. Crops and livestock require water delivered by electronically powered pumps. Tractors, harvesters, and other farm equipment run on petroleum products supplied by an infrastructure (pumps, pipelines) that require electricity. The plants that make fertilizer, insecticides, and feed also require electricity. Gas pumps that fuel the trucks that distribute food require electricity. Food processing requires electricity.

In 1900, nearly 40% of the population lived on farms. That percentage is now less than 2% [69]. It is through technology that 2% of the population can feed the other 98% [68]. The acreage under cultivation today is only 6% more than in 1900, yet productivity has increased 50 fold [69].

As stated by Dr. Lowell L Wood in Congressional testimony:

“If we were no longer able to fuel our agricultural machine in the country, the food production of the country would simply stop, because we do not have the horses and mules that used to tow agricultural gear around in the 1880s and 1890s”.

“So the situation would be exceedingly adverse if both electricity and the fuel that electricity moves around the country……… stayed away for a substantial period of time, we would miss the harvest, and we would starve the following winter” [70].

People can live for 1–2 months without food, but after 5 days, they have difficulty thinking and at 2 weeks they are incapacitated [68]. There is typically a 30-day perishable food supply at regional warehouses but most would be destroyed with the loss of refrigeration [69]. The EMP Commission has suggested food be stockpiled for a possible EMP event.

A prescription for failure

Even if all the recommendations of the Congressional EMP Commission were implemented, there is no guarantee that the grid will not sustain a prolonged collapse. There should therefore be contingency plans for such a failure.

There is also another consideration. The foundational pillars of prior American nuclear defense policy, in today’s climate, are of uncertain validity. Mutual assured destruction is the Maginot line of the 21st century. Nonproliferation will prove difficult to resurrect.

The consequences of a widespread nuclear attack have been positioned to the public as massive deaths from blast effects, and then further lingering deaths from the effects of radiation. We suspect there will be no electricity, and there will be no electricity for a very long time.

# 1AR

## Supply Chain

### XT 2AC 1: Plan Not Key to Inflation

#### Food, gas etc all alt causes – plan doesn’t affect them because they aren’t algorithmically surge priced.

Christopher Rugaber 3/31/22, AP reporter, “A key inflation gauge sets 40-year high as gas and food soar,” AP News, apnews.com/article/business-prices-inflation-c9d81525f808b25ecd37e5c91d6bb0e5

WASHINGTON (AP) — An inflation gauge that is closely monitored by the Federal Reserve jumped 6.4% in February compared with a year ago, with sharply higher prices for food, gasoline and other necessities squeezing Americans’ finances.

The figure reported Thursday by the Commerce Department was the largest year-over-year rise since January 1982. Excluding volatile prices for food and energy, so-called core inflation increased 5.4% in February from 12 months earlier.

Robust consumer demand has combined with shortages of many goods to fuel the sharpest price jumps in four decades. Measures of inflation will likely worsen in the coming months because Thursday’s report doesn’t reflect the consequences of Russia’s invasion of Ukraine, which occurred Feb. 24. The war has disrupted global oil markets and accelerated prices for wheat, nickel and other key commodities.

Squeezed by inflation, consumers increased their spending by just 0.2% in February, down from a much larger 2.7% gain in January. Adjusted for inflation, spending actually fell 0.4% last month. The decline partly reflected a shift away from heavy spending on goods to a focus on services, such as health care, travel and entertainment, which consumers had long avoided during the worst of the pandemic.

Spending on such services grew 0.6%, the most since July, while purchases of autos, furniture, clothes and other goods dropped 2.1%. Many economists had previously suggested that a shift away from goods purchases might loosen supply chain snarls and cool inflation. But prices are still rising rapidly for goods, including a 1.1% increase in February.

Americans’ overall incomes rose 0.5% in February, the highest gain since November and up from just 0.1% in January. Wages and salaries jumped 0.8%, the most in four months.

Businesses have been raising pay to attract and keep employees — a trend that is benefiting workers but also giving employers cause to raise prices to offset their higher labor costs. That cycle is helping fuel inflation.

Last month, food costs climbed 1.4%, the most in nearly two years. Energy costs spiked 3.7%, the biggest such increase since October.

The Federal Reserve responded this month to the inflation surge by raising its benchmark short-term interest rate by a quarter-point from near zero, and it’s likely to keep raising it well into next year. Because its rate affects many consumer and business loans, the Fed’s rate hikes will make borrowing more expensive and could weaken the economy over time.

Michael Feroli of JPMorgan is among economists who now think the Fed will raise its key rate by an aggressive half-point in both May and June. The central bank hasn’t raised its benchmark rate by a half-point in two decades, a sign of how concerned it has become about the persistent surge in inflation.

On a monthly basis, prices rose 0.6% from January to February, up slightly from the previous month’s increase of 0.5% and matching the highest monthly figure since 2008. Core prices rose 0.4%, down from a 0.5% increase in January.

Gas prices have soared in the past month in the aftermath of Russia’s invasion, which led the United Kingdom and the Biden administration to ban Russia’s oil exports. The cost of a gallon of gas shot up to a national average of $4.24 a gallon Wednesday, according to AAA. That’s up 63 cents from a month ago, when it was $3.61.

