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The Sharing Economy

Relatore:
Ch.mo Prof. Giovanni Caggiano

Laureando: Gianluca Segato
Matricola no. 1043573

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Abstract

Negli ultimi anni un nuovo fenomeno tecnologico, economico, sociale e culturale sta prendendo piede: la cosiddetta *sharing economy*. Gli enormi cambiamenti introdotti dal Web 2.0 hanno permesso la nascita di piattaforme multilaterali che riescono a coordinare gli utenti tra loro senza bisogno di intermediari. Al di là dell'analisi positiva del paradigma, sulla quale c'è comunque poco consenso accademico, le implicazioni economiche sono profonde ed antitetiche: da una parte è chiaro l'incremento di efficienza dei mercati che la *sharing economy* è andata a stravolgere, ma dall'altra è altrettanto lampante il nuovo spazio creatosi per lo sfruttamento del lavoro, per l'evasione fiscale, e per un potenziale comportamento monopolistico da parte di queste piattaforme *peer-to-peer*. Questa relazione si propone di dipingere un quadro il più possibile d'insieme di un fenomeno tanto nuovo, quanto controverso.

In the last few years, a new technological, economic, social and cultural phenomenon is emerging: the so-called sharing economy. The upheaval introduced by the Web 2.0 allowed the birth of multi-sided platforms which are able to coordinate users without the need of intermediaries. Beyond the positive analysis of the paradigm, on which there is anyway little academic consensus, the economic implications are profound and antithetical: on one hand, it is clear that there has been an increment of the efficiency of the markets disrupted by the Sharing Economy, but on the other it is evident as well how much room this new paradigm made for a possible exploitation of labor, tax evasion and monopolistic behavior by these peer-to-peer platforms. This work aims to paint the big picture of a phenomenon which is as much new as controversial.

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1. Introduction

The emergence of multi-sided technology platforms, a phenomenon known as the "sharing economy", has enabled individuals to collaboratively make use of idle or underutilized inventory via fee-based sharing. Instead of staying in a hotel's room, a traveler can now be hosted by a stranger, who shares his own house on AirBnB, against a fee. A commuter can share his ride with someone else who makes the same route via BlaBlaCar, or CarShare. Since renting an office is way too expensive for some new-born businesses (typically startups), services like LiquidDesk help by enabling them to share the working space. Given the fact that the car is a very expensive investment that for the most time remains idle, Uber and Lyft created peer-to-peer ridesharing platforms that connect passengers to local drivers in real time.

Users love this idea because it allows them to make up their wages, without making huge investments, or quitting their current job.

The convergence of a historic economic recession, a revolution of the information technologies, and growing environmental concerns, has given the birth to a new generation of businesses that enable a peer-to-peer market-mediated access to almost everything a consumer owns, from durable goods to skills. This movement lies on the shoulder of millennials, uninterested in the old milestones of self-identity definitions like owning a car, or a house, and whose measure of success does not rely anymore on economic wealth. But the phenomenon flourished well beyond this young generation.

The role of the Internet, and in particular of the Web 2.0, is crucial in the definition of the sharing economy: The Internet created the possibility of interaction between strangers, and on a macro level enabled the access to an enormous amount of information.

The share movement began with file-sharing, whereby users give access to their files (usually movies and songs), without asking anything else in exchange but the promise of spreading them even further (as implied by the intrinsic nature of the technological protocol used). Users started also to collaborate on joint projects: the open source movement began, pioneered by Linux, and sharing-content platforms were born, like Wikipedia and YouTube. The advent of the social networks, some time after, enabled people to share their lives, too. And finally, the ubiquity of the Internet empowered by modern smartphones gave the boost to the sharing economy, a peer-to-peer based activity of giving or sharing the access to goods and services, coordinated through online platforms.

The economic implications of this movement are profound, and given its dynamic nature, definitely not clear-cut. Even its definition and classification are arduous to define, not to mention its effects on efficiency and on equity, which are very controversial. Something can be asserted for sure: The sharing economy is an overwhelming, world-wide economic upheaval, and it is going to stay.

2. Brief History of the Sharing Economy

a. The Digital Revolution

In its very first version, the World Wide Web was a tool which operated almost unilaterally. As first conceived by Tim Berners-Lee in 1989, web pages were static, and users were passive consumers of a vertical service, merely reading websites, with no further contribution. Web 2.0, which "refers collectively to websites that allow users to contribute content and connect with each other" (Carroll & Romano, 2011), gave people the possibility of interaction, making the Internet by all means bilateral and horizontal, and enabled the development of online platforms that promote user-generated content (Hamari, Sjöklint & Ukkonen, 2015). This led very quickly to a peer-to-peer network of social and economic interactions: The Internet we are accustomed to nowadays.
This very rapid and profound change in the behaviors of people is commonly referred to as the Digital Revolution.

The peculiarity of the Internet lies in its being intrinsically no-frictions prone. Information-sharing has no costs, on the Web: There is no limitations of space and time, since information is stored in a virtual place reachable by everyone, in any place of the world, and is asynchronously accessible. The possibility of having an Internet connection has steadily been more and more affordable over the years (Kaleelazhicathu, 2003). The World Wide Web is the first tool which made the marginal cost of information almost zero (McKnight & Bailey, 1997).
In the context of information economics and market efficiency, this is a strong improvement. Two reasons why it is tough to achieve a perfectly competitive market lie in the costs of consumers' decision making (Simon, 1957) and in the costs of needing a centralized middle-man which reduces the complexity of information sharing. The Internet made these processes

very affordable by increasing their efficiency, thus driving the market towards the conditions of perfect competition (Chang, 2010).

The Internet has introduced many new ways of sharing, as well as facilitated the older forms on a larger scale (Belk, 2014). The first symptoms of this new – disruptive – model became evident with the advent of file sharing: privately owned movies and music began to be shared among peers on the Web. The pioneer of this movement was Napster, which relied on centralized servers, but its evolutions, namely the eD2k protocol (used by eMule), and above all the Torrent protocol, are also technologically decentralized (Gosling, 2003): This also means that there is no way to prevent people from sharing their files. The interesting point is that the Torrent trackers require that users balance their uploads and downloads (Aigrain, 2012), making use of a particular form of market exchange very similar to barter (Belk, 2010).

