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Marketplace platforms or exchanges? Financial metaphors for regulating the collaborative economy

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Introduction

The terms "sharing economy", "collaborative economy", "on-demand economy" and "peer economy" are currently used – in media and other popular literature, and increasingly by state regulatory agencies and academic publications – to denote an emerging class of businesses which mediate, via the Internet, buyers and sellers of services. Prominent examples include the "ride-sharing" companies Uber and Lyft (which match requests for rides with providers of rides); the residential-space booking companies Airbnb and HomeAway (which connect requests for non-hotel lodging with renters and homeowners); the "P2P" loan services companies Lending Club and Prosper (matching borrowers with investors); and the freelance services companies oDesk and Elance (now merged as Upwork). These firms, largely funded by venture capitalists, are not generally buyers or sellers of goods themselves, as in a traditional production market (White 1981a); instead, they produce networked "marketplace platforms" which in turn provide opportunities to buy and sell – skimming a percentage of each transaction as a middleman – and are thus always distinctly less concerned with organizing the supply-chain logistics characteristic of commercial trade.

While platforms of this sort have existed for some time – eBay, after all, was profitably matching buyers and sellers of large varieties of goods online in the 1990s – they have become increasingly prominent in recent years in their overt "disruption" of various service industries, and the high (greater than $1 billion) "unicorn" valuations of Uber, Lyft, Airbnb, WeWork, InstaCart, and others. Recently, multiple pop-business books – related to the emerging field of "platform economics" centered around MIT's Sloan School of Management (Evans, Hagiu, and Schmalensee (2006), Evans (2011)) – have been published on the subject, with titles like *Matchmakers: the New Economics of Multisided Platforms* and *Platform Revolution: How Networked Markets Are Transforming the Economy – And How to Make Them Work for You*.1

But should economic sociologists leave the theorization of marketplace platforms solely to economists? In this article I will suggest that economic sociology is uniquely positioned to provide a distinctive interpretation of marketplace-platform phenomena, particularly via theoretical insights from Patrik Aspers, which were originally developed and articulated in the very pages of Economic Sociology: *European Electronic Newsletter* (Aspers 2005); and, perhaps unexpectedly, via the long tradition of historical and ethnographic research on financial markets ranging from Abolafia (1996) to Cetina and Bruegger (2002) to MacKenzie and Pardo-Guerra (2014). Specifically, I will argue that many of the emergent organizational and regulatory complexities of the marketplace platform – especially with regard to competition, fragmentation, counterparty risk, and the possibility of self-regulation and cooperative ownership – have already been historically realized, in an equally dramatic fashion, in a completely different organizational domain: namely, that of the *securities exchange industry*. The gradual introduction of electronic stock exchanges, for example, was accompanied by an extended controversy – simultaneously technological and political – over the nature of their relationship with traditional exchanges, and I will argue that this is just one of the intriguing and productive parallels with these newer controversial marketplace platforms.

But I will also suggest that it is essential that economic sociologists find a place for their traditions of inquiry in the rapidly accelerating contemporary debates on scalable marketplace platforms. The phenomena of "marketization" that these platforms induce – now known in France as "ubérisation" – represent a very different type of "financialization" than the increased centrality and dependence on financial markets articulated by Krippner (2012), and it is clear that many regulatory agencies are at risk of (mis-)regulating marketplace platforms as if they were traditional production

firms. Examples of these densely-networked arenas of discussion include the U.S. Federal Trade Commission's workshop "The 'Sharing' Economy: Issues Facing Platforms, Participants, and Regulators" (FTC 2015) and hearings by the UK Parliament's House of Lords (European Union Committee 2016). Additionally, a multitude of debates have taken or are currently taking place within various urban governments, in which municipal representatives and local citizen groups are pitted against multibillion-dollar-valued private corporations to negotiate the ontological character of their services; and some of these debates unconsciously re-rehearse the way that U.S. regulators attempted to simultaneously – and arguably paradoxically – unify markets and enforce competition in the newly-emerging digital stock exchanges of the 1990s.

Switch-role markets in finance

In 2005, Patrik Aspers – as part of a critique of Callon (1998)'s theory of performativity – made the claim that economic sociology "misses a crucial distinction between two kinds of markets: exchange role markets, such as financial markets, and fixed role markets, such as producer markets for commodities" (Aspers 2005, 33).**2** His typological distinction was developed further in later works (e.g. Aspers (2007) and Aspers (2011)), changing what he called "exchange role markets" to "switch-role markets", to indicate more directly that actors on either side may *switch roles*: that is to say, it is possible (or common) for buyers to switch to becoming sellers, and vice versa. (See Fig. 1 for an illustration.) The other primary ideal-type distinction introduced by Aspers was that of *standard* markets, where the good or service being exchanged is standardized and represented via some measure or contract; versus *status* markets, where the buyers and sellers are distinctive and can be ordered in relation to one another. The apotheosis of the *switch-role* and *standard* market, then, is a modern securities market, where a buyer can rapidly "flip" a stock within microseconds (i.e. switch from buyer to seller), and the goods being traded are perfectly standardized and fungible (i.e. the buyer or seller is solely concerned with that stock's price than the relational identity of the seller).