Michael Pearce, an economist at Capital Economics, estimated that the gas price spike will cost Americans an annualized $100 billion in March.

Americans will likely dig into their savings to cover the higher gas costs in the near term, he said. “But if higher gasoline prices are sustained, that will eventually weigh on spending in other areas.”

On Thursday, President Joe Biden is expected to [order the release of up to 1 million barrels of oil](https://apnews.com/article/russia-ukraine-biden-business-europe-3e1808077371b88ae043c86584763afd/)a day from the nation’s strategic petroleum reserve in an effort to reduce gas prices.

Thursday’s report follows a more widely monitored inflation gauge, the consumer price index, that was issued earlier this month. The CPI jumped to 7.9% in February from a year ago, the sharpest such increase in four decades.

Many economists still expect inflation to peak in the coming months. In part, that’s because price spikes that occurred last year, when the economy widely reopened, will begin to make the year-over-year price increases appear smaller. Yet Fed officials project that inflation, as measured by its preferred gauge, will still be a comparatively high 4.3% by the end of this year.

#### Rate hikes, Russia invasion, and spending behavior is a disaster for inflation- projected to stay high

Anneken Tappe 3/31/22, Senior Writer at CNN business, “The Fed's favorite inflation measure ticked even higher last month,” CNN business, https://www.cnn.com/2022/03/31/economy/february-inflation-consumer-spending/index.html

The PCE index is the [Federal Reserve](https://www.cnn.com/2022/03/21/economy/federal-reserve-powell-bostic-interest-rates/index.html)'s preferred measure of inflation, and last month's reading is a far cry from the central bank's target of around 2%. Earlier this month, the Fed [raised interest rates for the first time](https://www.cnn.com/2022/03/16/economy/federal-reserve-interest-rate-hike/index.html) since 2018 in an effort to curtail rising prices.

But the nature of America's high inflation is changing.

Earlier on in the pandemic, higher prices were spurred on by high demand and supply chain troubles. But after [Russia invaded Ukraine](https://www.cnn.com/2022/03/24/business/blackrock-globalization/index.html) last month, global commodities markets have been thrown for a loop. Energy prices soared nearly 26% in February, according to the BEA. US oil prices climbed nearly 9% last month and have risen even higher in March despite a [recent pull-back](https://www.cnn.com/2022/03/29/energy/oil-prices-russia-ukraine/index.html). Americans are [feeling the effect at the pump](https://www.cnn.com/2022/03/12/energy/us-gas-prices-russia-oil/index.html).

"Prior to the return of inflation, the Fed would have less urgency to raise rates in the face of war or other threats to economic growth, but in this situation, with inflation likely to be exacerbated by disruptions due to war, the Fed needs to do the opposite of what they would normally do and that's to fight an even bigger threat of inflation," said Chris Zaccarelli, chief investment officer for Independent Advisor Alliance, in emailed comments.

As for the inflation data, the [economic spillover from the Ukraine conflict](https://www.cnn.com/2022/03/04/business/russia-ukraine-supply-chain-oil/index.html) won't be confined to just February. Food prices, for example, rose 8% in February and are expected to increase throughout the year, as the conflict continues to affect the global food supply chain.

Economists hope that inflation will peak in the first quarter and then slowly come down during the remainder of the year. Whether February was this peak remains to be seen.

"The peak in the year-over-year inflation measures has proven illusive, but we suspect that a top is forming in March if the pull-back in energy prices is sustained," wrote Action Economics chief economist Mike Englund in a note to clients.

For February alone, prices rose 0.6%, or 0.4% excluding food and energy.

But even though inflation is on fire, Americans keep spending -- at least for now. Consumer spending increased 0.2%, or $34.9 billion, last month, according to Thursday's data.

Elevated incomes and savings are keeping consumers shopping. In February, American incomes rose by 0.5%, or $101.5 billion, while disposable incomes rose by 0.4%, or $76.1 billion. The personal savings rate stood at 6.3%, an increase from the start of the year.

However, economists worry that prices could climb so high that consumers will drastically change their spending behavior, postponing purchases or downshifting to cheaper alternatives. That would be bad news for US economic growth, some two-thirds of which is driven by consumer spending.

## K

### XT 2AC: Util Good

#### Util is most ethical.

Isaac, Poli Sci PhD, 2 Jeffrey C. Isaac, James H. Rudy Professor of Political Science and director of the Center for the Study of Democracy and Public Life at Indiana University, Bloomington. He writes regularly for Dissent, and his most recent book is Democracy in Dark Times. “Ends, Means, and Politics” at <http://www.dissentmagazine.org/article/?article=601>

