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# Quantity and quality of work in the platform economy

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## Abstract

This critical and scoping review essay analyses digital labour markets where labour-intensive services are traded by matching requesters (employers and/or consumers) and providers (workers). It first discusses to what extent labour platform can be treated as two-sided or multi-sided markets, and the implications of these classifications. It then moves to address the legal and regulatory issues implied by these technologies. From a theoretical point of view, using a framework where innovation is not neutral in the labour market, platforms have implications for the quantity of jobs, for the kind of skills and tasks which are exchanged, and in terms of bargaining power of the contracting parties. It includes a critical evaluation of the empirical evidence from a variety of sources.

Keywords: platforms, employment, quality of work, regulation

JEL CODES: L23, L86, J21, J24

## 1. Introduction

Nowadays, a customer is likely to get her taxi using an app in her phone. Across the cities in both developing and developed countries, thousands of digitally hired riders use their bikes or motorcycles to deliver any sort of products. Hotels outsource most of their standard tasks through platforms. Highly skilled freelancers look for their clients online.

These are just a few examples of a new phenomenon which has been increasing in the last decade, where platforms have become new actors in almost any sector, from tourism to logistics, from advertisement to personal care. This chapter focuses on a particular set of platforms, those for the exchange of labour. Although still limited, the share of workers whose main occupation is managed by a platform is increasing, and there is no sign of this trend to be reversed in the immediate future. Platforms have been studied extensively because they appeared to be a conundrum for the standard toolkit of industrial regulation. New tools have been developed to study them. In terms of law, new controversies emerged, and the profession has been polarized among those who pushed for the development of new instruments to guarantee entitlements to social rights, and those who argue that platforms are simply living into (and exploiting) a limbo and should be fully included in the existing regimes. These debates are important from a labour market perspective, because they affect both wage negotiation and labour demand. Platforms are the successful application of new technologies, and although the relationship between innovation and the quantity and quality of labour has been extensively addressed in the literature, it is legitimate to ask to what extent one can make inference from standard models to this new labour market domain. Of course, new evidence has been collected, although through the hype of the moment, *the passions and the interests* (Hirschman, 1977) may have leaked into the discussion. In other words, to understand the implications of platforms for labour market, it is paramount to sort out technological issues, regulatory issues, theoretical issues and the robustness of evidence. The aim of this chapter is to put some order across these domains to understand the complex employment implications of digital labour markets.

The first question to be asked is to what extent labour platform can be treated as other platforms to exchange other production factors or goods. In the literature, platform have been extensively investigated because they pose several challenges to standard pricing theory and market analysis, due to the concurrence of network effects, market making, fixed costs, among the others. It is helpful to provide a heuristic characterization of platforms along different dimensions, instrumental to disentangle some of the open issues from a policy perspective. In fact, labour platform can be classified according to the degree of control exerted over the workers, according to the geographical location of the task and the need (or lack thereof) of physical delivery, and the characteristics of the traded task. This would be the object of the following Section.

Building on this conceptualization, Section 3 addresses the most compelling issues from a legal and regulatory perspectives: what are the implications, from a competition perspective, of the presence of large platforms in the labour market, and what is and ought to be the legal status of platform workers, oscillating between employee and private contractor. The risk of increasing market power exists and has implications for wages and employment. The status of the workers is also important because it affects dramatically the bargaining power and the entitlements in terms of social rights.

Section 4 presents the empirical evidence on labour supply, platformization of tasks, wages and compensation of workers, and on matching frictions and the presence of discrimination in platforms.

## 2. The technology of the platforms and its conceptual implications

‘Two-sided or multi-sided markets or platforms are situations where a platform enables two or more groups of users to transact or at least interact in ways that at least one group and usually all groups benefit directly or indirectly from having a growing number of users on the other side(s)’ (Codagnone et al 2019: p 18). Since 2002 (see, for example, Rochet & Tirole 2003, 2006; Parker & Van Alstyne, 2000, 2005; Eisenmann et al, 2006; Rysman, 2009), a growing body of economic literature has analysed situations that broadly qualify as two-sided markets (henceforth 2SMs), although the conditions for two-sidedness (or multi-sidedness) still remain an empirical matter to be ascertained case by case (Filistrucchi, et al 2013; Filistrucchi et al, 2014).

According to Roche and Tirole (2003) the role of platforms is to internalise the externalities on both sides, i.e. network effects are assumed to be two-ways. They study cases where the two sides cannot coordinate and there is no possibility of pass-through in that the amount charged on one side cannot be translated onto the other.

On the contrary, Armstrong (2006), Evans (2003), Evans & Schmalensee (2007), and more recently Filistrucchi et al. (2013) consider the more general case where network effect can exist on only one side of the market, and both 'membership' (access) and 'transaction' (usage) are used. In this setup, the important thing is that having one side coordinated by an intermediary is more efficient than by bilateral relationship. For instance, the TV market can be a 2SM, although viewers generally do not like TV advertising.

In their second contribution Rochet & Tirole proposed yet another definition "A market is two-sided (a two sided platform exists) if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board" (Rochet & Tirole, 2006, p.664-665). Network externality ceases to be a necessary condition, although they may be assumed to make the cross externality possible.

A further generalization is provided by Hagiu & Wright (2015a; 2015b), according to which the features of two-sidedness and multi-sidedness are the following ones: (i) enabling of direct interactions between two or more distinct sides (ii) affiliation of both sides with the market/platform. Direct interaction entails that sides maintain control over key terms of the interaction (pricing, bundling, delivery, marketing, quality of the goods or service offered, terms and conditions) as opposed to a situation where the intermediary takes control over such terms. Affiliation means that at each side, the users make the investments needed to join the market/platform and interact with the other sides; such affiliation generates cross-group network effects. In this perspective, a company endogenously chooses to become a platform, as an alternative to be a reseller or a Vertical Integrated (VI) conglomerate. The cost and benefit of vertical integration stand in retaining control and coordination, at the price of organizational difficulties. The cost and benefit of platformization lie in cost saving in exchange of less control and of efforts needed to motivate professionals to adapt their decisions to the new information arising.