The first business which exploited this power was eBay. The idea behind eBay is simple yet very effective: creating a virtual place, wherein people can auction their private belongings. It is notable how Pierre Omidyar founded eBay precisely because he wanted to create a perfect market (Cohen, 2003). He arguably succeeded (Chang, 2010). Indeed, eBay is moving towards a perfectly competitive marketplace: It is a market with many buyers and many sellers, who, given their numerosity, have no power to influence the price of the goods. There is freedom of entry, and there is perfect information - thanks to the increased problem solving capability of users enabled by search and evaluation features.

It became clear very shortly how radical the change was. Between 1997-2000 several new Internet-based companies (commonly knew as dot-coms) were founded, and they all embodied the same peer-to-peer concept: among them there was, for example, Wikipedia, where volunteers contribute to the creation of a joint repository of the human knowledge, and YouTube, where videos are uploaded and shared among peers. As noted by Belk (2014), in a broad sense “the Internet itself is a giant pool of shared content that can be accessed by anyone.”

Among these dot-coms, there was Amazon, which on the other side increased the market efficiency by eliminating the middle man: Giving access to a wider and broader supply of goods, embodying the long-tail theorem, and doing it cheaper and quicker than physical

stores, Amazon accomplished to oust the markups and the margins of the traditional vertical value chain (Denning, 2014).

Eventually, the whole Internet boom turned out to be a speculative bubble, which busted in March of 2000. eBay and Amazon were amongst the few dot-coms which survived.

A new tech boom has been thriving in the last few years, in part thanks to another technological revolution: smartphones, and the advent of the Internet of Things. On 2007, Apple introduced the iPhone, a mobile phone with readily available Internet capabilities and a comprehensive app marketplace. This allowed users to interact with each other wherever they are, nurturing an ecosystem of startups all over the world. The main and by now established protagonists of this new wave of innovation are led by Facebook, went public on 2012, followed by Twitter, LinkedIn, Snapchat, Pinterest and many others.

In particular, after the Lehman default on 2008 and the consequent escalation of the global crisis, a special niche in the startup ecosystem is gaining more and more traction, receiving enormous investments and extensive press coverage (Rauch & Schleicher, 2015): the so-called sharing economy firms. Uber, AirBnB, Lyft, Kickstarter, BlaBlaCar, Car2Go, ZipCar and Freecycle are some of the pioneers of this new, disruptive, model, according to which privately owned (and usually idle) goods are shared or rented out via a peer-to-peer marketplace.

These businesses (usually startups) differ a lot from each other. However, it is possible to identify at least two common traits, in addition to their common reliance on the Internet. The first one is political: The framework wherein they operate shifts the foundation of the economic system from ownership, to access; as posited by Belk (2014), “they use temporary access non-ownership models of utilizing consumer goods and services”. The second one is technical, and is a direct consequence of the first: Economic theory should revisit its classification of capital goods. Indeed, lines have become more blurred, and the traditional taxonomy might no longer be held true.

b. A Political Shift: from Ownership to Access

Ownership can be regarded as the key building block in the development of the modern, western capitalist economic system, even though it is a concept which varied widely over the history.

In England, all along the Middle Age, the land was by far the main source of revenues and power (Vanover, no date; Dukeminier & Krier, 1988), and rural life was organized around the Commons. Even though under the Saxon system land ownership was tied to families, after the Norman conquest of 1066 the feudal system established itself as the standard economic system of the western world. William the Conqueror claimed ownership of all the land in England, and everyone else held their land either directly or indirectly from the King (Kolbert & Zimmermann, 1977), who in turn received it from God. Feudal landlords leased their land to peasant farmers, who had virtually no tenancy rights: In fact, the feudal notion of property relations was very different from ours today. We are accustomed to the idea of ownership as the exclusive personal possession of something, but in the feudal economy this was hardly the case: Everything was the result of God's creation, and thus was his exclusively to dispose of (Rifkin, 2014). As posited by the historian Richard Schlatter: "No one could be said to own the land; everyone from the king down through the tenants and sub-tenants to the peasants who tilled it had a certain dominion over it, but no one had an absolute lordship over it." This meant that everyone had access to land, which was shared or rented out by landlords, but nobody except the King actually owned it.
During the course of the Middle Age, Feudalism changed, eventually dying in the XVII century when Capitalism began its climb to ascendancy. This was mainly due to some legal reforms: Statute De Donis Conditionibus, passed by King Edward I in 1285, gave children the possibility to succeed their parents in the rights to land holdings, which in turn created multiple legal interests in a single piece of land; Statute Quia Emptores, passed in 1290 again by Edward I, made by all means land marketable. During the so-called Enclosure Movement, communally held land was enclosed, transformed into private property and exchanged on a marketplace. All along the XIV, XV and XVI centuries economic system transformed, becoming steadily more dependent on capital and less dependent on land (Dukeminier & Krier, 1988). By 1660, Feudalism was formally ended, and modern Capitalism began its path in becoming the main standard economic system, with its stress on private property (Vanover, no date).

It is evident how the idea of Social Commons is hardly new: Actually, property rights are a fairly new economic concept, looking at history, and we are just moving back (Bollier, 2014).

As Jeremy Rifkin writes in his book "The Zero Marginal Cost Society" (2014), we are now moving from "the right to own and exclude", back to "the right to have access and be included". This going-back is possible because the Internet ousted the dispersion costs that before forced entrepreneurs to concentrate the production. The Third Industrial Revolution brought up by the digital revolution is shifting the economic paradigm from markets to social commons, from ownership to access, and this emergence is not something new, but rather "the rediscovery of something that goes back a very long time" (Rifkin, 2014).

Today, a commuter can find a ride in someone else's car via BlaBlaCar or Uber. He would rather pay to have access to the car trip, for a limited amount of time, and to a very little cost, than to actually own the car. It is more affordable, more efficient, ecologically more aware, and it has some positive externalities too (given by the social interaction implied by the transaction). Today, entrepreneurs can access to potentially unlimited founding from a crowd of backers on Kickstarter, rather than investing their own money or getting a loan; today, tourists can holiday in a stranger's house via AirBnB, rather than staying in a hotel. Today, if someone has some time to spare, he or she can run errands for cash on TaskRabbit.