As a result, the most important political questions are simply not asked. It is assumed that U.S. military intervention is an act of "aggression," but no consideration is given to the aggression to which intervention is a response. The status quo ante in Afghanistan is not, as peace activists would have it, peace, but rather terrorist violence abetted by a regime--the Taliban--that rose to power through brutality and repression. This requires us to ask a question that most "peace" activists would prefer not to ask: What should be done to respond to the violence of a Saddam Hussein, or a Milosevic, or a Taliban regime? What means are likely to stop violence and bring criminals to justice? Calls for diplomacy and international law are well intended and important; they implicate a decent and civilized ethic of global order. But they are also vague and empty, because they are not accompanied by any account of how diplomacy or international law can work effectively to address the problem at hand. The campus left offers no such account. To do so would require it to contemplate tragic choices in which moral goodness is of limited utility. Here what matters is not purity of intention but the intelligent exercise of power. Power is not a dirty word or an unfortunate feature of the world. It is the core of politics. Power is the ability to effect outcomes in the world. Politics, in large part, involves contests over the distribution and use of power. To accomplish anything in the political world, one must attend to the means that are necessary to bring it about. And to develop such means is to develop, and to exercise, power. To say this is not to say that power is beyond morality. It is to say that power is not reducible to morality. As writers such as Niccolo Machiavelli, Max Weber, Reinhold Niebuhr, and Hannah Arendt have taught, an unyielding concern with moral goodness undercuts political responsibility. The concern may be morally laudable, reflecting a kind of personal integrity, but it suffers from three fatal flaws: (1) It fails to see that the purity of one's intention does not ensure the achievement of what one intends. Abjuring violence or refusing to make common cause with morally compromised parties may seem like the right thing; but if such tactics entail impotence, then it is hard to view them as serving any moral good beyond the clean conscience of their supporters; (2) it fails to see that in a world of real violence and injustice, moral purity is not simply a form of powerlessness; it is often a form of complicity in injustice. This is why, from the standpoint of politics--as opposed to religion--pacifism is always a potentially immoral stand. In categorically repudiating violence, it refuses in principle to oppose certain violent injustices with any effect; and (3) it fails to see that politics is as much about unintended consequences as it is about intentions; it is the effects of action, rather than the motives of action, that is most significant. Just as the alignment with "good" may engender impotence, it is often the pursuit of "good" that generates evil. This is the lesson of communism in the twentieth century: it is not enough that one's goals be sincere or idealistic; it is equally important, always, to ask about the effects of pursuing these goals and to judge these effects in pragmatic and historically contextualized ways. Moral absolutism inhibits this judgment. It alienates those who are not true believers. It promotes arrogance. And it undermines political effectiveness.

## Axon

### XT 2AC: Blockchain Inev

#### Crypto inevitable everywhere – the SEC cant solve it.

Tal Elyashiv 21, Founder and Managing Partner at SPiCE VC, Founder and Board Member at Securitize, MBA from the University of British Columbia, BS in Math and Political Science from Bar-Ilan University, “A New Global Arms Race In Digital Finance Is Heating Up”, CNBC, 1/21/2021, https://www.cnbc.com/2021/01/21/op-ed-a-new-global-arms-race-in-digital-finance-is-heating-up.html

Today, we’re on the precipice of what could be the largest transformational period in global history. With the first Industrial Revolution, new technologies like assembly lines, factories and transportation fundamentally changed society. This time, instead of cogwheels doing the work, blockchain-based digitalization will continue to drive transactions. Specifically, this latest phase of progress has its sights set on a massive industry ripe for disruption: finance.

Digital finance and the monetary system is leveraging decentralized blockchain technology to modernize financial markets. Dominant players in these systems include the world’s biggest financial institutions and global central banks.

The rise of digital currencies and CBDCs

As tokenization is an inevitable trend, central bank digital currencies (CBDC) are surging in adoption, since they are simply one kind of a more generalized digital asset, albeit one that is bound to risk-free central bank money. The global rivalry in digital currencies is heating up as central banks from an increasingly wider swath of countries, including China, Hong Kong, Thailand, the EU, U.K., U.S., and Australia, explore potential use cases for tokenized money.

CBDC is the first place where we see top-down adoption of distributed ledger technology (DLT) from central banks and governments. The adoption of CBDCs will drive significant DLT ecosystem innovation and development that will impact financial organizations. The widespread adoption of DLT will extend beyond finance to other industry verticals like security, supply chains, healthcare, retail and ecommerce.

How institutional investors are buying into crypto via Anchorage

CBDCs will certainly make payments, settlement of deals and trading simpler, especially when it comes to global trade. It will also potentially change the role current institutions are playing regarding money and payments. CBDC implementation will also possibly make cross border payments simpler and much cheaper. One result of that will be the enablement of micropayments, allowing small businesses to be more competitive and eliminate the need for aggregators in order to make them economically viable, resulting in a different distribution of value.

Winners and losers are made from historic periods of societal shifts and advancements. The U.S. was obviously a dominant force during the first revolution. As the world embarks on a new transformational journey, who is driving it? The answer to this question is very complex and currently unclear, but there is an intense financial technology “arms race” brewing between the world’s superpowers for dominance in digital finance infrastructure and technology, spurring short-term competitive innovation with critical long-term implications.

“I believe that if America does not lead innovation in the digital currency and payments area, others will,” David Marcus, head of Diem, the cryptocurrency project founded out of Facebook, said in a statement to the U.S. Senate Committee on Banking, Housing and Urban Affairs.