Labour platform are those who normally are labelled "sharing economy", "collaborative economy", "crowd-working", "crowd-sourcing", the "gig economy", and the "on-demand economy". A possible definition is in Codagnone et al (2019, p. 74 and pp. 76-83). Digital labour platforms: *(1) work as digital marketplaces for non-standard and contingent work; (2) where services of various nature are produced using preponderantly the labour factor (as opposed to selling goods or renting property or a car); (3) where labour (i.e. the produced services) is exchanged for money; (4) where the matching is digitally mediated and administered although performance and delivery of labour can be electronically transmitted or physical; (5) where the allocation of labour and money is determined by a collection of buyers and sellers operating within a price system.* Notice that this definition excludes various online players, such as LinkedIn (does not match condition 1), Airbnb (condition 2), and so on. They display network effects, price non-neutrality, control on some terms of exchange, and platform affiliation. In this regard, they can be treated as 2SM. The real issue is related with control, i.e. whether there is direct interaction or rather the control exerted by platform operators introduce an ambivalence between market and hierarchy. A growing body of economic literature has studied platforms such as Uber, Airbnb, oDesk (today Upwork), TaskRabbit simply as two-sided labour markets with some consideration of the issue of control (Cullen & Farronato, 2015; Farronato & Fradkin, 2015; Hagiu & J. Wright, 2015a, 2015b, 2015c; Horton, 2010). As a result, the answer from such literature is that digital labour markets are either pure two-sided market or a hybrid of market and hierarchy, and it needs to be ascertained empirically case by case.

In fact, for both Uber and some digital labour platforms (i.e. especially Amazon Mechanical Turks), one side of the platform (i.e. the so called 'contractors') loses control over "pricing, bundling, delivery, marketing, quality of the goods or service offered, terms and conditions", violating direct interaction according to Hagiu and Wright (2015c). Digital platforms such as Upwork and MTurk exert control over contractors (Upwork more than Freelancers, as the latter does not have virtual offices which monitor even keystrokes). Intermediary agencies operating within MTurk or Upwork are also displaying a larger degree of control than the one assumed by the VI versus platform model. TaskRabbit introduced a more standardised and

controlled business model in 2014, moving along the same direction. The presence of various reasons, i.e. typical matching frictions, the heterogeneity of tasks/contractors/employers, prominence of on-demand and time-sensitivity (i.e. Uber), and problems of co-ordination of multiple contractors induced platform towards an increase of control over the terms of trade.

Besides control, Codagnone et al. (2019) argue that there are two additional dimensions which should be disentangled: a) whether transactions are fully online, or there is a physical delivery, i.e. Online Labour Markets (OLMs) that are potentially global, versus Mobile Labour Markets (MLMs) that are by definition localised; and b) what type of tasks are traded and what skills are required to deliver them (low skills mostly routine or manual vs high skills and mostly cognitive and interactive). Crossing the two dimensions generates four types: (1) OLMs for micro-tasking (i.e. small pieces of routine cognitive work requiring low to middle levels of skills as traded for instance in Amazon Mechanical Turk); (2) OLMs for tasking and at times delivery of entire and self-contained projects (i.e. tasks requiring middle to high skill levels such as in Upwork or Freelancers); (3) MLMs for physical services (i.e. performing low skilled manual work and errands such as in TaskRabbit); (4) MLMs for interactive services (i.e. interactive services requiring high skills such as in TakeLessons).

### 3. The Legal background: contracts and regulation

The rise of digital labour markets poses two main questions from the legal point of view. The first one – being more general in common with other digital platforms – relies on the definition and identification of platform as a mechanism facilitating the matching between offer and demand that raises issues on market power and anticompetitive behaviour. The second concern is raised with regards to the specific nature of what is exchanged, that is the legal framing of providers of services – those offering own work in exchange of a remuneration – to the platform. In this case, the debate should address the type of contract that should be applied and, consequently, the entitlements in terms of social protection and insurance, but also liabilities and taxation.

#### 3.1 Digital labour markets and competition policy

As discussed above, multi-sided platforms are agreed to have at least two “sides”, users and providers, or buyers and sellers creating indirect network externalities such that participants on each side benefit, the more numerous are the participants on the other side. Platforms rely on demand economies of scale (Shapiro and Varian, 1998) benefitting from two-sided network effects, a phenomenon whereby an increased volume of producers using the platform makes it more attractive for consumers to participate, and those consumers in turn attract more producers. Therefore, the multi-side nature of digital markets – and of the specific category of digital labour market – affects the volume of transactions and the market’s price structure with relevant consequences concerning the nature of competition and the policies aiming at favouring the latter.

First, platforms reduce transactions costs by enough to enable transactions that would otherwise not occur (Auer and Petit, 2015). From this point of view, price on each side of the market is not reflective of marginal cost on that side, because the price structure and the level will be set separately. The existence of feedbacks linking the two sides of the markets allow platforms adopting peculiar competitive strategies like, as in the canonical example, ‘letting in’ (i.e. opening the doors of the digital market/network the platform controls) new customers – or providers of work such as in case of digital labour markets – on one side to reduce the price charged to the other side (Eisenmann et al., 2006), or vice versa. This competition strategy takes the form of “envelopment” and consists in building barriers to entry in the “enveloped” market. The latter occurs even in the specific case of labour platform for which the so-called “chicken-and-egg problem” exists. Without workers, consumers do not find value in using the platform, and without consumer participation, workers may not use the platform. To overcome the initial gap, the platform may subsidize initial participation and as the platform expands and its ecosystem became self-sustaining, subsidies are typically discontinued. This change in policy may adversely affect workers or consumers, or both, who participate on the basis of receiving certain subsidies but then find that their costs increase.

Second, the standard consumer welfare analysis applied by anti-trust enforcement to detect anomalies is not applicable anymore, because prices usually taken as indicators of consumer welfare are in some platform close to zero and all the competitive pressure is exerted through service quality and innovative characteristics of the service itself (Coyle, 2018). Therefore, consumer welfare analysis might be biased in revealing an improvement of conditions for consumers by ignoring dynamic consumer welfare in favour of static efficiencies.