See appendix, figure 1

While it was clear to Aspers that financial markets were obvious examples of the switch-role and standard market, neither Aspers nor many other economic sociologists were, until recently, particularly concerned with the *stock exchange* itself in its role as a *firm*, a structured institution without which those financial markets would not exist.**3** If one considers the stock exchange as an organization which can be in competition with other organizations – as in the case earlier in the 20th century, between the New York Stock Exchange (NYSE) and regional exchanges like Philadelphia's at which one could trade NYSE-listed securities – one can see exchanges as sellers in a *fixed-role* market for trading services (concisely, a "market for liquidity"**4**), where the "buyers" of those trading services are various individual and institutional traders, buying and selling stock on the platforms produced by the exchanges (and mediated by the exchange's authorized brokerage firms and/or dealers); see figure 2. Exchanges, then, are themselves in fact producers; and what they produce are market platforms to match buyers and sellers of various securities. In brief, *an exchange industry is a fixed-role market that produces switch-role markets*. And just as Aspers (2007, 379) insisted that "no existing theory can be used to explain both [fixed-role and switch-role markets]", one can often find in non-specialist discussions of stock exchanges certain basic terms (such as "market" and "competition") being interchangeably applied to both the fixed-role market competition (for trading services, between exchanges) and switch-role market competition (between buyers and sellers of a given stock to transact at a favorable price).

See appendix, figure 2

In order, then, to understand the regulatory dynamics of marketplace platforms – which, like securities exchanges, have their primary activity the automated matching of buyers and sellers, and not production via a supply chain of upstream-to-downstream commodities – we can look to the much longer history of the financial markets produced by stock exchanges for clues. Specifically, we will focus on issues regarding (1) competition and fragmentation; (2) counterparty risk; and (3) self-regulation. By *competition/fragmentation* we refer to situations in which one can trade the same securities in multiple arenas; until the regulatory changes of the 1990s it was common, for various reasons, for 80% or more of trading in a given stock to occur on a single exchange. By *counterparty risk* we refer to the possibility that a participant on one side of a trade will default on their obligations; stock exchanges act to mitigate this risk in various ways, which we will discuss below. Finally, by *self-regulation* we refer to the governance structure of many exchanges, which deferred various aspects of regulatory action to the institutions themselves.

Competition/fragmentation in financial markets

The New York Stock Exchange (NYSE) – to rely on a prominent example – has a long history of deliberately limiting competition: the original Buttonwood Tree agreement in 1792, for example, fixed the minimum commission rate for member brokers at 0.25%, meaning that no matter how large the volume of shares traded, the brokers got the same non-negotiable cut; it also stipulated that members should deal with each other instead of non-members whenever possible (Harris 2003, 64). Through the 20th century, the NYSE actively prevented its members – the "broker-dealers" which traded on behalf of institutional and individual investors, and/or on their own behalf – from belonging to competing exchanges (such as the Consolidated Stock Exchange, founded in 1885, and the "curb" market which would become the American Stock Exchange.)**5** In response to the crash of 1929, the Securities Exchange Act of 1934 created the Securities and Exchange Commission (SEC) as an independent regulatory agency (primarily due to concerns regarding stock price manipulation), but much of the regulatory activity was left to the exchanges themselves, as so-called Self-Regulatory Organizations (SROs); and so their anti-competitive practices continued during the 20th century.**6** The NYSE's members were also prohibited from trading NYSE-listed securities on other (e.g. regional) exchanges, and while the SEC managed to abolish these restrictions for newly listed stocks after April 26, 1979, the NYSE's "Rule 390" prevented member competition in trading all pre-1979 stocks until 2000.**7**

Perhaps analogously to some of the incumbent "cartels" which various marketplace platforms are now held to be disrupting – such as the regulated "medallion" system for taxicabs in some large cities – the New York Stock Exchange in the early 1970s had a very high "seat price" for brokerage firms who wished to execute trades on the exchange. Moreover, existing rules made it nearly impossible for any new or alternative exchange venue to attract significant trading in NYSE-listed securities. Even after the SEC's 1975 Securities Acts Amendments which eliminated minimum fixed commission rates, the NYSE continued to dominate U.S. trading, with over 80% of the share volume in 1981.**8** But along with the 1975 Amendments came the emphatic call for a so-called National Market System (NMS), a concept which sought to encourage competition among exchanges by allowing traders to get the best price on multiple markets; and with that came the beginnings of technological interventions which aimed to link information about quotes for bids and offers, as well as information regarding executed trades.**9**

In another paper currently under development (with Yuval Millo, Daniel Beunza and David Lubin)**10**, we detail the interweaving of technological and regulatory change during the 1990s in the United States, as the increasing technical facility for brokers (at first non-members) to effectively run their own order matching engines – as entirely new exchange-like systems known as *electronic communications networks*, or ECNs – coincided with the SEC's attempt to facilitate competition among the incumbent exchanges (Nasdaq and the NYSE). The decisions made in this period, including the 1996 Order Handling Rules, are in part responsible for certain distinctive aspects of today's exchange industry, an environment in which (for example) every NYSE-listed stock can be traded on many dozens of competing platforms, from public exchanges to dark pools; and which is beset by controversies involving high-frequency-trading (HFT) algorithms which perform arbitrage at high speeds between these competing exchanges.