Huw van Steenis of UBS said there will be a “three-horse race” around the future of money with private tokens and CBDCs developing in parallel with efforts to improve the current system. The implications of winning or losing the digital finance “arms race” are massive and far-reaching.

During the U.S. and USSR space race, NASA harnessed tremendous intellectual and technical capital to enable the moon landing and further space exploration, leading to a variety of spinoff inventions, from global positioning systems (GPS) to advances in flight technology to Velcro and even freeze-dried food. In the same way, blockchain-based digital finance technology is a means to the end of greater technological sophistication.

The three leaders in the digital currency arms race

More than 80% of the world’s central banks are exploring their own versions of digital currencies, but it’s China, the U.S. and the EU that have the resources, technology and infrastructure to determine the future of the digital economy. 2020 started with a major event within the financial world: the World Economic Forum in Davos, where the WEF released a toolkit for policymakers regarding the creation of CBDCs.

### XT 2AC: Rulemaking Now

#### Rulemaking coming now.

Walters ’21 [Kurt; Harvard Law School; “Reassessing the Mythology of Magnuson-Moss: A Call to Revive Section 18 Rulemaking at the FTC,” *Harvard Law & Policy Review*, Vol. 16; AS]

D. A New Era?

There is a palpable sense that the FTC is on the precipice of a new, more assertive era after President Biden’s designated pioneering antitrust scholar Lina Khan as FTC Chair. 108 In recent years, a growing set of scholars have urged the FTC to resuscitate long-underutilized authorities across both its competition and consumer protection mandates, including Khan’s own calls to reinvigorate competition rulemaking. 109 The impression of an imminent return to FTC rulemaking grew even stronger when, in its first meeting under Chair Khan, the Commission issued a suite of administrative reforms to streamline section 18 proceedings. 110

The prospects for new section 18 rulemaking are greater today than at any time in the past forty years. Commissioner Rebecca Slaughter has endorsed section 18 rulemaking to push back against AI-powered algorithms that are biased along lines of race or gender, or otherwise harm consumers. 111 Commissioner Rohit Chopra advocated its use for “restatements” of existing precedent so that penalties can apply to first-time violations as well as repeat offenders, listing imposter fraud and tip-theft by gig work companies as prime areas for rulemaking.112 Commissioner Christine Wilson, who unlike Slaughter and Chopra occupies a Republican seat on the Commission, has voiced her support for a section 18 rulemaking covering data privacy President Biden has similarly called for an FTC rule to restrict surveillance style data collection, 114 which would likely be issued under section 18.115

#### Rulemaking now

Brown ’21 [Megan; 3/31/21; Wiley Rein LLP; and Duane Pozza; Wiley Rein LLP; “FTC Prepares to Expand Rulemaking, Including on Privacy and Data Use”; https://www.jdsupra.com/legalnews/ftc-prepares-to-expand-rulemaking-7281226/; AS]

Last week the Federal Trade Commission (FTC) announced the creation of a new rulemaking group within the FTC’s Office of the General Counsel. The announcement and other statements signal that the FTC under Acting Chairwoman Slaughter will be much more active in proposing rules on high profile issues. The agency’s announcement notes that the rulemaking group will tackle both unfair and deceptive practices and unfair methods of competition. And in separate remarks on March 26 at the American Bar Association Antitrust Law Spring Meeting, Acting Chairwoman Slaughter suggested that the agency may move forward on rulemakings about data use – which could encompass privacy, concerns about alleged manipulation on data platforms, and competition issues.

The New Office is a Shift From the Commission’s Decades-Old Approach to Rulemaking

The establishment of a dedicated rulemaking group is a significant change for the FTC, which has been restricted in its rulemaking activity since the last century. In response to controversies over how the FTC was engaged in rulemaking at the time, Congress passed legislation over four decades ago that significantly constrained the FTC’s rulemaking authority. In general, the FTC is required to follow cumbersome rulemaking requirements in addressing unfair or deceptive practices (generally known as “Magnusson-Moss” rulemaking), which go well beyond normal agency Administrative Procedures Act (APA) procedures.

As a result, in recent years, the FTC has relied much more heavily on enforcement actions rather than rulemaking to articulate its expectations. This approach has been controversial and resulted in high profile disputes in the area of data security, including prolonged litigation with Wyndham and LabMD. Structurally, responsibility for various rules is currently distributed among staff throughout the agency. And many of the rules the FTC still enforces are focused on narrow segments of the economy (e.g., the contact lens rule).

This means that, unlike the Federal Communications Commission (FCC), the FTC has comparatively little expertise in traditional rulemaking procedures, such as under the Administrative Procedure Act. In the context of ongoing debates over federal privacy law, some commentators have warned against giving the FTC broad rulemaking authority.