Third, the phenomenon of “multihoming”. Multihoming occurs when consumers can join different platforms with the latter expected to compete on a level playing field to attract the former. In the case of digital platforms, multihoming participation is linked to multihoming costs: the cost of participating on more than one platform. The key objective of digital platforms is to continuously increase and consolidate their user base by *de facto* increasing multihoming costs without erecting any formal or physical barrier to avoid users’ entry/exit. According to Choudary (2018) on labour platforms, one of the ways to increase multihoming costs is to create enforced dependence (lock-in) through reputation systems. Workers who have invested in building a reputation on one platform are hesitant to move to another platform without the ability to transfer their reputation and this is especially true if a higher reputation rating affords them greater visibility and increased work opportunities on a particular platform (Choudary, 2018, p. 4).

Fourth, platforms might pursue low or even negative profits for long periods desiring to grow to a dominant position in one or more markets (Khan, 2017). In order to exist, platforms need to be sure to expand both sides in an appropriate balance (Evans, 2011). Until reaching this critical mass, platform is likely to be operating in loss. After reaching a critical mass on both sides, a platform can quickly grow to a large scale thanks to the power of the indirect network effects. Therefore, profitability cannot be any more considered as an adequate indicator for competition and market dynamics.

According to Coyle (2018), the raise of digital markets through multi-side platforms undermines standard competition policy tools, mostly because competition is run for the market and not in the market leading to a case by case assessment of anticompetitive behaviour. Therefore, an appropriate analysis should abandon conventional market definition, in favour of a wider view of the ecosystem of markets centred around a platform (Coyle 2018). Several authors – among them see Khan (2017) - emphasize the need to shift from ex post competition assessments and remedies to ex ante regulation and in that sense, anti-trust enforcement practices should switch the focus of the analysis from prices and consumer behaviour to investment and innovation strategies pursued by platforms.

## 3.2 Digital labour markets and the employment status of platform workers

### 3.2.1 Regulation of digital platform work by existent law

In Europe, the European Commission (EC) has taken an “observational” stance, under the premise that the sector is in embryonic phase, limiting its role to provide guidelines to fill the gaps in terms of employment law and social security. Member States have not been very active either, and have been encouraged to use existing legislation. In particular, the assimilation of platform-based labour to non-standard forms of work makes feasible the application of the three directives on “atypical employment” on Part-Time Work, Fixed-Term Contract and Temporary Agency Work exploiting the principle of equal treatment contained in the aforementioned directives (Council Directive 97/81/EC of 15 December 1997; Council Directive 1999/70/EC of 28 June 1999; Directive 2008/14/EC of the European Parliament and the Council of 19 November 2008).

Since 2015, the Commission focused its attention on carrying out a public consultation aiming at gathering observations from various stakeholders in order to deliver two Communications on Online Platforms and on Collaborative Economy released in 2016 (European Commission, 2016). According to De Stefano and Aloisi (2018), the relevance of the Communication lies in fixing classification of activities distinguishing professionals from individuals who turn to collaborative economy platforms on an occasional basis. A narrow set of criteria has been settled such as the frequency with which a service is rendered, the provider’s profit-seeking motive and the payment. The Communication identifies the supply of the “underlying service” as the main criterion to establish which regulatory framework should be applied depending on the nature itself of

the platform – if operating in the digital market (cloud work web-based) or in the “real world” (gig-work location based). Furthermore, the Communication states that when all conditions are met, the platform exercises an influence or even a control on the “ultimate provider” of the service – namely the worker. In that case, the platform cannot be considered as a facilitator of the intermediation service and it should absolve its responsibilities (Smorto, 2019). The Communication states that three criteria need to be met in order to detect the existence of an employment relationship. First the existence of the subordination link, second the performance of effective duties, third the presence of remuneration. When the subordination link exists, the digital platform work can be included in the existent regulation for employees.

One of the main points consists in identifying thresholds in order to distinguish between peers – occasional providers – from professional services. According to the EC, several elements need to be taken into account such as the frequency of the activity (European Commission, 2016). If platform workers are acknowledged as professionals, they might be obliged to pay insurance against industrial accidents at the workplace and contributions to vocational training. This happened for example in France, where since 2016 platform workers are considered as “workers obtaining work through digital platforms” and therefore they are entitled to the rights of strike and unionization. The right to collectively bargain was also passed in Ireland (O’Regan, 2016). Overall, the European Communication advocates an intervention of Member States aimed at “assessing the adequacy of national employment legislation to the need of workers and self-employed individuals in the digital world by providing a guidance on the applicability of their national employment rules in light of labour patterns in the collaborative economy” (European Commission, 2016: p. 13).

Indeed, only few European countries have adopted specific regulations to address issues stemming from the diffusion of the platform economy. Existing regulatory schemes range from European Directives on atypical employment to casual work schemes such as zero-hours or voucher-based contracts.

### 3.2.2 Employee versus self-employed status

Despite the vast heterogeneity of platform jobs, those who argue in favour of extending current legislation to account for platform work focus on the major binary divide between workers self-employed and those in an employment relationship. This emphasis is partly motivated by the need to reduce market segmentation and reduce inequalities, as self employed and employee status have very different implications in terms of social security and taxes.

In fact, self-employment status generally provides lower social protection than employment contracts, for example in terms of social insurance against unemployment, accidents or occupational diseases. Health and safety regulation are linked to employment status and conditions for self-employed platform workers are less favourable.

As of early 2018, there was no specific regulation clarifying the employment status of platform workers and, as a result, existing employment statuses are valid for platform workers if their characteristics are applicable to platform work (Eurofound, 2018a). This is equivalent to delegate to the platform’s terms and condition the determination of the workers’ status, which is usually self-employed. Across the EU, this has fuelled legal actions, and many different court cases have pronounced different deliberations.

In terms of tax regimes, Eurofound (2018b) underlines that usually platform workers intentionally limit their income to stay below certain thresholds in order to benefit from favourable tax regimes. Specific tax regulation of platform work has been established in Belgium in 2016 and in Estonia in 2015. The uncertainty around the employment status of platform workers has implications in terms of tax regimes: if platform workers are classified as employees, the platform is responsible for paying the income tax; conversely, if workers are self-employed, then they are responsible for that.