On the other side, from the producers' point of view, it is more efficient, and more convenient, to use one's own car for carrying people around using Uber, rather than buying a cab and investing on a taxi license; it is easier to rent a part of one's own house on AirBnB, rather than to pay for investing in a hotel; it is more transparent and enjoyable to invest in a project on Kickstarter, rather than depositing money in an almost flat rate bank account.

Consumers, by all means, are now comfortable to have access to goods and services for a limited amount of time, rather than owning or buying them, and producers are comfortable to share their own belongings rather than investing in formal factors of production. Lines and distinctions typical of the neoclassical view are becoming more and more blurred. This is the reason why the change is not only political but technical too.

c. A Technical Shift: A Change in the Classification of Capital Goods

Economic theory teaches that – among all the others – there are two possible classifications by which organize goods. The first one depends on rivalry and excludability, while the second one on the purpose behind the acquisition of the good.

Following the first classification, goods can be either private, public or club (Cornes & Sandler, 1986). Private goods are rival (their consumption by one individual prevents another individual from consuming it) and excludable (it is possible to prevent consumers who have not paid for it from having access to it), whereas public goods are non-rival and non-excludable. Club goods, finally, are excludable and non-rival, but only until reaching a point where congestion occurs.
The second classification instead, divides goods into two categories: capital goods and consumption goods. The first group comprises all the durable goods which are used in the production process. The consumption goods, on the other hand, following the official OECD definition, are those goods which are used "for the direct satisfaction of individual needs or wants".

Capital goods cannot be public: public goods are not excludable, and this means that they are prone to free-riding. It is not a coincidence that public goods have to be produced by the whole community, in order to avoid a market failure (Baumol, 1952).

Academically, almost every capital asset is regarded as private; capital goods which are also club goods are approximately always services. The peer-to-peer economy is challenging this point of view. A lot of capital goods traditionally considered private are actually becoming club goods: cars and houses are the most prominent examples.
The crux of the matter is that rivalry can be regarded as a continuum, and not as a binary category (Leach, 2004): A house can be shared, since it's comprised of different rooms; a car can be shared, since it always has, at least, two seats.

The shift is evident: A consumption good can become a capital good and vice versa, and that is because its owner may not actually be using it all the time.
And this is happing now because, for the first time in history, we have access to a whole new level of information.

3. Nomenclature

a. Definition and scope

The rise of this new economic model, ignited by the digital revolution and the advent of the Internet of Things, is often called the birth of either the "new economy" (DeLong &

Summers, 2001), the "sharing economy" (Lessig, 2008; A. Sacks, 2011; Belk, 2010; Sacks 2014; Zervas et al., 2015), the "collaborative consumption" (Felson & Spaeth, 1978; Algar, 2007; Botsman & Rogers, 2010; Belk, 2014), the "peer-to-peer economy" (Rodrigues & Druschel, 2010), the "gig economy" (e.g. Kreider, 2015), the "disaggregated economy" (Rauch & Schleicher, 2015), or the "access economy" (Bardhi & Eckhardt, 2012; Denning, 2014; Sacks, 2014).

The most encompassing characterizations of the phenomenon are arguably given by Hamari et al. (2015) and by Botsman (2013). The first regards the sharing economy as a "peer-to-peer based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services". The second broadly defines the pattern as an "economic model based on sharing, swapping, trading or renting products and services, enabling access over ownership". Finally, a third classification worth mentioning is the notion of "market-mediated access," given by Bardhi and Eckhardt (2012).

There is a great variety of terminology, and above all an utter lack of agreement on the scope, the classification and the taxonomy of the phenomenon. This leads to a difficulty in defining it, largely due to the wide definitions that such a nomenclature offers (Hamari et al. 2015): Rauch and Schleicher (2015) says that "crafting a precise definition remains problematic", while a draft opinion by the European Commission for Economic Policy, reported by Brighenti (2015), even states that "given its innovative and dynamic nature, the concept cannot be ultimately defined". The rapporteur suggests a for-profit/non-profit division, but shortly after states that while "the profit/non-profit divide does help in reading SE [sharing economy] initiatives," "it is not sufficient to draw the line between different forms of SE." The criterion that the Commission suggests is then "a distinction made between SE initiatives that create and ossify a distinction between the various typologies of users (consumer-users vs. provider-users) and SE initiatives that foster a peer-to-peer approach in which every user can be a provider and consumer at the same time". In this way, however, it is possible to include in this paradigm the pooling and collaborative economies, represented by services like Wikipedia, GitHub, YouTube and even The Pirate Bay. In fact, every model that uses a peer-to-peer, technologically web-based, sharing approach, can be regarded as "sharing economy". Rifkin (2014) and McAfee and Brynjolfsson (2012) push the borders even further, including in the economic upheaval of the XXI century also the automation of labor introduced by machines.

The economic analysis of the technology's sudden arrival is of great interest, but it is beyond the scope of this work. Beyond are also those services where there are no monetary transactions, no distinctions between consumers and producers and no market exchanges, such as the open source movement (e.g. GitHub) or collaborative encyclopedias (e.g. Wikipedia), even though for sure these phenomena are incredibly fascinating and remarkable from an economic standpoint (as pointed out, among others, by Benkler, 2002).
From a strictly linguistic point of view, therefore, it could actually be possible to speak more of a renting economy, rather than of a sharing economy.

b. Taxonomy

Botsman (2013) divides the sharing economy into three buckets: first, product-service systems that facilitate the sharing or renting of a product; second, redistribution markets, which enable the re-ownership of a product; and third, collaborative lifestyles wherein assets and skills can be shared (as summarized by Sacks, 2014). Hamari et al. (2015) draw the distinction looking at the method of exchange: in the first group, there is access over ownership, whereas the second is characterized by an actual transfer of the ownership through swapping, donating or purchasing second-hand goods.

Schor (2014) shapes the distinction following two dimensions: the platforms' market structure (peer-to-peer vs. business-to-peer) and market orientation (for-profit vs. non-profit).