A rulemaking group within the General Counsel’s office would not only develop greater expertise in rulemaking best practices, it would help agency leadership evaluate legal issues, both in the record and in court. Substantively, a rulemaking group would be charged with considering rules dealing with both consumer protection and competition issues. As the agency’s release put it:  “The new structure will aid the planning, development, and execution of rulemaking – especially new rulemakings – in turn making the Commission’s work more efficient and potent.” Additionally, as the General Counsel is appointed by the Chair, the Chair would be better able to coordinate rulemaking efforts (though any notices or final rules will require a Commission vote).

What Will the Agency’s Rulemaking Priorities Be?

Last week, at the ABA Antitrust Law Spring Meeting, Acting Chairwoman Slaughter indicated that one priority would be to conduct a data-related rulemaking, which could encompass not just traditional privacy issues, but also alleged manipulation on data platforms and competition issues. She may have bipartisan support on the Commission for at least some rulemaking in this area:  In a speech at Silicon Flatirons in February, Commissioner Christine Wilson stated that she may be open to the possibility of a privacy rulemaking, in order to address what she characterized as a “market failure” in privacy, and to bring greater certainty and predictability for business.

Acting Chairwoman Slaughter has also been outspoken about the need for the agency to address algorithmic discrimination and what she has long called “data abuses.” In a speech last year, she argued that a Magnusson-Moss rulemaking this area, while “slow and imperfect,” could “generate a rule in this area if Congress ultimately fails to act,” or at least “significantly advance the public debate.” And she argued that a rule “might be able to affirmatively impose requirements of transparency, accountability, and remedy . . . in a way that takes into account context and relative risk.”

There may be greater rulemaking on the antitrust side as well. In recent Congressional testimony, Acting Chairwoman Slaughter noted that rulemaking may be preferable to case-by-case litigation in dealing with certain competition issues. One likely area appears to be non-compete provisions in employment contracts. In her testimony, she noted that she “strongly support[s] the Commission taking up and considering a rulemaking to address unfair and anticompetitive non-compete provisions in employment contracts.” Similarly, Lina Khan, who has been nominated for the open Commissioner slot, has also indicated that she is favor of a non-compete rulemaking in an article co-authored with current Commissioner Rohit Chopra (who has been nominated to lead the Consumer Financial Protection Bureau).

#### Aiding small businesses now.

Henderson ’21 [Juliana; 7/1/21; Office of Public Affairs @ FTC; “FTC Votes to Update Rulemaking Procedures, Sets Stage for Stronger Deterrence of Corporate Misconduct”; https://www.ftc.gov/news-events/press-releases/2021/07/ftc-votes-update-rulemaking-procedures-sets-stage-stronger; AS]

The Federal Trade Commission approved changes to its Rules of Practice to modernize the way it issues Trade Regulation Rules under Section 18 of the FTC Act, which will provide a roadmap for businesses, stop widespread consumer harm, and promote robust competition.

These changes bring agency procedures back in line with the 1975 statute that granted the agency Section 18 rulemaking authority, and they build on the agency’s announcement earlier this year of a Rulemaking Group within the office of the General Counsel. Commissioner Rebecca Kelly Slaughter was joined by FTC Chair Lina M. Khan and Commissioner Rohit Chopra in a statement, noting the changes will reinvigorate the FTC’s rulemaking procedures and vastly improve the Commission’s work on behalf of consumers and small businesses.

 “These changes show the FTC is turning the page on decades of self-imposed red-tape and returning to the participatory and dynamic process for issuing Section 18 rules that Congress envisioned. Clear rules help honest businesses comply with the law and better protect consumers and workers against bad actors. They will also lead to substantial market-wide deterrence due to significant civil penalties for rulebreakers,” said Commissioner Slaughter. “Streamlined procedures for Section 18 rulemaking means that the Commission will have the ability to issue timely rules on issues ranging from data abuses to dark patterns to other unfair and deceptive practices widespread in our economy.”

#### Expanded rulemaking procedures thump.

InsideARM ’21 [InsideARM; 9/20/21; “FTC Opens Rulemaking Petition Process, Promoting Public Participation and Accountability”; https://www.insidearm.com/news/00047691-ftc-opens-rulemaking-petition-process-pro/; AS]

District of Columbia -- At an open Commission meeting on September 15, 2021, the Federal Trade Commission voted to make significant changes to enhance public participation in the agency’s rulemaking, a significant step to increase public participation and accountability around the work of the FTC.

The Commission approved a series of changes to the FTC’s Rules of Practice designed to make it easier for members of the public to petition the agency for new rules or changes to existing rules that are administered by the FTC. The changes are a key part of the work of opening the FTC’s regulatory processes to public input and scrutiny. This is a departure from the previous practice, under which the Commission had no obligation to respond to or otherwise address petitions for agency action.

“Guarding against insularity is a constant challenge for virtually all federal agencies, and ensuring that the FTC is accessible even to those who lack well-heeled counsel or personal connections is essential to our institutional credibility,” said Chair Lina M. Khan. “Congress granted the FTC the power to issue rules, equipping us with a vital tool to protect the public from harmful business practices. Interested members of the public will be able to petition the FTC to invoke its rulemaking and other authorities to advance its mission.”

The updates to the Rules of Practice make a number of changes designed to clarify the process of submitting petitions to the FTC while also adding more opportunities for public input and accountability in the Commission’s response to the petitions it receives.