Overall the *corpus* of European social law fails to uniformly define what makes an employee, while settled case law established that the employment relationship can be defined when, for a certain period of time, a person performs a service for and under the direction of another person in return for which receives a remuneration (European Court Reports 1986 - 02121). Indeed, it emerges that the power of command determining the activities carried out by the worker, the working conditions and conditions of remuneration stem from the internal structure of the contract (Veneziani, 2009). From the definition of employment relationship emerges that the work has to be carried out by the worker on behalf of someone else; the worker should be under that

person's supervision and, finally, a remuneration must exist. Other factors can be used to identify an employment relationship following an approximation of *sufficient conformity* according to which all the circumstances of the case can be taken into account, such as the continuous nature of the work, the compliance with working hours and the provision of some sort of guidance. Focusing on these criteria, De Stefano and Aloisi (2018) reach the conclusion that many requirements of platform-mediated arrangements sit uneasily with self-employed worker status (De Stefano and Aloisi, 2018, p. 46). The authors claim that the existence of a strict surveillance system based on consumer ratings, GPS features, bar-coding technology, time constraints, constants metrics, regular screenshots, and response rates undermine the classification of digital platform labour as a self-employment condition and document the inconsistency between the contractual label of "self-employed workers" and the autonomy of platforms workers (De Stefano and Aloisi, 2018, p. 46).

In order to disentangle the nature of the relationship, several dimensions might be considered such as the managerial and direction power, supervision and control power, coordination with the platform, flexibility in the time schedule, continuity of the performance, ownership of the equipment, personal labour such as irreplaceability. These dimensions might be assessed on a continuous base and by typology of platform distinguishing between online/global services to offline/local services, from professional crowdsourcing to manual services (De Stefano and Aloisi, 2018). According to Weiss (2016), creating new ad-hoc solutions for grey-zone cases such as the ones depicted by platform workers might complicate rather than simplify issues. When it comes to adapting existent laws to digital-platform workers, those who argue against the design of specific legislation only targeting platforms have tried to map working arrangements into three main categories such as passenger transport services, professional crowdsourcing and on-demand work at the household's premises. In terms of collaborative economy, these categories maps into the following services: peer-to-peer transport services, crowdsourcing, and manual on-demand work via platform (De Stefano and Aloisi, 2018).

Another attempt to regulate digital platform work by adapting existent legislation identified common traits between temporary work agencies and platforms. The Parliament resolution has recommended "to examine how far the Directive on Temporary Agency work 2008/104/EC1 is applicable to specific online platforms" (European Parliament, 2017) focusing on the triangular relationship between players and the role of platform as a "broker", although sometimes the power to supervise and control the individuals' performance is shared between the final user of the service and the platform itself. The application of the work agency scheme to the platform-mediated labour might be easily applied when the requester is a commercial business. Focusing on the Italian case, Faioli (2018) considers that some types of jobs app such as work performed through a digital platform in case of delivery of goods or provision of services should be framed under the temporary agency work umbrella. Furthermore, a first attempt of regulation already exists in the Italian legal framework through the Law no. 96 dated 21 June 2017 being a prototype of regulation of the labour market in the gig economy. According to Faioli (2018), in the gig economy where casual working activities are carried out through a digital environment matching demand and supply, coordinating working activities, measuring their quality, forecasting needs of consumers and sellers of goods and services, the price itself plays a minor role from a legal point of view because both consumers and sellers are not interested in it and they can choose across several prices. Indeed, prices have an impact on labour costs and the lower the price, the lighter the burden entailed by the value chain. From this point of view, the legislator should avoid abuses – the platform can be obliged to acquire the status of temporary work agency and be subject to applicable legislative and collective bargaining provisions.

## 4. The empirical evidence on digital platforms

### 4.1 Some Theoretical Hypotheses

Labour Platform can be addressed as a special case of the make or buy problem by the company. As pointed out by Coase (1937), this is the core problem which characterizes the role of the firm. If a firm decides to execute a certain task inside the boundaries of its direct control, it decides how to assign labour and capital to perform it, depending on relative price and relative productivities, under competitive conditions. On the



contrary, if the company decides to buy the execution of the task, it should decide whether to buy it directly through the market, or through a platform. In Coase, the decision to make or buy is the comparison between the transaction cost and the organizational cost: the optimal firm size is determined by the operation for which the equality between the marginal costs of executing it internally is equal to the cost of acquiring it on the market.

Under competitive conditions it is natural to assume that the size of the platform economy on total employment is a positive function of the quality of the matching process (i.e. the quality of the algorithms), while the relationship between platform employment and institutions is unclear. In fact, a change in labour market institutions, such as a typical labour market reform reducing firing costs, is likely to have two effects. The first one is labour deepening, because more tasks are internalized, if cost of organization is reduced. This translates into lower wages and more labour input used. The second one is labour saving, because marginal productivity is decreased (Saltari and Travaglini, 2008), and capital labour ratio increases. The net effects in unclear, and depends on labour supply on the platform, which is also likely to become more elastic to the wage.

Under competitive terms and multiple skills, the prediction does not change significantly, it depends on what kind of skills has comparative advantage on *platformized* tasks (Acemoglu and Author, 2011). Usually one would assume that mainly low skill workers have a comparative advantage on platforms. Naturally, factor augmenting technology or education change the relative supply of skills and the patterns of allocation of skills to task, which reflects basic supply and demand rules.

However, as Drakoupil and Piasna (2017) point out, the employment in platform may not necessarily be a question of matching demand and supply, but rather of control over the process and of asymmetric information. In fact, the quality of the matching via digital platforms may decrease rather than improve allocative efficiency. The major driver concerns the risk of a relative weakening of platform workers position vis-à-vis customers and the platform itself. Such weakening might be driven by specific labour market fragilities, as the presence of high unemployment levels, faced by individuals deciding to offer their services on platforms. If such a weakening occurs, platform workers might be induced to accept tasks below their qualification level with potential negative effects in terms of efficiency and productivity. In addition, the breaking down of jobs into tasks (i.e. the increase in work fragmentation) may favour a process of deskilling with, again, negative outcomes on both individual and aggregate productivity. Such phenomenon might be magnified by the platform-driven increasing demand for “clickwork” (i.e. as in the case of the micro-tasks offered to platform workers by Amazon Mechanical Turk, described in detail by De Stefano, 2016) with little to no skill content or opportunities for learning.