Following this classification while looking at the market structure of the sharing platforms, Rauch and Schleicher (2015) call the two categories that emerge asset hubs and peer-to-peer networks. The essence of asset hubs (or B2P, following Schor, 2014) is micro-rental: There is a singe "hub" entity selling assets that it directly owns, not necessarily for profit. In this category fall municipally-provided bike sharing, as well as traditional businesses like Netflix, whereby consumers can access a whole catalog of movies paying a periodical fee, or ZipCar, a car-rental service which gives you the possibility to rent a car for few hours.
It is questionable whether these firms are actually true sharing companies: even Apple, the world's most capitalized company to date, on September 2015 introduced an "access program" for its iPhone products. In fact, the asset-hub paradigm merely modernizes a traditional business model; what makes it different is the degree of disaggregation now possible (Rauch & Schleicher, 2015). Still, the core idea is not a game changer.

On the other hand, the second category – peer-to-peer networks (P2P) – connects many would-be sellers with many would-be buyers, embodying the true nature of the sharing economy: disaggregated consumption on a dispersed and decentralized level.

The distinction between P2P services and B2B ones is important. Since P2P platforms' business model hinges on fees, these services seek the maximization of trades: more transactions, more exchanges, more commissions. In contrast, B2P firms often struggle to maximize revenue per transaction. This is the reason why businesses like Uber are still trying to keep prices as closer as possible to marginal costs, in order to increase volumes, whereas ZipCar-like firms' utility functions revolve around the maximization of the price markup.

Also the market orientation of these services is of particular significance. Provided that the paradigm of interest is the one where there is a clear distinction between different typologies of users, in the sense that the boundaries between consumers and producers are clear-cut defined, it is possible to draw a distinction between for-profit and non-profit sharing firms. Following Hamal et al. (2015), the first group can be referred to as "collaborative consumption" – though others have used this term with an entirely different meaning (e.g. Felson & Speath, 1978), or in a much broader sense (as does Belk, 2014, that takes into account also transactions characterized by non-monetary compensations) –, while following Schor (2014) the second one can be called "peer-to-peer economy" (P2P) – although others have called it "gig economy" (e.g. Kreider, 2015), or used the same term in a broader sense (e.g. Rauch and Schleicher, 2015).

Collaborative consumption (CC) is based on asset re-distribution. Existing assets are re-assigned to meet demand peaks: supply and demand match organically, via online platforms (Brusson, 2013). The most evident and prominent example is the car. Cars are the ultimate expensive underutilized commodity: in North America and Western Union it is in use 8% of the time (Sacks, 2011). Users shares their belongings, like cars, or even rooms of their own houses, because it makes a great deal in terms of practical and economic sense for the consumer (Belk, 2014). CC smoothes asset costs, implies less waste and ecological sustainability, and has positive externalities given by the enjoyment of the activity (Sacks, 2011; Hamari et al. 2015).

The P2P economy, on the other hand, is a decentralized model whereby "people coordinate acquisition and distribution of a resource for a fee" (Botsman & Rogers, 2010). It is a branch

of the sharing economy, although it must be noted how "sharing" is arguably a misnomer: these firms hardly share anything, and even users are mostly motivated by an economic gain (Hamari et al. 2015). The coordination exists thanks to the Internet and is decentralized in the sense that producers are not agglomerated; this leads to the conditions that can make perfect competition possible, as discussed above following Chang (2010).
P2P can be regarded, then, as a middle ground between usual hotels and non-monetary travel exchanges like CouchSurfing, between usual taxi services and hitchhiking. The pioneers of this paradigm are AirBnB and Uber.

This market orientation divide is crucial, since it defines the strategies, goals and utility functions of these platforms, as well as of their management and owners. For-profit platforms seek revenue and asset maximization, particularly promoting more rapid expansion and sometimes engaging in anti-competitive behavior. By contrast, non-profit sharing initiatives aim to serve needs, at a community scale, without being eager to scale or grow. (Schor, 2014)

4. The P2P Economy Pricing Models

a. Pricing Models: Organic, Artificial

As Chang (2010) noted, eBay is a perfect marketplace, where the high demand and the vast supply, both dispersed, assure the conditions of perfect competition. Following this idea, almost every peer-to-peer, multi-sided marketplace allows users to set their own prices. When consumers decide to share their house on AirBnB, the platform allows them to set the rate at which they want to be paid for the service. This "organic", decentralized pricing model – in theory – establishes the basis for traditionally reaching the equilibrium of demand and supply: Hosts adjust the price, based on the marginal cost they face, until the demand, based on the marginal utility of consumers, matches their supply.
Unfortunately, this model in a real-world case scenario is far from being perfect (Chawla, 2014c): Producers, in such a peer-to-peer context, are almost always amateurs, and they have neither the preparation nor the expertise to estimate the factors that can affect prices. This mismatch between perfect-pricing and actual-pricing is given by human biases (Gurley, 2014), as well as by the lack of information. For example, it is rather typical that a host on AirBnB charges the same rate all over the year, whereas hotels usually try to discriminate prices based on seasonal demand peaks (Phlips, 1983). This behavior could lead to a supply

gap: third-degree discrimination programs may expand the market to those consumers that might not buy otherwise (Hall & Lieberman, 2005).

There are some startups, on the other hand, that centralize the price that their users charge. Among them, there is Uber, which unilaterally sets its drivers' fares.
This "artificial", centralized pricing model could seem odd, even unfair since Uber's drivers are not employees: The decentralized peer-to-peer nature of drivers should match a decentralized pricing model, but Uber chose not to go after such a path. They are actually pushing the concept of outsourcing to its limit.
The firm provides a service that have little to no variation in terms of quality, which is easily measurable and observable due to the consumers' GPS data. It is very easy, then, to come up with a general price – imposed to every driver –, which can compete on a broader market. Such a strategy is actually very traditional, and in case of monopoly could lead to loss of efficiency. In this very moment, however, the competition among ride-sharing platforms is very tough, thus ensuring a price almost equal to the marginal cost (Goldman & Liu, 2014; Hall et al., 2015).
Quite shortly after releasing its service, Uber realized that on some specific timeframes (e.g. 1 a.m. of Saturday or New Year's Eve) there was a peak of unfulfilled requests: Users logged into the Uber's mobile application, requested a ride, but they were never served because of the lack of drivers on the road (Gurley, 2014). This supply-gap problem is something which affects the traditional industry of taxi too: It is not rare that consumers have to wait up to tenfold the average in order to have a cab, and sometimes they cannot even get it. Uber came up with developing a third-degree price discrimination algorithm, mimicking the behavior of the airlines business. This dynamic pricing model is called "surge pricing", and it consists of increasing the price of the ride when a peak of demand occurs. Surge pricing is a direct function of the supply-demand model: When available drivers are scarce relative to the number of Uber requests by potential passengers, Uber begins to raise a coefficient that multiplies the standard fare, in order to derive the a "surged" price. In this way, it shifts the curves and equilibrates supply and demand. Marginally raising the price, the marginal driver will then see that the new price (his/her marginal utility) correctly matches his/her marginal cost, thus increasing the available pool (Quirk, 2014). By all means, the company analyzes the requests of rides in real time, so it can dispatch an appropriate number of cars on the road. As noted by Isaac (2014), Uber achieves what Stephen Wood (1989) calls pay flexibility, that is the "firm's ability to adjust labor costs, particularly pay, to changing market conditions".