Once the Order Handling Rules and the Regulation of Exchanges and Alternative Trading Systems (Reg ATS) gave license to these new, broker-dealer-run ECNs to operate in an exchange-like manner, the race was on to draw liquidity away from the incumbent exchanges. These regulations also released the ECNs from the self-regulatory burden of being registered as an exchange. Instead of taking an equal commission from buyers and sellers, for example, ECNs like Island in 1997 began using so-called "maker-taker" pricing schemes which aimed to encourage the posting of orders on their system. If a match was made, the initial "liquidity provider" was rewarded with a high (0.25 cents/share) "liquidity rebate", while the "taker" on the opposite side was charged a negative "access fee" (0.30 cents/share).**11** This subsidization approach – in which some platforms attracting one group of customers with subsidies at the expense of another group of customers, as in the traditional newspaper industry – was noted by the early platform economics literature (e.g. Rochet and Tirole 2003) as a common strategy to build a "critical mass".

The effect of these regulatory changes, then, was certainly to "disrupt" an existing state of affairs in which there was little significant trading competition for incumbent exchanges. However, this competition – because it was happening at the firm level of the exchange industry (competing to provide trading services in given securities) rather than the level of a single, unified market for particular stocks (where indi-

vidual buyers and sellers might thus be concentrated in their "competition" for the best price) – came to be described as "fragmentation", a pejorative term which indicates a move away from an idealized market which finds its Walrasian equilibrium precisely in the participants meeting at a single continuous auction. From the story detailed above, however, it would seem that for switch-role markets, competition is necessarily *also* fragmentation.

The effect of this regulated competition/fragmentation on the exchange industry in the coming decade was extreme, with rapid waves of mergers as well as demutualizations – meaning that these former mutual cooperatives went public (and thus became listed firms on their own trading floors).12 In 2002 the exchange industry scholar Ruben Lee saw that in such a competitive environment – with the cost of a transaction headed to zero – that one of the last reliable sources of revenue for exchanges were the quotes and trade data themselves; he predicted that exchanges would thus become, like media companies, "content providers" (Lee 2002). This observation implicitly ties the disruption of the exchanges to the well-known disruption of other platforms like newspapers at the hands of online competition; and thus gives us one perspective on the future of marketplace platforms, which also equally at risk for competition and fragmentation. As Lee predicted, as the commission per transaction decreased in a more competitive environment, these newly public exchanges have increasingly derived their revenue from receiving revenues for market data.13 Indeed, some ECNs (like Island) which had originally avoided being registered as exchanges later sought to be registered as exchanges instead of broker-dealers, precisely because of the possibility of collecting revenue from their market data under U.S. regulations.14

Counterparty risk in financial markets

It is the economic concept of counterparty risk – the possibility that the opposing party to a trade will fail to settle their debt – that inspired various medieval financial innovations described by Braudel (1992).15 These mechanisms included *bills of exchange*, debt instruments which could be redeemed at trusted merchant banks; *fairs*, which at their conclusions took on the role of a clearinghouse, netting bills of exchange among merchants; and finally *stock exchanges* themselves, whose member dealers served as counterparties to both buyers and sellers. The "anonymous" trading we associate with modern stock exchanges – where buyer and seller may never meet in person, and yet manage to trust each other to complete a transaction – is only possible given highly standardized goods (such as stocks); and (especially in the case of forward or futures trading) a form of centralized *clearinghouse* institution which attempts to guarantee payment in the event of default of one party.16 By limiting its members, exchanges provided an element of trust that the opposing party would not default; by centralizing clearing (in what is called a "centralized counterparty" (CCP)), it provided further guarantees of ultimate settlement.17 The stock exchange is thus an institution that limits the risks of exchange on the financial markets it produces; we will later see important analogies to this state of affairs in marketplace platforms.

Self-regulation in financial markets

The self-regulatory status of stock exchanges – effected as a matter of pragmatic expediency in 1934 – was something of a curiosity for mid-century observers: one commentator noted that "stock exchanges seem to have been permitted to function almost as though there were no antitrust problem at all… the technical relationship of the exchange to the state is, roughly, the same as the relationship of a private club."18 Abolafia, in his ethnographic observations of futures and securities markets, noted that "self-regulators are, in fact, engaged in a delicate balancing act between profits and prudence… they know that the market's legitimacy is essential to their long-term viability."19 He contrasted the comparatively freewheeling futures pits with the presence of floor governors (SRO officials) on the NYSE floor, noting that "members exhibited a boastful pride in the rules and in the rules' consequences for a fair and equitable marketplace".20 The occasional large-scale study of the exchange industry in the 20th century (e.g. Securities and Exchange Commission (1963), Securities and Exchange Commission (1994)) raised the various potential problems of combining oversight and competition, without making firm recommendations for significant change to the SRO status quo. The question remains as to which type of industries demand or deserve self-regulatory status, and what precisely about trading services should lead it to remain outside more commercial antitrust regulations: if it is because an exchange is a natural monopoly, why deliberately induce competition? And if it is *not* a natural monopoly, then why delegate enough control to the exchange to permit it to maintain anticompetitive practices? As part of the next section, I will suggest that – whether we know it or not – state legislatures have (perhaps unfairly) granted a kind of self-regulatory status to certain marketplace platforms, and that explicitly expanding or constraining this SRO role will be an important policy prescription of the future.