Even the reduction in transaction costs induced by platforms might result in an uneven outcome for customers and workers. On the one hand, consumers logging into platforms for the accomplishment of specific task benefit from the opportunity of (virtually) putting in competition a massive number of individuals applying to perform such task. In this way, the waiting time for purchase goods and/or services might collapse while the probability of finding the right ‘task-supplier’ approaches one thanks to peculiar tools as the tracking of platform workers’ performance records. Platform workers, on the contrary, might spend a long time waiting and searching for adequate work implicitly bearing the transaction costs that were supposed to have disappeared.

Additionally, because of platforms, labour saving impacts of innovation may be less likely to be recovered through standard compensation mechanisms (Bogliacino and Vivarelli, 2012). Compensation mechanisms refer to a large array of forces that slowly provide adjustments to relocate those workers which are negatively affected by labour saving automation or introduction of new processes. Typically, they rely on change in wage and income to equilibrate the economy. Since downward pressure on wages has been going on for decades, resulting in a decline in labour share of national income (IMF, 2017), further movements may be naturally limited by floor effects. Additionally, asymmetries in bargaining power affects effective demand, reducing income channels to impulse economic recovery.

## 4.2 Descriptive Evidence

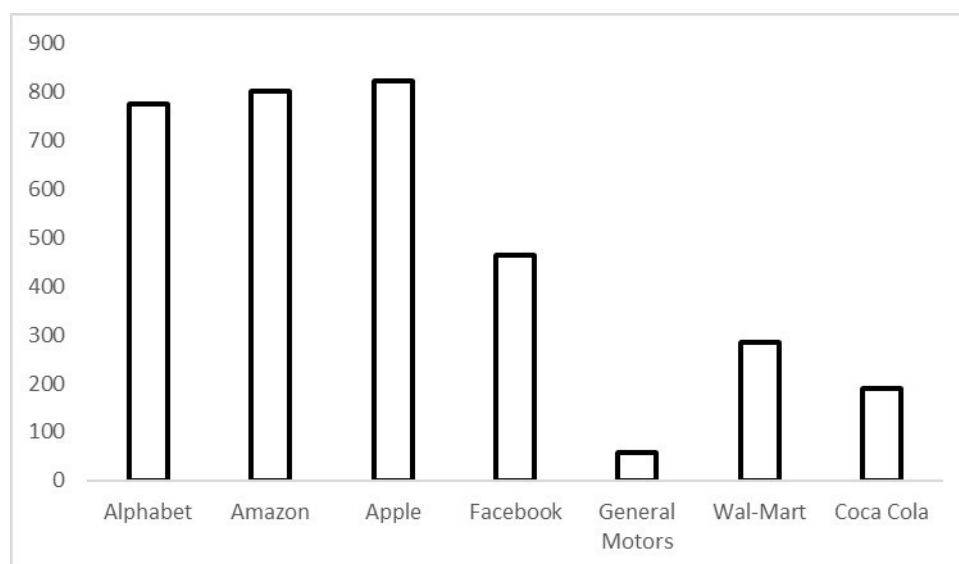
As introduced in Section 2, Eurofound (2018a) provides a taxonomy similar to Codagnone et al. (2019), which classifies platform according to economic sector, presence of *platform work* (a form of employment that uses an online platform to enable organisations or individuals to access other organisations or individuals to solve problems or to provide services in exchange for payment), *type of goods/ services that are traded and/or tasks that are performed within the platform perimeter*. Focusing on Europe, Eurofound (2018) has identified 10 types of platforms, having reached a considerable size in terms of turnover and number of workers involved. The Eurofound (2018)'s taxonomy is reported in table 1, with examples of key platforms operating in each sector.

Table 1 The Eurofound taxonomy on digital platforms

Economic sector	Platform work	Example of tasks	Platform example
Accommodation	No	renting a holiday home	Airbnb and HomeStay
Financial services	No	crowdfunding	Kickstarter and Seedr
Household tasks	Yes	cleaning	Hilfr and Helping
Non-commercial services	No	volunteering, social media	Linkedin and Couchsurfing
Professional services	Yes	software development or graphic design	Upwork and 99 Designs
Transport	Yes	person transport and food delivery	Glovo and Deliveroo

Source: Eurofound (2018a)

Figure 1 Market capitalization (February 2019) of major platforms vis-a-vis selected companies US stock market



Source: Finbox.io. Retrieved at 02/03/2019. Note: Market capitalization refers to a public company's total equity value as implied by the stock's last observed trading price.

To provide a measure of the degree of Schumpeterian 'disruptiveness' (and associated economic gains) of the major platform companies, the most recent data on market capitalization are reported in Figure 1 comparing leading platforms (i.e. Alphabet, Amazon, Apple, Facebook) with three traditional US giants operating in rather heterogeneous sectors (Coca-Cola, General Motors and Wal-Mart). The divide between market capitalization of global platforms as those reported in Figure 1 and the other traditional oligopolists is

striking. Both Alphabet, Amazon and Apple (to a lower extent Facebook) capitalization figures are close to three times those reported by Coca-Cola, General Motors and Wal-Mart. Despite market performance are exposed to a rather strong degree of volatility, there is no risk of an inversion in such a trend within a short time period.

The global survey of platform by Ewans and Gawer documents that big players in the platform economy are located in North America and Asia, while Europe and Africa Latin America are followers. The sectors with the largest number of platforms are commerce, financial services, and software, followed by social networking, media companies, transportation and real estate, although in terms of market capitalization, the ranking changes.