Uber's co-founder and CEO Travis Kalanick commented this feature saying: "We are not setting the price. The market is setting the price. We have algorithms to determine what that market is" (Wohlsen, 2013).

b. Effects on the Efficiency

These two pricing models – the first, decentralized, which can be labelled as "organic", and the second, centralized and dynamically adjusted, which can be identified as "artificial" – are the two possible choices of the peer-to-peer economy firms. It can be questioned whether there is one which is better than the other. Indeed, the organic model may lead to a supply gap, but introducing a price discrimination both expand the supply and shrinks the demand. The question is then whether the latter effect is strong enough to offset the gains in efficiency of the former: Does the discrimination increase or decrease the general welfare?

Varian (1983) gives some necessary and sufficient conditions for third-degree price discrimination to increase welfare. A necessary condition is that the total level of output increases as a result of the discrimination, while a sufficient condition is that the profitability of the output after discrimination exceeds the profitability of the output before discrimination, evaluated at the new prices. Hall et al. (2015), carried out a natural experiment by exploiting a technical glitch in the Uber's algorithm, which caused a surge outage on NY during a period of peak demand. "Completion rates fell dramatically and wait times increased, causing a failure of the system from an economic efficiency perspective". On the other hand, "using prices to signal to riders that rides are scarce and inducing driver-partners to forgo other activities [closed] the gap between supply and demand and [led] to improved outcomes for both riders (as a whole) and drivers-partners". In short, Hall et al. (2015) demonstrated that Uber price-discrimination abides the Varian conditions, leading to an increase of general welfare. They also demonstrated that demand and supply curves in such an environment are incredibly elastic.
Other studies, for example, Goldman & Liu (2014) established that Uber is also more efficient and cheaper than the traditional taxi business, both for the price and for the quality of the service, defined as the average time of arrival of the car.

Given these results, and following Chawla (2014c), it is evident that AirBnB-like startups should embrace the third-degree price discrimination of Uber.

Indeed, small business owners and amateurs rarely have access to the sophisticated algorithms and data needed to adapt pricing on the fly, according to customer's habits. But P2P platforms actually do: Given the incredible amount of data that these platforms store, and their outstanding computational power, sharing-alike firms are potentially able to suggest the best price that users should charge, based on comparable goods in local markets and on general demand fluctuations.
However, it must be remarked how the positive outcome of price discrimination in the ride-sharing market is ensured by the tight competition between the P2P platforms, specifically between Uber, Lyft, Sidecar and taxis themselves (Goldman & Liu, 2014). If Uber was the only P2P firm matching drivers and customers, it would adopt a monopoly pricing strategy on selling rides to consumers and buying rides from drivers: These rates would be far from the efficient ones. From an efficiency standpoint, thus, the best solution should be a mere suggestion by the P2P platform of the optimal price, leaving the final choice to the producer-user.

5. Effects

There are at least three more ways whereby the sharing economy could affect the economic system, in addition to pricing models' consequences.
The first one looks at the possible breakdown of the status quo: Does the introduction of a new peer-to-peer form of supplying a service have a negative impact on the performances of the traditional businesses? Is it possible to refer to this effect as "market cannibalization", or, on the contrary, the final net effect is actually positive, in a sense that there is an increase in the total output of the industry?
The second one regards the sharing economy ecological impact: Does this phenomenon do have a real effect on hyper-consumption and thus on the stigmatization of squandering, and, in the case of an affirmative answer, to which extent? In a sense, the question is whether the actions of these firms imply some positive externalities, which have to be accounted for when estimating the overall impact of the sharing economy on general welfare.
The third way is given by the fact that P2P firms create and serve two-sided markets since their users include both market-buyers and market-sellers (Rauch & Schleicher, 2015): Does this affect the general welfare?

a. Market Cannibalization

Zervas et al. (2015) studied the consequences that an online platform has when lowering the barrier to entry for suppliers, by performing an empirical analysis of the impact of AirBnB on the hotel industry. Using a difference-in-difference empirical strategy, they found that, in Texas, "each additional 10% increase in the size of the AirBnB market resulted in a 0.37% decrease in hotel room revenue." Given that in the past few years the AirBnB inventory has grown exponentially, the study estimated a "revenue impact of over 8-10% for the most vulnerable hotels." The negative effect on local hotel room revenue is not uniform: Lower-end and independent hotels are the most vulnerable to increased competition coming from AirBnB's users, whose impact on them is disproportionately larger than the impact on chain hotels. Both hotel executives and AirBnB itself tend to argue that the P2P platform targets complementary markets from that targeted by hotels. Zervas et al.'s study proved the contrary, suggesting a substitution pattern instead: They provided an "empirical evidence that the sharing economy is significantly changing consumption patterns, as opposed to generating purely incremental economic activity." The hotels' reaction to AirBnB's market entry is a statistically significant decrease in hotel room prices: this means that from AirBnB benefit not only the participants in the sharing economy but all the consumers of the market.
AirBnB's entry aftermaths have adverse effects thus: from the traditional suppliers' standpoint, it heavily shrinks their revenues, affecting the whole industry. However, consumer benefit from lower prices and increased competition in the accommodation industry, and hosts on the platform derive an incremental income by sharing their private assets. Moreover, if the net effect is positive and the new total output is greater after AirBnB introduction, the whole economy of the cities could benefit from it, too: guests could spend more and stay longer (since they spend less on the accommodation), as independent studies commissioned by AirBnB suggested. More broadly, an increased travel and tourism outlay could even produce new jobs (Zervas et al., 2015). Unfortunately, the overall effect is hard to measure, and quantifying the net impact of P2P platforms comparing the benefits against the relative costs remains a topic worth investigating.