Among the changes are:

More clarity for those seeking to file petitions related to rulemaking with regard to information that is required with submissions, as well as guidance on the data that can be helpful to the Commission in evaluation petitions.

A new requirement that the Commission publish all petitions for rulemaking that it receives in the Federal Register and solicit public comment about those petitions.

A new requirement that the Commission provide petitioners with a specific point of contact in the agency, and that the Commission provide a response to petitioners on its decision to either act on or deny the petition.

In addition to formal rulemaking, the new changes will also apply to requests by certain parties for special exemption from FTC rules, as well as petitions related to industry guidance issued by the Commission.

The Commission vote to approve the changes to the Rules of Practice and other related rules and to publish the changes in the Federal Register was 4-1, with Commissioner Christine S. Wilson voting no. Chair Khan issued a separate statement. Commissioner Rohit Chopra also issued a separate statement.

### XT 2AC: Not Struck Down

#### Not struck down – Chevron grants the FTC broad interpretative power of Section 5.

Vaheesan ’17 [Sandeep; Legal Director @ Open Markets Institute, JD @ Duke; “Resurrecting a Comprehensive Charter of Economic Liberty: The Latent Power of the Federal Trade Commission,” *University of Pennsylvania Journal of Business Law* 19(3), p. 645-700; AS]

I. THE FTC HAS THE AUTHORITY TO DEFINE THE MEANING OF SECTION 5

The FTC has broad power to define the meaning of Section 5. Modern administrative law gives executive and independent agencies considerable freedom to define the meaning of statutes phrased in general terms. A body of law, originating with the Supreme Court's landmark 1984 decision Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.,28 has granted elastic quasi-legislative power to the administrative state. The Court held in Chevron that agencies have power to interpret ambiguously worded statutes so long as the interpretation is reasonable.2 9 Section 5 of the FTC Act, with its language on "unfair methods of competition," is the type of generally worded statute that an agency is empowered to interpret.

In addition to interpretive authority under Chevron, when Congress enacted the FTC Act in 1914, it expressly granted the Commission the power to define the meaning of "unfair methods of competition." Congress was reacting to the Supreme Court decision in Standard Oil Co. v. United States in which the Court held that it had the ultimate power to interpret the Sherman Act.3 1 In delegating the power to define "unfair methods of competition" to the FTC, Congress sought to reassert control over the development of antitrust policy and prevent the courts from subverting legislative desires.

A. Modern Administrative Law Gives the FTC Broad Discretion to Interpret Section 5

Modern administrative law has transferred significant lawmaking power from the courts to the numerous executive and independent agencies in the federal government. Questions of statutory interpretation that were once the jealous prerogative of the courts are now often resolved by, for example, the Department of Labor, the Environmental Protection Agency, or the Federal Communications Commission. While agency statutory interpretations are still subject to judicial review, interpretations of statutes phrased in general terms are examined under a deferential legal standard.

The Supreme Court's Chevron decision revolutionized administrative law and policymaking in the United States. In reviewing a challenge to an interpretation of the Clean Air Act by the Environmental Protection Agency, the Court established a deferential standard of review for agency interpretations of statutes. The Court held that an agency's interpretation of a statute would be accorded deference if the statute is ambiguously worded and the agency's interpretation is reasonable.32 In practice, Chevron deference has meant that an agency's interpretation is permissible unless the statute's language expressly forecloses this particular interpretation.33 Chevron deference represents a transfer of power from the courts to the executive branch. Statutes that were traditionally interpreted 34 by the federal courts are now often given meaning by federal agencies.

The Court in Chevron justified this transfer of lawmaking and policymaking functions to agencies on multiple grounds. First, open-ended statutory language presumably reflects a desire on the part of Congress for agencies to interpret the statute.35 Second, the Court stated that agencies are better equipped than the courts, both in terms of expertise and resources, to decide the technical questions often implicated in statutory 36 interpretation. Third, the Court stated that agency heads, while they are not selected by popular vote, do answer to the democratically elected president.37 As such, agencies face more public accountability than federal judges with life tenure.

An agency's interpretation of a statute does not have to be articulated through notice-and-comment rulemaking to receive Chevron deference. Agencies have broad discretion over the policy instrument that they use to articulate interpretations of a statute. While notice-and-comment rulemakings are one of the most common means of propounding an interpretation of a statute, interpretations made through formal adjudications are also typically entitled to Chevron deference." Whether Chevron deference applies to interpretations made through other means, such as policy statements, is decided on a case-by-case basis.4 0

Agencies also have the power to revise and reverse earlier statutory interpretations. The Supreme Court decision in National Cable 41 Telecommunications Ass'n v. Brand X Internet Services upheld a significant change in the Federal Communications Commission's interpretation of a statutory provision. Provided they offer a reasoned explanation for the changed interpretation, agencies' revised interpretations of a statute are entitled to Chevron deference. 42 Agencies are thereby not bound by prior interpretations. They have the power to interpret and reinterpret ambiguously phrased statutes over time. Recently, the Supreme Court granted agencies procedural flexibility on revisiting interpretive rules, policy statements, and other regulatory interpretations that were not made through notice-and-comment rulemaking. In Perez v. Mortgage Bankers Ass'n, the Court held that agencies can subsequently revise these less formal interpretations without going through the notice-and-comment 43 process.