In terms of prevalence of labour platform, according to Harris and Krueger (2018), it can be estimated around 0.4% of total employment in the US, while Pesole et al. (2018) estimate a 2% of “online active population” in Europe, increasing to 10% when expanding the definition to all workers that used labour platforms at least one. Using secondary sources, Eurofund (2018a; 2018b) claim that the share of working-age population participating to digital platforms could be conservatively estimated in 0.5%.

#### 4.3 Platform workers

A relevant question concerns the profile of those who sell their workforce on digital platforms. The empirical research on this issue is still inconclusive and the heterogeneity across countries and sectors is also very high. A UK based research (Lepanjuuri et al. 2018) has recently focused its attention on platform workers – i.e. in this study platforms are defined as “involving exchange of labour for money between individuals or companies via digital platforms that actively facilitate matching between providers and customers, on a short-term and payment by task basis” – and their characteristics. Relying on a survey realized in 2017, Lepanjuuri et al. (2018) found that the 4.4% of the surveyed population (including Amazon Mechanical Turk, CrowdFlower, Clickworker, Microworkers and Prolific) worked via-platforms during the previous 12 months. Remarkably, the 45% of respondents declared that the income earned via digital platform represent a fairly (28%) or very (17%) important share of their personal income. As for the demographic characteristics, it turns out that UK platform workers have a gender profile similar to the overall population. Among those declaring to work through platforms, the 54% were men and 46% per cent women (compared to 49% and 51% respectively in the overall population). In terms of age, young workers seem to prevail. The age composition of those involved in the UK platform economy is skewed towards those aged 34 or less. The 50% is aged 18-34 while in the general population this group represents the 27%. On the contrary, only the 10% of platform workers is aged 55 or over. Regarding education levels, no significant differences between those working via platform and the general population have been detected. The 37% holds a degree-level education or higher qualifications as opposed to the 34% of the general sample.

Nevertheless, according to the evidence from the COLLEEM survey, aiming to be representative of all internet users between 16 and 74 years old in selected European countries, platform workers are predominantly male, and with tertiary education (Pesole et al. 2018). Between countries, there is a large degree of heterogeneity: the UK has the highest incidence of platform work, followed by Germany, the Netherlands, Spain, Portugal, and Italy.

#### 4.4 What tasks are more likely to be undertaken ‘via-platforms’?

Platform workers tend to be assimilated to self-employed having no (or very weak) protection against social risks and no unions to associate with in order to rise their remuneration or working conditions levels (see Faioli, 2018; Preissl, 2018 for a discussion on this point). As increasingly emphasized by both the academic and the policy debate, platform workers are pervasively directed, monitored and persistently pushed (via-algorithms) to increase their performance (De Stefano, 2016). In other words, the same techno-organizational environment that seems to guarantee a self-employed type of autonomy to platform workers is indeed the perimeter within which they are exposed to significantly high levels of hetero-direction and control (at least comparable with those characterizing standard employees). Given these arguments, the analysis of the actual and potential labor impacts of digital platform should be focused around the jobs or, more specifically, the tasks more apt to be ‘platformized’ – i.e. managed and organized via-platforms – exposing workers to high

levels of socio-economic risk and ambiguity in terms of status – i.e. self vs standard employment discussed above.

As De Stefano (2016) pointed out, digital platforms are pushing further the (long-lasting) process of labor fragmentation – or, casualization – enlarging of the share of workers exposed to strong uncertainty – i.e. precarious workers having non-standard contracts lacking protection against layoffs and social risks, earning below-the-average wages, being often non-unionized. From this point of view, it is important to concentrate the attention on sectors, parts of the productive process, jobs and, ultimately, tasks that are prone to be organized via-platforms. Platforms, in fact, might also be interpreted as technologically peculiar ways to externalize parts of the production process with the aim of increasing organizational flexibility and reducing costs. On the other hand, platforms represent also a mean through which traditionally autonomous activities – i.e. a paradigmatic case is that of private car transport – are now apt to be pooled, organized with strong degrees of hetero-direction and control but still configurable, in juridical terms (see section 3 above), as self-employed work.

The organization of production processes and related tasks via digital platforms is a practice unfolding in both manufacturing and services. Concerning the former, many tasks referring to manufacturing-related business services – i.e. as, for example, customer care activities, communication, marketing – are increasingly externalized to platforms (De Stefano, 2016). Relatedly, high-tech companies increasingly tend to outsource a series of crucial medium and low tasks to platforms external to the company's core. Among the tasks requiring low skills there are: tagging photos on the web; collecting information needed to 'feed and train' algorithms; driving around Google cars to fuel the Google Maps application of key information (for a complete discussion of this point, see Irani 2015). As for medium-skill related tasks, digital platforms are now an attractive place to outsource less complex (and strategic) but still relevant parts of ICT-related production processes. The most commonly outsourced tasks concerns, for example, programming or elaborating information through specific softwares.

Another area where platforms are penetrating is that of professional services, both medium-low as well high skilled services. The 'Upwork' platform is paradigmatic for what regards the provision of tasks requiring medium-high skills. Via a platform as Upwork both companies and individual clients can buy very well specified tasks ascribable to the following domains: web development and design, App development, writing, administrative support, customer services, marketing and accounting. Within those domains, the tasks that companies and individuals might be willing to outsource (or to buy from) to digital platforms tend to be those not implying the usage of company-specific knowledge or requiring to undertake strategic decision. That is, the more the tasks are standardizable, codifiable and can be realized relying on a circumscribed and generally available amount of knowledge the more intense the process of outsourcing towards digital platforms will be. Concerning tasks associated to low skill levels, there is another paradigmatic example, that of the 'Taskrabbit' platform. Logging into this platform, it is possible to buy services (performed by workers that are defined as 'taskers' on the platform website) as: mounting and installation, moving and packing, furniture assembly, home improvement, general handyman, heavy lifting. As in the case of medium and high skill related tasks, these services might be requested by individual clients but also by companies outsourcing such activities (i.e. think for example at companies realizing furniture and/or dwelling components relying on digital platform to perform ancillary tasks as lifting and assembly)

Focusing on tasks as a reference point to analyze diffusion extent and potential implications of digital platforms (on this approach, see also Eurofound, 2018), thus, it is possible to identify the areas where a further penetration of platform work is more likely to occur. On the other hand, adopting this approach allow framing the diffusion of digital platform as a deepening of the long-lasting tendency towards production fragmentation and outsourcing. In addition, the opportunity to organize via-platforms low-skill tasks as, for example, general handyman might be interpreted as the transformation of so far informal into formal marketplaces.