Derviş (2015) states that these P2P platforms create more jobs than they destroy. In a sense, they allow to reach a Kaldor-Hicks improvement: those that are made better off (the platform, the customers, and new part-time self-entrepreneurs), in fact, could hypothetically compensate those that are made worse off and lead (abstractly) to a Pareto-improving outcome.
Nonetheless, there are still losers, a real problem that should be addressed.

b. Waste Stigmatization and Ecological Impact

Collaborative Consumption, Peer-to-Peer networks, and Asset-Hubs differ in many respects, but all of them radically absorb idle capacity. In sum, "the sharing economy means good, and people can be employed more intensively than before, making already-existing products and service providers more valuable" (Rauch & Schleicher, 2015). In any case, secondary markets reduce demand for new goods.

However, despite the logicality of this argument, there are almost no comprehensive studies regarding the sharing economy ecological impact (Schor, 2014). The greatest exception is car-sharing, a topic explored by copious analyzes.

A report by the U.S. Federal Transit Administration (led by Millard-Ball et al., 2005) pointed out how car-sharing both improve and reduce travel in a positive way: Car-sharing converts fixed costs into usage fees, so that costs are directly proportional to the amount that members drive, providing a strong financial incentive to drive less. At the same time, some car-sharing members who did not previously own a car will now use the service to make new vehicle trips, since they do not have to face the fixed costs related to the purchase of a car. Both are a benefit in terms of efficiency, since car-sharing is preventing squandering and ecological drawbacks for some, while improving mobility for others.
A study by Schure et al. (2012) acknowledged the fact that car-sharing can reduce vehicle ownership, but studied its effects when combined with unbundled parking. They found that there are strong synergies to be realized, and the presence of "both car-sharing and unbundled parking in residential developments had a significant impact on vehicle ownership"; in fact, "car-share members had significantly lower levels of vehicle ownership and drive-alone rates than nonmembers did." Ultimately, car-sharing and unbundled parking can help a development succeed with less parking.

Many others studied the impacts of car-sharing services, and everyone confirmed that there is a clear evidence of a net reduction in the vehicle miles traveled and fuel consumption (e.g. Cervero et al. 2007, Martin et al. 2010).

c. Two-sided Markets

P2P firms create and serve two-sided markets, since their users are both buyers and sellers: They are two sets of agents, which interact through a platform, and the decisions of each set

affect the outcomes of the other one through an externality. Two-sided platforms range from a game system such as the PlayStation or the Xbox (neither gamers nor game software houses will be interested in the game console if the other party is not) to credit cards (where both consumers and suppliers value each others' participation in the payment system).

In general, two-sided platforms are created to mitigate coordination costs: they tend to arise in situations in which "there are externalities and in which transactions costs, broadly considered, prevent the two sides from solving this externality directly", playing an important role throughout the economy "by minimizing transactions costs between entities that can benefit from getting together" (Evans & Schmalensee, 2007). This characteristic generates, for P2P services, a series of economic insights that play a significant role in strategic decision making and economic policymaking (Rysman, 2009).

Rauch and Schleicher (2015) stated that in the sharing context, this two-sided structure has two peculiarities.
First, it creates a public good: In fact, it produces "useful information whose value the platform itself cannot capture". For instance, the price at which assets are traded on a stock exchange is useful for anyone interested, regardless of their exchange membership status. So, too, AirBnB renal prices are valuable for anyone interested in renting out their flat, notwithstanding their participation to the platform. The result is a "non-rival, non-excludable information that makes the exploitation of resources easier for customers and non-customers".
Second, this structure lead sharing economy platforms to have complex economies of scale, whose net result is difficult to ascertain: on one side, due to the vast fixed costs of developing the technological infrastructure and the ridiculous costs of adding new members, there are obvious economies of scale. However, at the same time, there are diseconomies of scale since the entrance of new members increases the difficulty, for participants, to identify high-value matches: With too much offers on the AirBnB's database, it is arduous for customers to find the best one fitting their needs. At the end of the day, the optimal size might be difficult to establish.

6. Controversies

a. Do the Winners Win Just Because of Deregulation?

The dawn of the sharing firms disrupted the markets in which they entered, and the aftermath is both positive and negative. As argued previously, following Derviş (2015), the final outcome is a Kaldor-Hicks improvement, so that the sum of the gains far outweighs (abstractly) the losses. Nevertheless, there are still losers, most notably the old incumbents, and a real question is whether the new challengers are winning just thanks to unfair competition, in which case local or national authorities should intervene.

Usually, the market in which these firms operate is regulated by state policies that ensure the protection of consumers. For hotels, this goes from a standard, minimum cleanliness that they must abide, to the presence of clear fire escapes. Taxi drivers are required to regularly undergo health and professional tests; employers for manual jobs must comply a set of security rules for their workers. These markets are typically heavily regulated, and most cities control their entry using a license system, and even setting prices (Shaw et al., 1983).
On top of this regulation, which can be either tight or tolerant depending on the nature of the service, there is the usual taxation: these businesses might produce not only income tax but also value-added or sales taxes. Most cities and states both tax and regulate hotels and taxis, and the tourists who stay in hotels are usually an important source of tax revenue (Derviş, 2015; Baker, 2014).

Sharing firms disrupt this regulation. From a strictly formal standpoint, they are not the provider of the service, but merely a broker: The duties depend on the producer-users of the two-sided market, who in turn have no incentive to follow them since their output is so little that the probability of being caught is tiny.

At least so far, Uber has made it impossible to collect value-added taxes (Derviş, 2015), and many of AirBnB's customers are not paying the taxes required under the law (Baker, 2014). Uber is currently in disputes over whether its cars meet the safety and insurance requirements imposed on standard taxis. Its drivers did not pay for any kind of license, and especially in Europe this lack is originating furious protests from the incumbent license holders, who are accusing Uber of unfair competition and exploitation (Isaac, 2014).
AirBnB hosts do not face the regular inspections that hotels confront to ensure customers' protection. Cities have zoning restrictions because neighbors living in apartment buildings may want not to be living next door to a hotel, but given the very nature of the P2P service, there is no way that AirBnB's hosts follow this rule (Baker, 2014).