Switch-role markets in marketplace platforms: a comparison

The current approaches to regulation of firms like Uber/Lyft and Airbnb/VRBO are in part misplaced, as these firms have many qualities that are less like traditional participants in a taxicab or hotel industry and far more like the new electronic stock exchanges of the 1990s; it may be the case that legislators would do better to contend with the "market microstructure" of the businesses in question. See appendix, figure 3, for an illustration showing the sharing-economy analogy to appendix, figure 2, for a broad comparison of the various aspects discussed in this section, see appendix, table 1. The interjection of exchange-like logic into commercial domains, I suggest – i.e., the competitive substitution of fixed-role production/consumption markets with switch-role markets which automatically match buyers and sellers – is at the heart of the perfect storm of controversy which these businesses appear to continuously generate. As in the previous section, I will address three aspects of these marketplace platform firms: (1) I will consider the relevance of *competition and fragmentation* by examining the potential (but relative absence at present) for linking "orders" between competing marketplace-platform firms, in an analogy to 1990s-era developments on stock exchanges. (2) I will address *counterparty risk* by discussing the use of reputation feedback systems and other mechanisms for facilitating trust. (3) Finally, I will examine the practices, promises, and potential (or lack thereof) of encouraging a *self-regulatory* approach to marketplace platforms.

See appendix, figure 3

Competition/fragmentation in marketplace platforms

Like the NYSE "club" of the 1970s, Uber/Lyft and Airbnb in particular have become notorious in many municipalities for their anti-regulatory attitudes, seeking to halt much nascent legislation through extensive lobbying. But unlike the NYSE throughout most of the 20th century, these firms are more at risk from competition by future platform firms, assuming those competing platforms can reach a sustainable critical mass. To use the phrasing of economists, there are low "switching costs" between, e.g., using Uber versus using Lyft (one simply has to download a new mobile app.) To put it another way, the "off-exchange" trading restrictions that protected the NYSE – preventing the occurrence of equivalent transactions (of e.g., NYSE-listed securities) on other exchanges – are not present in this case (many platforms are available for the same approximate service, a ride from point A to point B). At the same time, the phenomenon of "liquidity attracting liquidity" remains, so that the more drivers/riders use the Uber platform, the more appealing the platform is for future participants (just as a confluence of buyers/sellers attracts other buyers/sellers). No legal barriers prevent the interlinking of the markets, however, only technical ones. Therefore, the apps may deliberately attempt to block external firms from displaying price quotes – as Uber did for Urbanhail, a price comparison startup for ride services in Boston.**21**)

We can see then that the most significant difference between stock exchanges and Uber/Lyft is that the former facilitates the buying and selling of perfectly standardized (and thus fungible) *goods*, while the latter facilitates the buying and selling of (more or less standard) *services*; for while one can trivially "flip" a stock, it is harder to see how one can literally "flip" a ride or short-term rental – though many Airbnb hosts, for example, are also Airbnb customers, often simultaneously (e.g. while one is on vacation).**22** To problematize this traditional goods-services distinction, with its origins in Adam Smith's concepts of productive and unproductive labor, requires a return to debates in economic sociology in the early 2000s (Callon, Méadel, and Rabeharisoa (2002); Slater (2002)).**23** Inspired by Gadrey (2000), Callon et. al. find that frames around service activities facilitate "the singularization of products" (Aspers' *standard* market); and it facilitates the consumer's "attachment to and detachment from" products (as in the purchase of a temporary ride from point A to point B; or, perhaps, the *switch-role* character of getting "in and out" of a market by, e.g., buying and quickly selling). Despite this, the ability of goods and services to be conflated for centuries – and why their arguably "sociological" distinction remained unproblematic for late-20th-century economists in many regards – is that their exchange can be represented and recorded by a *transaction* (Hill 1977). As such, marketplace platforms, whether they match buyers and sellers of goods (e.g. eBay, Amazon's used-books marketplace) or buyers and sellers of services (Uber/Lyft, Taskrabbit), have the same basic revenue model at the center of their platforms: to bring together as many buyers and sellers together as possible, and to take a percentage of each facilitated transaction.