#### 4.5 Evidence on employment, contracts and working conditions

Moving to the labor demand in digital platforms, it is important to distinguish between direct and indirect effects (in terms of employment and income). In terms of direct effect, digital platforms constitute an

opportunity to externalize many tasks out of the company's core perimeter (Weil, 2014). By allowing managers to control and track detailed and precise information regarding tasks performed outside geographical and time boundaries, platforms are, to a certain extent, the transposition "in open space and on a global scale" of the Taylor (1911)'s scientific management principles. At Taylor's time, the efficiency gains stemming from the scientific task fragmentation were subordinated to the setting of well-organized and circumscribed physical spaces (i.e. the factory) endowed with conspicuous personnel aimed at continuous monitoring and control. Within the digital platform, in turn, the Tayloristic organizational principles are realized just by connecting to the web those who perform tasks via the platform's App. Uber is a paradigmatic example in this respect. The company's core is reduced to few managers and data analysts updating and refining algorithms while all the rest - including the 2 million drivers operating almost globally via the Uber's App, according to official figures - is external to the company's perimeter (even in legal terms). At the same time, Ubers' managers are capable to control and track performance related information of drivers regardless of the location. In employment terms, the development of platforms might open opportunities, thus increasing employment, in a large number of service sectors. Nevertheless, this positive effect might be counterbalanced by the erosion of market shares of traditional operators (i.e. as in the case of Uber vis a vis traditional taxi drivers) crowded out by platforms. That is, the diffusion of digital platforms might result in a compositional change within the workforce - a migration towards platforms of workers losing their job in traditionally protected sectors - rather than in a net positive employment effect.

This latter element relates to the indirect effects of the diffusion of platforms. As argued above, successful platforms tend to hold increasing and persistent market power. Such concentration of market power tends to put pressure on platforms' competitors as well as along the value chain connected to them inducing suppliers to adopt cost-competitiveness strategies based on wage and employment compression. In this case, the paradigmatic example is Amazon. Holding massive market power in the online retail sector and aiming at maximizing its margins, Amazon exerts a continuous competitive pressure on companies supplying their product via its digital marketplace. In order to stay on the platform and keep selling their products to the massive share of global consumers using Amazon, the vast majority of suppliers undergo continuous price reduction (often required by the platform itself) with potentially negative effects on employment and wages. By the same token, the increasing share of demand syphoned out by online retail platforms as Amazon favors the adoption of aggressive cost competitive strategies by traditional retailers likely to have negative repercussions on employment and wage levels.

The high degree of work fragmentation characterizing platforms might also affect workers' bargaining power. A key issue concerns platforms workers' contractual status. Given the digital relationship with platforms, those selling their workforce through it tend to be considered and contractualized as autonomous workers lacking social protection and with scarce opportunity for collective actions (Degryse, 2016). Indeed, the degree of direction and control exerted by the platform management casts serious doubts about the claim that the individuals working via-App are self-employed. Despite an increasing number of lawsuits filed by drivers against Uber (mostly in the US and to a lower extent in Europe), small achievements have been obtained in terms of rights and benefits (Collier et al. 2017). From a juridical standpoint, drivers are still considered platform's partners and being a dispersed and atomized interest group they are unable to mobilize collectively and to obtain significant results in legislative arenas.

The ILO has recently investigated platform work reporting some information on dimension and characteristics of a specific form of work performed via platforms: the so-called crowdwork (Berg et al. 2018). According to the Jeff Hows' definition reported by Berg et al. (2018: p.3), crowdwork is "the act of taking a job once performed by a designated agent (an employee, freelancer or a separate firm) and outsourcing it to an undefined, generally large group of people through the form of an open call, which usually takes place over the Internet". Among the most famous examples of crowdwork there are offline labor platforms as Amazon Mechanical Turk or Crowdfunder. According to the survey results, workers of all ages are engaged in crowdwork. The average age of respondents is 33.2 years. Differently to the Lapanjuuri et al. (2018)'s findings, this survey reports a male bias with women representing only one out of every three workers (in developing countries the distribution is even more unbalanced with only one woman out of five crowdworkers). Confirming what emerged concerning platform work in the UK, crowdworkers turn out to be well educated: the 18% holds a high school diploma, the 25% had a technical certificate or some university

studies, the 37% had a bachelor's degree and the 20% had a postgraduate degree. How long, on average, is the platform work relationship? The 56% of the survey respondents declare to have performed crowdwork for more than a year while the 29% had crowdworked for more than three years. If this kind of poorly remunerated activities (i.e. activities performed remotely, in isolation and most often concerning the realization of highly fragmented and repetitive micro-tasks as tagging pictures on the web or surfing the latter to signal inappropriate contents) can be fairly considered as the more radical form of flexibilization (or casualization) of work, Berg et al. (2018)'s results seem to show that for many crowdworkers this is not an episodic occurrence but rather their prevalent condition. This consideration matches with the results reported by the authors regarding the 'reasons for doing crowdwork'. The 32% of respondents said that they do crowdwork in order to complement pay from other jobs while the 22% because they "prefer to work from home". Indeed, the 10% of respondents point to their health conditions as a key motivation behind their choice of doing crowdwork. For those declaring to be affected by disabilities or chronic illness, crowdwork provides a way to continue to work and earn an income. How do the crowdworkers fare? The evidence on the earnings of contractors in these digitally-mediated labour markets is limited to a few studies of a limited number of cases (MTurk, Crowdfunder, Uber, Upwork and Nubelo, and TaskRabbit). Some evidences have been collected in Codagnone et al. (2016): in Ipeirotis (2010) – one of the first analysis of earnings in MTurks - 10% of the posted micro tasks in MTurk were priced at 2 cents or less, 50% above 10 cents, and only 15% above \$1, corresponding to a potential average hourly wage of about \$5 per hour (which is lower than the US minimum wage of \$7.25 per hour). Berg (2016) confirms that reported average hourly wage for both MTurk and Crowdfunder is between \$1 and \$5.5 per hour, although 10% of Turkers both in the U.S. and India report hourly earnings above \$10. According to Hall and Krueger (2018), Uber drivers earn \$6 per hour more than drivers of traditional cabs (\$19 per hour versus \$13 per hour). In Upwork, the average hourly wages are \$16 in software, \$8 for writing and translation, \$4 for administrative support, and \$5 for both customer support and sales and marketing. With TaskRabbit, the average job is \$55 and now it cannot entail an hourly wage of less than \$12.50 per hour. The average remuneration across the five platforms included in the Berg et al. (2018)' survey is 4.43 dollars per hour while median earnings turn out to be lower, 2.16 dollars per hour. Nearly two-thirds of American workers surveyed on the Amazon Mechanical Turk platform earned less than the federal minimum wage of US\$7.25 per hour; only 7 per cent of German workers surveyed on the Clickworker platform reported earnings above the German minimum wage of €8.84 per hour, taking into consideration paid and unpaid hours of work.