Nevertheless, it must be noted that there is still no comprehensive study on the topic; there is no clear-cut proof that for-profit P2P platforms allow the evasion of regulation and taxes, and, strictly speaking, users could regularly pay taxes and abide by local and national regulation. For sure, it is a fact that there is a growing concern from state authorities over the matter.

Analytically, the paradox emerges from an asymmetry of perspectives: When taken individually, users of a sharing platform produce too little output to be treated as a formal business subjected to regulation. At the same time, collectively they are so much relevant that they are able to unsettle the market as a whole. From the point of view of the authorities, then, the P2P platform is substantially (even thought not formally) a collector, a hub. The duties, then, must refer to the platform. On the other side, from the point of view of the sharing firm, its own role is merely of intermediation, and it is not responsible for the behavior of its users.

The interesting and still not completely answered question is then whether this kind of unfair advantages is actually present, and in the case of a positive response, whether its effects on the market competition outweigh the intrinsic positive impacts of the sharing economy outlined before.
There is another interesting question worth doing: Is the current regulation reasonable? Because – albeit it might be that the disrupting force of the sharing economy just comes out from deregulation – it might also be that this is the proof that the system should be changed.

The car-related markets are, again, the most studied ones, in particular the taxi segment. The topic is so vast and complex that it by far goes beyond the scope of this work. Nonetheless, it seems appropriate to call attention to the most important points made so far.

Market regulation exists for a reason: the absence of control over the numbers entering the trade results in a greater number of vehicles operating than the demand justifies, with the result that incomes become depressed (Barrett, 2003). Centrally set prices ensure a minimum wage for drivers, as well as predictability of fares for consumers, and state-backed services guarantee the presence of a service which might be subjected to market failures (Frankena and Pautler, 1984).

However, the liberalization of the market is advocated by the majority of economists (Moore & Balaker, 2006). Licensing induces the development of a secondary market (Kenny and McNutt, 1998), which leads to the separation of taxi licenses from taxi driving and sometimes

to speculative bubbles, whose consequences reflect on final consumers (Barrett, 2003). Evidence for systematic market failure in taxi markets is thin, and the benefits of deregulation would be tremendous: lower fares and lower operating costs, improved service quality, innovation and increased demand (Frankena & Pautler, 1986). In short, as put by Frankena and Pautler (1984), "there is no persuasive economic rationale for some of the most important regulations".

Barrett (2003) studied a sudden deregulation of the taxi sector in Ireland by the High Court in 2000, highlighting, among the consequences, a three-fold increase in taxi numbers and much-reduced passenger waiting times for taxis. Opposing to other economists' view (e.g. Frankena & Pautler, 1984; Moore & Balaker, 2006), Barrett indicates the superiority of deregulation over proposals for more gradual liberalization.

In the end, academic literature seems to suggest that Uber's disruptive and outstanding growth can be ascribed to an unorthodox deregulation of the taxi sector, but at the same time that this deregulation is not unfair, but actually good for the general welfare.

In the case of AirBnB-like firms, however, the context is slightly different. The most relevant difference between hotels and taxis regards the quality offered. For cabs, the quality of the service is easily observable and lies especially on two parameters: time elapsed waiting for the arrival of the driver and price paid. Uber, when the user requires a ride, estimates both the time of arrival and the fare due; users can then dismiss the request, or move along accepting the offer.

AirBnB is far less efficient when explicating its offers: in the case of home-rental, the criteria and parameters used to estimate the quality of the service are way more complex and challenging to demonstrate. Arguably, there is a certain degree of asymmetric information which weight on consumers, and eventually can result in adverse selection: as in Akerlof's market for lemons, it is possible to argue that high-quality service is never produced in this unregulated market, resulting in a market failure.

This is the reason why it makes sense from a pure economic perspective to regulate AirBnB's and Uber's service defining a set of minimum safety and quality standards that producers must oblige to follow, while, on the contrary, it does not make sense to regulate the entrance to the market using licenses: authorities should leave to the market the role of equilibrating the demand and the supply.

b. High Leverage on Stakeholders: Labor Exploitation and Monopolistic Behavior

The "asymmetry of perspective" discussed before, that can possibly allow P2P platforms to avoid regulation, culminate on labor issues. In fact, one of the greatest issues that sharing firms should address is the very controversial relationship they have with their producer-users. Instead of investing in a fleet of cars and hiring drivers as employees, or leasing it out to independent contractors as a traditional business would, Uber, Sidecar and Lyft play the role of the 'digital matchmakers' (Isaac, 2014; Damodaran, 2014). The same goes for AirBnB, TaskRabbit and all the other "sharing" firms.

In this context, producer-users are formally self-entrepreneur who use a platform of intermediation in order to meet consumer-users, and the sharing firms are then just mere brokers which take a slice of the transaction price for providing the service: These companies were able to classify their users as independent contractors instead of employees.
However, when the firm decides to adopt a centrally determined pricing model – an "artificial pricing model" as defined before – substantially this is hardly the case. It becomes a model of "evasive entrepreneurship" (Elert & Henrekson, 2014), which is aimed at circumventing existing institutional framework exploiting a "legal void" (Isaac, 2014), and allowing the P2P platform to bear almost no liability, since "the plan is simply to channel the information of those who do act in the world: It is the actors who take risks, not [the platform]" (Lanier, 2013).

In fact, the paradox emerges precisely when looking at risk. The traditional social contract between employers and employees consists of protections and income security guaranteed to workers; the sharing companies, however, perpetuate the degradation of this contract (Isaac, 2014): Producer-users must face all the burden of being self-entrepreneur while not having the chance of accessing to any of its perks.
Looking at the case of ride-sharing companies – the most prominent example of artificial pricing model services – it is possible to see how drivers have to work for an unstable income: the very nature of this model gives to drivers no real control over pricing, hence putting them in a situation in which they face "vulnerabilities in terms of maintaining a stable income" (Isaac, 2014). Noticeably, their condition is not very different from employment.
At the same time, tough, they have neither the benefits nor the protections associated with employment: no retirement fund is created, and both the fixed and variable costs burden of the

shoulder of users, namely the costs of the car, of its maintenance and of the gas. By and far, the biggest risk workers assume when driving "for" a P2P platform is accident liability (Brooks, 2014; Isaac, 2014). Some services, like Uber, have a commercial insurance policy that covers drivers who are actually carrying passengers or are on their way to pick them up (for Uber it amounts to $1 million per incident). This means that the policy does not apply when the driver is "between passengers", that is when he/she is logged onto the P2P platform but yet to accept a call (Brooks, 2014). The worst-case scenario happens when the driver's insurance company discovers that he/she was using the vehicle for commercial purposes, without paying the premium price for the commercial plan: the insurance company will most likely deny the claim and cancel the insurance policy altogether. These are the reason why, contrary to normally hired workers, the sharing workers risk to loose every thing they have (Isaac, 2014), whereas they do not have the possibility to self-determine their income.