Taking the notion of liquidity in a financial market and applying it to these marketplace platforms can be instructive, to see how the analogy can apply to both goods and services. For example, the claim of Uber's representatives that their prices are a function of "supply and demand" can lead

one to ask whether drivers represent supply and riders demand, or vice versa. To use the securities market analogy – in which those who post limit orders are market "makers" and those who post market orders the price "takers"**24** – the driver is ostensibly a "maker" of liquidity, with the rider a "taker"; but from the perspective of the driver, who also needs liquidity, the riders could be the "makers" and her the "taker."**25** On Uber's platform, for example, a driver can be punished for turning down too many rides (being "unmarketable"), and riders can abort their ostensibly "marketable" orders for rides if the estimated price (or estimated "surge" factor) is too high. But note the comparative opacity and discontinuity of this matching process: in a financial market, if offers suddenly and discontinuously "surged" to 1.4 times their previous value, automated circuit breakers would halt trading! There is thus reason to be suspicious of Uber's "Economics 101" claims, when their system is not truly running a continuous auction matching explicit bids and offers. Interestingly, the Uber/Lyft competitor Sidecar, beginning in February 2014, allowed drivers to bid on rides and riders to choose based on price or other driver parameters (e.g. closer drivers, drivers with higher ratings); these competitor features brought the exchange-like character of these systems to the fore, but this pricing system was not enough to sustain Sidecar as a viable competitor.**26**

Counterparty risk in marketplace platforms

One controversial aspect of marketplace platforms is the use of interactive ratings systems to induce service quality and customer protection by providing a measure of participant reputation; but ratings systems (pioneered in part by eBay, and common in, e.g., Uber/Lyft, Airbnb, and more) are only one way that users of marketplace platforms attempt to mitigate counterparty risk.**27** First, one should note that these ratings systems are often *bilateral* – the rider rates the driver, but the driver also rates the rider – which is suggestive of switch-role markets because the buyer is no different from the seller (i.e., both can be rated in the same manner). By contrast, in production markets it is more common to rate only one side, as in Yelp reviews, which are strictly fixed-role and unilateral (for an analysis of consumer restaurant reviews, see Mellet et al. (2014)).

But the other, less appreciated way these platforms mitigate risk is by providing various guarantees of settlement and protection from other liabilities, much as a stock or futures exchange mitigates credit risk with centralized clearing and settlement procedures, as described above. In the case of many marketplace platform services, one's credit card is not charged (or bank account deposited) until the service is consummated; Airbnb specifically provides $1M liability insurance in the case of accident or death. Much like the transactions processed by clearinghouses, economic transactions "between", e.g., a rider and driver are actually composed of two separate transactions: one from the rider's credit or debit card to Uber/Lyft and one from Uber/Lyft to the driver (with rider payments netted weekly and middleman fees deducted). The mitigation of risk on the part of "collaborative economy" marketplace platforms is thus not entirely dependent on collaborative ratings but instead uses traditional centralized clearing and settlement methods recognizable from the exchange industry to facilitate anonymous transactions. We can thus also see how "peer-to-peer" lending firms (e.g. Lending Club, Prosper) could initially be distinguished by their blending of traditional risk management (e.g. FICO credit ratings) with more "collaborative" information about social ties.**28**

Self-regulation in marketplace platforms

Before the waves of demutualization and mergers of the 2000s, exchanges like the NYSE were member-owned, nonprofit cooperatives, a fact that is often lost in dismissive discussions about Wall Street and capitalism, and one which is especially lost on the recent critical commentary that private, for-profit, venture-capital-funded marketplace platforms could also be realized as member-owned "platform cooperatives" (Scholz 2016). Given the history of stock exchanges, this perspective is both reasonable (it is, indeed, technically quite possible to imagine a member-owned ride services or short-term rental services platform) but also dismissive of the revenue challenges that can emerge in a technopolitical situation where any of your customers (such as the brokerages of the incumbent stock exchanges) could turn and become a competitor (e.g., by implementing their own order matching system and drawing away order flow with various incentives and rebates).

However, the appropriate regulation of marketplace platforms, whether private or cooperatively owned, remains in question. If, as I have been arguing, marketplace platform firms are like stock exchanges, how can the self-regulatory organization (SRO) status of exchanges inform their regulation? It would appear that by conceiving of these companies as traditional competitors (i.e. as similar to taxicab companies or hotels), many of their practices appear outright to be illegal. But if we conceive of them as exchanges, then we can see that some combination of self-regulation, transpar-

ency, and oversight may be more appropriate; an argument like this has recently been proposed by Cohen and Sundararajan (2015). But even given the SRO status of exchanges which provides a measure of day-to-day regulatory autonomy, it should be noted that exchanges are comparatively far more bound by SEC rules than any current marketplace platform firm is by any corresponding agency (such as the Federal Trade Commission (FTC)). Specifically, we can look at the obligations of exchanges to expose market data to facilitate inter-exchange competition, but also for oversight purposes (so that, e.g., the SEC can investigate "flash crashes"); this is precisely the kind of information which some legislators have found very difficult to elicit from Uber/Lyft/Airbnb, especially in any kind of real-time modality.[29] A modest, and yet arguably far-reaching, proposal would be to permit the SRO-like qualities of existing marketplace platform firms – the enforcement of business practices (using internal data) and the use of reputation feedback systems – but to mandate a certain level of data transparency to regulators. The potential also exists to mandate data exposure even to competing platforms, but to do so would be – as in the history of the exchange industry – to trade anticompetition for hypercompetition (i.e. from one or two major exchanges to dozens of competing exchanges and dark pools). Just as with the exchanges, it will be increasingly necessary to step back and determine a sustainable combination of regulation and self-regulation; but it will not be possible for legislators to move forward until the current level of opacity of operational data is explicitly reduced.