The FTC's interpretation of Section 5's prohibition on unfair methods of competition is almost certain to receive Chevron deference. The words "unfair methods of competition" are not self-defining and susceptible to multiple interpretations. These words are open-ended in content and, on their face, allow for a broad range of permissible interpretations. One scholar has succinctly captured how nebulous Section 5 is: "Nearly every word of the statute is rife with ambiguity: What is unfair? Unfair to whom? . . . What is a method? . . . What is competition?"" In light of its wording, Section 5 appears to be the paradigmatic example of a statute whose interpretation is entitled to Chevron deference.

#### Ambiguity in “unfair methods of competition” means Chevron applies.

Hurwitz ’14 [Justin; Assistant Professor of Law @ University of Nebraska College of Law; “*Chevron* and the Limits of Administrative Antitrust,” *University of Pittsburgh Law Review* 76, p. 209-275; AS]

A. Section 5 is Precisely the Sort of Statute to Which Chevron Applies

As a threshold matter, Section 5 is precisely the sort of statute to which Chevron deference is meant to apply.167 At a mechanical level, Chevron instructs courts to first ask whether the meaning of the statute is clear.168 Both “unfair methods of competition” and “unfair or deceptive acts or practices” are inherently ambiguous; courts need not turn to historical documents to determine whether a specific meaning was intended by Congress or whether Congress clearly intended to delegate interpretive authority to the FTC. Nearly every word of the statute is rife with ambiguity: What is unfair? Unfair to whom? What is deceptive? What is a method? An act? A practice? What is competition? As the Court has noted, the standard is “by necessity, an elusive one.”169

Absent clarifying language in the statute itself, or in some cases references outside the statute that indicate contrary congressional intent,170 the ambiguity inherent in the language of Section 5 is sufficient to trigger Chevron deference. The sole task of the courts is—or should be—to ensure that, whatever construction the FTC gives to Section 5, that construction is permissible within the boundaries of the statute.171

The argument for deference is even stronger when we consider outside references. The statutory history has consistently demonstrated a congressional intent to grant the FTC broad discretion to define the scope of Section 5 and, in particular, that the scope of Section 5 is broader than that of the antitrust laws.172 Section 5 was enacted in response to concerns that the courts had interpreted the antitrust laws too narrowly;173 it was deliberately drafted with language that had not previously been considered by the courts.174 When the Court imposed an overly narrow construction on the statute in the 1950s, Congress amended the statute to overcome that narrowing interpretation.175

Section 5 is, thus, a case study in each of the four rationales for Chevron deference:176 congressional intent; agency expertise; concern about the courts’ limited political accountability as compared to Congress and its agencies; and the separation of powers—all of which urge deference to the FTC’s interpretation of Section 5. It is hard to imagine a statute better suited to Chevron deference than Section 5.

## Civil RICO

### XT – PDCP

#### The CP expands core antitrust laws – review competes but ENFORCMENT of review comes from Sherman Act powers. At worst, its links to NB

Rill 2 – was an Assistant Attorney General for the Antitrust Division in the Department of Justice (James, "The Evolution of Modern Antitrust among Federal Agencies." George Mason Law Review, vol. 11, no. 1, Fall 2002, p. 135-142. HeinOnline)//gcd

The sectoral agencies, however, have clearly failed to fully embrace consumer-welfare objectives, and the frictions in time and sometimes outcome resulting from overlapping jurisdiction with the Federal Trade Commission (FTC) and the Department of Justice (DOJ) persist. Thus, parallel authority exists for merger enforcement in certain industries, such as telecommunications, cable, and broadcast in the DOJ and the Federal Communications Commission (FCC). The FCC's jurisdiction to review such mergers is derived from the Communications Act of 1934," which requires the FCC to review mergers between telecommunications common carriers under a "public interest" standard. The Clayton Act 12 grants the FCC the authority to bar acquisitions of common carriers engaged in wire or radio communications where the effect of such acquisition may be to substantially lessen competition or tend to create a monopoly.' 3 The Clayton Act mandate also gives DOJ the power to review mergers generally. 14 While the DOJ review focuses on whether possible anticompetitive effects of the merger violate antitrust laws, the FCC has used its broader powers under the Communications Act to apply the public interest standard, which includes not only an assessment of the competitive effects of the merger but other factors as well. These review standards have resulted in differing treatment of the same merger. For example, in the case of the merger between Bell Atlantic and NYNEX, the DOJ did not oppose the merger and imposed no conditions while the FCC imposed several conditions derived from a novel antitrust theory and transcending antitrust remedies. 5 The conditions imposed by the FCC were clearly directed toward meeting the policy objectives of the Communications Act rather than addressing potential antitrust harm