When the situation is too heavy to bear, users should avoid perpetrating the transaction. For consumer-users, the exit strategy is changing P2P platform, and this competition ensures fair prices, as discussed previously. For producer-users, this is not the case. The asymmetry is given by the great leverage that the P2P platforms have on them: Producer-users have to abide a set of platform-specific rules, which sometimes arrive to dictate even on the specification of the car. Not only: Typically, these platforms use a bidirectional rating system to regulate the market and flush out bad drivers, but ratings are not shared between competitors, preventing drivers from easily change platform. Since building up a good reputation is essential for surviving in such a market, drivers could decide to just renounce moving out the relationship. It is true that the rating system works in both directions, but it is more likely that a consumer drops a request when he/she sees a driver with no reputation, than the contrary (Isaac, 2014; Schor, 2014).

The implications are profound: the economic stability of drivers is influenced by the decisions of a single actor, which however gives nothing in exchange in order to balance this privilege.

This problem of unbalanced leverage can be suffered even by consumers. Unfortunately, these are winner-take-all business: as pointed out by DeLong and Summers (2001) "the rule of thumb […] has been that the market leader makes a fortune, the first runner-up breaks even, and everyone else goes bankrupt rapidly". They justified it by looking at the structure of their costs ("an industry with high fixed costs and near-zero variable costs tends to monopoly") but this is only part of the story: the peer-to-peer mechanism works only when a

critical mass is reached, and the challenge is building a marketplace that ensures the presence of both supply and demand (Sacks, 2014). When this happens, it is very difficult for an external competitor to challenge the dominant position of the incumbent. It is possible to argue that P2P platforms are actually natural monopoly (and, in fact, DeLong and Summers actually suggest it).
As a broker, the platform shows the buyer and seller only what it wants to: There is an enormous degree of asymmetric information, since the platforms' algorithms are not regulated nor transparent. When there is no exit strategy for consumers, it amounts to an algorithmic monopoly: The platform may mimic market-style pricing, or it may not, and consumers as well as producers are left with no other option (Joshi, 2014).

In a sense, P2P platforms are doing the contrary of what they claim: they move surplus from consumers and producers to gatekeepers.
For users, the access and utilization of a P2P platform have to be in any case a Pareto improvement, because if it was not there would be no transaction at all. Still, a great part of the surplus is kept by the platform, thanks to its technological advantage, leverage power, potential monopolistic position, and a general poor macroeconomic climate (Cox, 2013).

There are two possible solutions that can partially solve the issue.
The first one is opening, centralizing and democratically managing the rating systems and all the other blocks that prevents workers to switch platform. This would ensure a fairer treatment of labor. The second is fostering sharers organization, even unionization. On some degree, this will happen naturally thanks to the economy of scales typical of these markets, but public authorities and the sharing firms itself should promote this kind of initiatives. In this way, the high bargaining power that the P2P platforms benefit can be balanced. Some authors (e.g. Schor, 2014) even suggested the utter democratization of the ownership and governance of the platforms.

In any case, it is clear that the issue is a not only a problem of efficiency but also of equity, and as such must be tackled accordingly: not only economically, but politically too.

7. Conclusions

The digital revolution of the XXI century has completely disrupted the economic fabric of almost every market: by shifting the framework from ownership to access, in a fashion which reminds the medieval Social Commons, this new movement changed the approach that both consumers and produces have had until now. Consumers and producers are now very fluid categories, since consumers can now share or rent their belongings with their peers, by exploiting the idle capacity of their assets and becoming actual producers. All of this was made possible by a historic convergence of favorable conditions – an economic recession, a revolution of the information technologies, and growing environmental concerns – as well as the development of a cultural change, with the desertion of the old self-identity definitions like owning a car, or a house, and of the old measures of success tightly related to economic wealth.

Given the innovative and dynamic nature of the phenomenon, defining it, its scope and its classification remains problematic, and over the matter there is no clear-cut agreement by academic literature. Still, almost every economist agree that it is possible to broadly divide the concept by following two criteria: market orientation (non-profit/for-profit) and market structure (peer-to-peer/business-to-peer).

In particular, the peer-to-peer, for-profit model is of great interest because its economic implications are profound. The P2P sharing firms, in fact, can decide which pricing model to adopt – either centralized and artificial or decentralized and organic – and this choice has serious legal and economic effects. The artificial model allows to reach a perfect market efficiency by ousting the asymmetric information costs, that are created by non-professional users and are typical of the organic model, but it makes room for a monopolistic behavior. Not only – centralizing the pricing while decentralizing the labor force puts the platforms in a very dangerous position since it could allow users to make legal actions against the platform itself.

At the end of the day, the sharing economy introduces an outstanding, innovative, disruptive, game changer paradigm, which allows the whole economy to reach a Kaldor-Hicks improvement according to which the sum of the gains outweighs the sum of the losses. It increases the efficiency of the use of idle goods, among which there is also spare time, it forces the public opinion to re-think the current regulation system, and generates positive externalities by reducing pollution and producing public goods.

However, the Kaldor-Hicks theorem looks just at the sign of the net value of generated welfare, ignoring the magnitude of both the gains and the losses. Unfortunately, the gains are big enough to shadow the huge losses and costs associated with this epochal revolution: In

fact, the sharing economy creates new ways of exploiting the labor force, evading the taxes, disrupting old businesses and taking advantage of monopolistic positions.
This is the reason why the consequences and the impact of the sharing economy must be addressed and regulated politically and internationally, to avoid that the tremendous efforts and sacrifices that the western world was forced to made with the advent of capitalism, two centuries ago, have been made vain.

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