See appendix, table 1

Michael Castelle *is a Ph.D. Candidate in the Department of Sociology at the University of Chicago. His dissertation* The Transaction and the Exchange: from Database to Marketplace *investigates the late-20th-century formalization of the transaction concept and the subsequent reliability of – and institutional dependence on – transaction-processing computing systems in finance and commerce. He is currently (with support from the University of Chicago's Nicholson Center for British Studies and the University of Warwick's Centre for Interdisciplinary Methodologies) developing a research agenda which examines historical and contemporary practices of dataflow and/or streaming data in computing.*

Endnotes

1 Evans and Schmalensee (2016); Parker, Van Alstyne, and Choudary (2016). While I do not directly engage with the platform economics or industrial organization literature here, I intend this essay to be a first step towards developing a distinctive alternative to – and coherent critique of – that subfield's emphases on "two-sided" and "multi-sided" markets (Rochet and Tirole (2003); Evans (2003); Rysman (2009); Hagiu and Wright (2015)), which tend to privilege market scenarios featuring indirect network effects.

2 By "producer markets" Aspers referred to what Harrison White isolated as production markets in his influential papers which called for a sociological understanding of interfirm competition (White (1981a), White (1981b)).

3 A newer article (Ahrne, Aspers, and Brunsson (2015)) does point out that exchanges "usually take the form of associations or firms" and contrasts this with contemporary economists' assumption that markets can appear spontaneously. Works focusing on the Paris Bourse as a firm and/or institution include Hautcoeur and Riva (2012) and Lagneau-Ymonet and Riva (2015), but the history of inter-exchange competition there is less extensive than in the U.S. cases.

4 Friess and Greenaway (2006, 162).

5 Michie (1986).

6 On the history of the SEC and of exchange self-regulation, see Seligman (2004) and Seligman (1982).

7 Karmel (2002).

8 Seligman (1985).

9 These systems emerging from the National Market System mandates include the "consolidated tape" (reporting executed trades), "consolidated quote" (reporting quotes for limit orders), and the Intermarket Trading System (ITS) (allowing, e.g. traders on regional exchanges to forward their orders to the NYSE, or vice versa) (Seligman 1984).

10 Castelle et al. (2016).

11 Foucault (2012); Angel, Harris, and Spatt (2010). For a comparison of these U.S. securities rules to the European Union's Markets in Financial Instruments Directive (MiFID) see Boskovic, Cerruti, and Noel (2010).

12 On the demutualized exchange see Macey, Jonathan R. and O'Hara, Maureen (2005).

13 Hasbrouck (2014). Reg NMS' "market data rule" imposes a weighted formula based on trade volume and frequency, as well as for improving on the visible best bid and offer (Hasbrouck 2007). (In Europe, there is no comparable regulated consolidation of market data.)

14 Markham and Harty (2008). In 2009, the CEO of the Direct Edge ECN stated: "As an exchange operator, you follow the money. With exchange status and market penetration you can collect significant market data fees here in the USA" (Schwartz, Byrne, and Schnee 2013, 18).

15 On counterparty risk and broker defaults on the Paris Bourse, see Riva and White (2011). For other discussion of financial risk in the economic sociology literature, see Zaloom (2004); Hardie (2004); MacKenzie, Beunza, and Hardie (2009); and Holzer and Millo (2005).

16 On clearinghouse mechanisms, see Millo et al. (2005).

17On the introduction of centralized clearing to the NYSE, see Bernstein, Hughson, and Weidenmeier (2014).Note that the concept of clearing (bilateral, multilateral) presumes switch-role markets, while the concept of settlement (fund transfer between counterparties) does not.

18Westwood and Howard (1952).

19Abolafia (1996, 101–102). For a more critical perspective on SROs see Miller (1985).

20Abolafia (1996, 104).

21Woodward (2016).

22Adam Smith remarks that the labors of servants, for example, "generally perish in the very instant of their performance, and seldom leave any trace or value behind them for which an equal quantity of service could afterwards be procured." (Smith 1776, 358)

23For example, it reveals that many "on-demand"-style firms may match buyers and sellers of services, but those services (specifically, delivery, a.k.a. the temporary service-like intermediation of goods transactions) are potentially rather closely integrated into traditional fixed-role production markets for goods. Indeed, some on-demand firms (Instacart, Shyp) are closely integrated with producer firms (e.g. supermarkets and shipping carriers, respectively) that they have reclassified some or all of their shoppers/couriers as employees.

24On the distinction between makers and takers in financial markets, see Foucault (2012).