### XT 2AC 2: Expertise

#### Wouldn’t deter or solve – solvency requires getting inside an algorithm.

Woodcock ’20 [Ramsi; Assistant Professor @ University of Kentucky Rosenberg College of Law; “The Efficient Queue and the Case against Dynamic Pricing,” *Iowa Law Review*, 105(4), p. 1759-1798; AS]

The case for banning dynamic pricing is stronger than the case for banning naked price fixing also because dynamic pricing is easier to identify, and therefore to prosecute, than is price fixing. The communications that give rise to the agreement necessary to identify an instance of price fixing can consist in no more than a meaningful look, or a few words of code., ° 20 They are fleeting and difficult to record. 2 Dynamic pricing, by contrast, requires the creation and maintenance of an IT infrastructure programmed to adjust prices in response to unexpected surges in demand with a frequency that exceeds the frequency with which supplies of the firm's products may be replenished. 22 The speed with which a firm can refresh inventory is easily ascertained from a firm's own inventory data. And the rest of the evidence is in the software that adjusts prices in response to new information about demand, and in the software technicians required to tend to that software.L23 Put these observables together-inventory refreshment times substantially above zero and a dynamic pricing infrastructure-and the inference of dynamic pricing follows immediately. Where in the case of price fixing it is in some sense necessary to get inside the heads of the officers of different corporations to determine whether they have struck an agreement, it is only necessary, in the case of dynamic pricing, to get inside an algorithm.s4

The ability to observe the dynamic pricing infrastructure itself is helpful, because inferring dynamic pricing from price changes themselves would be difficult. The reason is that dynamic pricing is difficult to distinguish, based on price changes alone, from the conceptually distinct practice of personalized pricing.!5 Personalized pricing is the tailoring of prices, ideally at the individual or unit level, based on past information about demand, in contrast to the price adjustments based on new information about demand undertaken by dynamic pricing. 12 6 Personalized pricing can look like dynamic pricing because in order to charge consumers personalized prices based on past information about consumers' willingness to pay, it is necessary, unless all customers buy at the same time, to change the prices at which products are offered over time based on the identity of the shopper making a purchase.7 Thus, personalized pricing requires the constant adjustment of prices overtime, just as dynamic pricing does. '2 The distinguishing feature of dynamic pricing, that the price changes are based on new information about demand and not old information about the identity of purchasers, cannot be inferred from the rate of change of prices alone. Distinguishing the two practices may not ultimately be important for antitrust, however, because, as I argue elsewhere, personalized pricing too should be understood to violate the antitrust laws.'29

#### Only the FTC can survey algorithm data to identify anticompetitive practices.

Kreighbaum ’20 [David; Associate @ McGuireWoods LLP, JD @ Texas A&M University School of Law; “Algorithms Take Flight: Modern Pricing Algorithms' Effect on Antitrust Laws in the Aviation Industry,” *Loyola Consumer Law Review*, 32(2), p. 282-317; AS]

When an inevitable moving force (technology) finds its way around an immovable object (federal antitrust laws), the object needs to adapt, not change. Most options to regulate the airlines' oligopoly 'crack' are unhelpful. However, using current antitrust laws-specifically the FTC-to promote transparency in the airlines' pricing algorithms would benefit consumers. 219 If airlines provided the information their algorithms use to the FTC, they could prevent anticompetitive behavior. This will also benefit airlines. Pricing algorithms are a necessity in the aviation industry. By making their pricing algorithm's information available to the FTC, airlines are able to continue using the technology. Additionally, being transparent with the FTC will prevent future lawsuits that lead to costly discovery while investigators determine whether pricing algorithms were colluding.

I recommend the FTC regulate airlines' pricing algorithms because the FTC has previously recognized a need to regulate big data"O and it has jurisdiction over unfairpractices.21 An algorithm is useless without large amounts of data. Data is how it learns and improves. 2 Pricing algorithms in the aviation industry could lead to unfair-pricing." 3 With the FTC regulating big-data and unfair practices, regulating the data that airlines' pricing algorithms use is a logical extension. The FTC may not be able to catch everything, but someday they may employ an algorithm that can.

#### Private parties cannot decipher algorithms.

Gulati ’18 [Ankita; MBA @ Fore School of Management; “How Much Is No Longer A Simple Question – Pricing Algorithms and Antitrust Laws”; https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3682486; AS]

There has also been significant research into ways in which a self-learning algorithm can be taught to explain its decisions. The DARPA147 is looking into ways in which a self-learning algorithm can be designed to comprise several smaller modules which may be easier to understand which examined individually.148 Others have toyed with the idea of designing an algorithm which would provide an example that explains why it made a particular decision.149 Another approach could be to use two self-learning algorithms together where one makes the decision, and the other observes and describes the process.150

As such, it is theoretically possible to decipher even the most complex self-learning algorithms, and the FTC needs to invest in research into such methods in order to both uncover evidence of anti-competitive agreements and audit algorithms that appear to collude even in the absence of an agreement. It is also highly likely that if the FTC would announce its intentions of auditing pricing algorithms in the future, algorithm programmers may also have the incentive to find ways to make algorithms more explainable to reduce the compliance costs of their clients.