25While there is certainly an overall asymmetry between the rider and driver as actors (the former might consummate a ride once in a day, but the latter several times), during their mutual engagement it is not necessarily obvious which one provides liquidity while the other takes it away.

26Tam (2014).

27For a prescient comparison of eBay to financial markets, see Kollock (1999).

28Verstein (2011).

29On the increasing importance of data monitoring for financial regulators, see Flood, Mendelowitz, and Nichols (2013).

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Appendix

Figure 1 a) A fixed-role market. B) A switch-role market

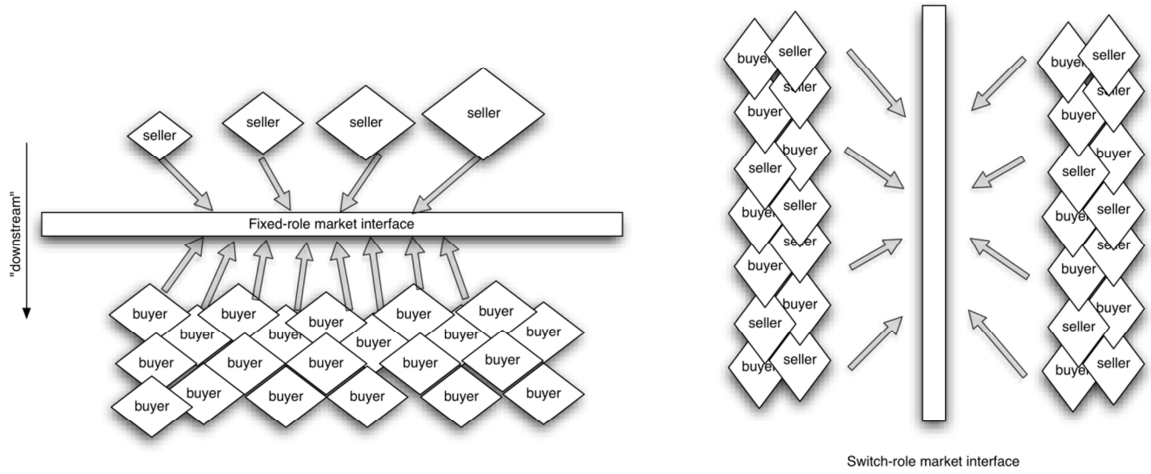


Figure 2

In this historically-inspired example, producers of trading services for IBM stock include the NYSE and the regional Philadelphia Stock Exchange (PHLX). Brokers and dealers are "in the market" for the exchanges' services, which consist of switch-role markets in which they can alternately buy and sell IBM stock.

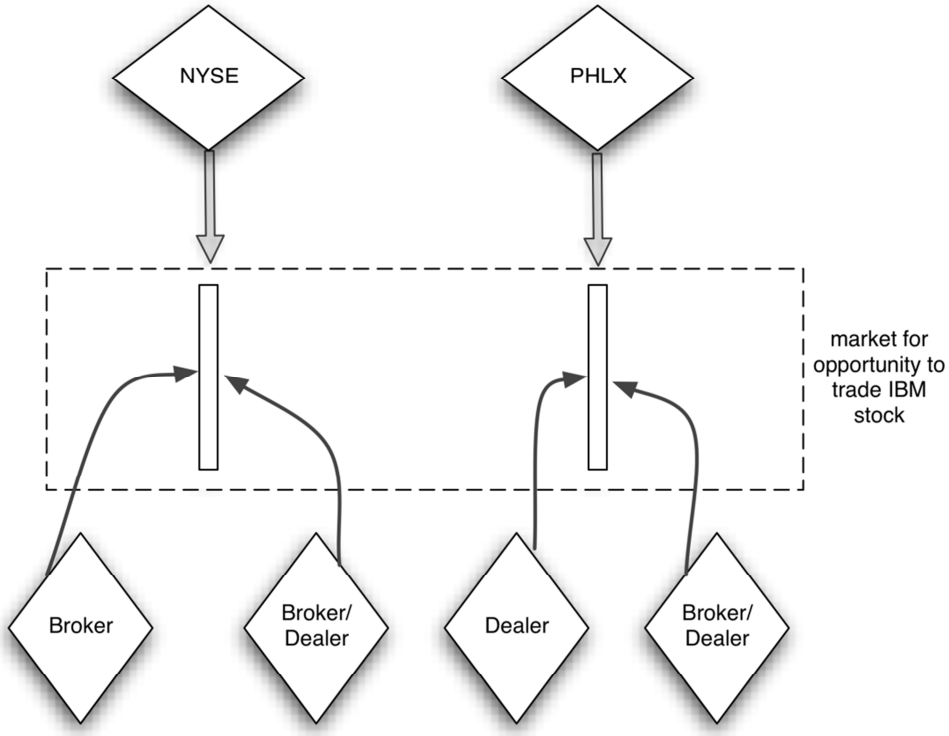
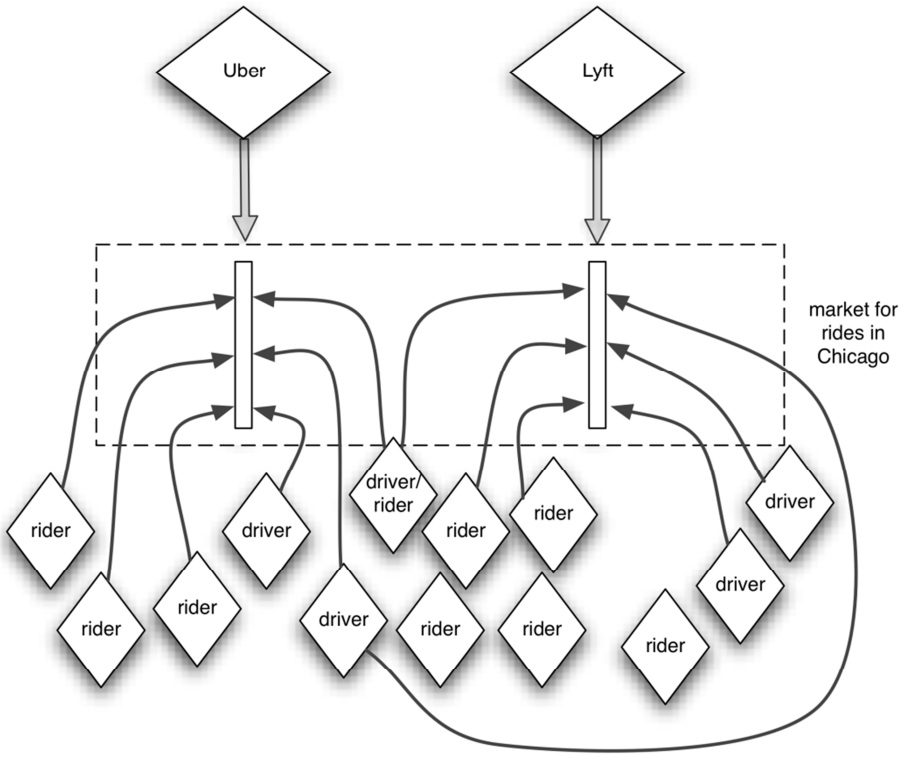


Figure 3

In this figure producers of ride services in a given city include Uber and Lyft (incumbent taxicab services not shown). Drivers and riders are "in the market" for the exchanges' services, which consist of potentially switch-role markets in which they can alternately take the role of a driver or a rider (though not all riders are also drivers).



	NYSE (pre-2000s)	*ECNs (in late-1990s securities exchange industry)*	*Uber/Lyft (ride services industry)*	*Airbnb/Homeaway (hospitality services industry)*	*Instacart/Deliveroo (groceries/food delivery services industry)*
Ownership structure	Member-owned cooperative (became public corporation in 2006)	Privately owned/ varying sources of funding	Privately owned/ VC funded	Privately owned/ VC funded	Privately owned/ VC funded
Market roles	Fixed-role producer of physical switch-role markets (on the trading floor) for various stocks	Fixed-role producers of electronic switch-role markets for various stocks	Fixed-role producers of markets for rides in various cities	Fixed-role producers of markets for short-term rentals in various cities	Fixed-role producer of delivery services for (fixed-role) markets for perishable goods (supermarkets, restaurants)
Competition/ Fragmentation	Competition limited to "third market" of off-exchange members (after repeal of Rule 390, decline of market share to electronic exchanges)	After Order Handling Rules, ECNs fragmented markets for OTC securities by drawing order flow away from Nasdaq dealers	Competition with incumbent taxicab services and various other ride services startups; markets for rides overtly fragmented, but covertly connected via drivers running multiple apps	Incumbent hotel / B&B industry; other hospitality services startups	Limited due to overt partnership with fixed-role supermarkets and restaurants
Switch-role aspects	Buyers and sellers of securities interchangable	Buyers and sellers of securities interchangeable (but various	Partial/potential (drivers are often periodic riders; less common for riders to be drivers. Cannot "flip" a ride.)	Partial (similar to ride services, hosts are often users, users less often hosts)	Partial (users less likely to also be shoppers/delivery drivers)
Transaction fees	Varies and minimum commission negotiable (since 1975); began as 0.25% commission per share	Varies minimum commission not fixed	20-25% fixed-rate commission	6-12% fixed-rate commission for guests; 3% fixed-rate commission for hosts	$3.99-$9.99 flat delivery fee; 0-15% markup on prices depending on store (Instacart); £2.50 flat fee per delivery (Deliveroo)
Counterparty risk	National Securities Clearinghouse Corp. (NSCC) as central counterparty (CCP)	Also used NSCC (jointly owned by NYSE, Amex, and NASD).	Bilateral ratings system; centralized netting and payment processing	Bilateral ratings system; centralized netting and payment processing	Unilateral ratings system (Instacart); customer service line only (Deliveroo); centralized netting and payment processing

Table 1

Comparison of stock exchanges ca. the 1990s (NYSE and competitor ECNs) with various marketplace platform firms