Indeed, poor wages go hand in hand with low social protection schemes for platform workers: The Economy Workforce Report (RFS, 2015) shows that 8% of drivers and 16% of delivery workers are uninsured; 30% have no health insurance; 43% complain about insufficient pay and 49% about not finding enough work. The respondents (all self-employed) indicate as the most desired benefits in order of importance for social protection: health insurance; retirement benefits; paid sick, holiday, and vacation days. According to the data reported in Berg (2016), those respondents whose primary income source is the platform (MTurk and Crowdfunder) lack any form of social security coverage, only 8.1% of those based in the US report making regular payments into private pensions and only 9.4% contribute to social security.

An interesting case study is Italy, where there has been a significant expansion of platform related employment, especially in the sectors of food-delivery, intermediating supply, tourism, real estate and retail. Guarascio and Sacchi (2018) provide a detail account of the economic and employment performance of digital platforms operating in Italy.

The first important stylized fact is that trends are not homogeneous but are somehow sector specific. At least in the case of global platform such as Amazon, Google or Facebook, the speed of growth in terms of revenue and wages is faster than the average performance in the related sector. However, only for Google revenues grow more than wages, while this is not the case for the other ones.

Although all platforms show an increase in employment over the period 2012-2016, Italian platforms show a low employment intensity. This is partly specific of the type of business: platform related with intangible services (Google and Facebook) can rely on a small subset of highly educated workers. However, for labour platforms such as Deliveroo, Foodora and Just-Eat, this may represent an artefact of presenting as "partners" or collaborators those who should appear as employees given the nature of the relationship with the platform

and the level of control operated by the firm. This is not the case for logistics, where Amazon presented 1169 employees in 2016, being one of the largest employers.

Guarascio and Sacchi calculate the Gross Worker Turnover (GWT), given by the ratio between the sum of new contracts and terminations over the employment stock in a given year (calculated exclusively with reference to paid employment contracts). This is a measure of the occupational volatility at the company level. The GWT is very high for Amazon Logistica, but this is not the case for Google and Facebook. Type of contracts differs dramatically across platforms, with temporary work prevalent in some sectors and open-ended contracts in others (Table 2).

They also suggest a taxonomy of work related business strategies, which is exemplified in Table 3 by Foodora, Just-Eat and Deliveroo. Foodora has a very restricted set of workers, with fixed term contracts, but then hires food-delivery staff using “coordinated and continuous collaboration” contracts (this type of contract implies a highly flexible labour relationship according to which workers are free to organize their own work with firms in charge of the organizational coordination). The extensive use of this type of contracts might explain the contrast between high volume of new contracts, on one side; and small number of employees, on the other. Just-Eat and Deliveroo's organizational modes are very different, although the structure is not: Deliveroo hires their “collaborators” through occasional contracts or relies on self-employment relationships, whereas Just-Eat outsource to an auxiliary company that is responsible of the coordinated and continuous collaboration.

Table 2. Number of employees, gross worker turnover and new contracts (absolute values and type of contract)

Platform	# Employees (2016)	Gross worker turnover	New contracts* (average 2016-2017)	New contracts* (average 2016-2017)					
				Open-ended	Fixed-term	Temp agency work	Collaborations	Oblig**	Total
Amazon IT Logistica	1058	1229%	7133	10,1%	0	89,7%	0	0,2%	100%
Amazon IT Services	111	47%	58	68,2%	2,6%	0	0	29,2%	100%
Google IT	195	60%	66	37,4%	3,8%	53%	0	5,8%	100%
Facebook IT	22	34%	6	77,8%	0	0	0	22,2%	100%
Booking.com	239	52%	67	6%	52%	37%	0	5%	100%
Casa.it	135	48%	25	40,6%	32,4%	7%	0	20%	100%
Subito.it	111	48%	36	66,2%	0	16%	5,3%	12,5%	100%
Deliveroo	70	54%	30	80%	18,5%	0	1,5%	0	100%
Foodora	45	156%	1814	0,6%	1,7%	0	97,2%	0,5%	100%
Just-Eat	80	84%	37	22,5%	56%	16%	0	5,4%	100%

Source: INAPP elaboration on Aida-BVD data and Comunicazioni obbligatorie - Mandatory Communications (MLPS). Years 2016 and 2017. Note: gross worker turnover is the ratio between the sum of new contracts and terminations communicated between 2016 and 2017 over the stock of employees drawn from the AIDA 2016 balance sheet data. To carry out the calculation, new contracts for internships and collaborations has been subtracted from the numerator. The new contracts figure (third column) refers to the average of new contracts activated by each platform in 2016 and 2017. The new contracts reported in the

column 'other' refers to apprenticeship contracts (contractual type activated exclusively by the Subito.it platform).

Table 3 Organisational models of labor platforms - Deliveroo, Foodora and Just-Eat

Deliveroo model	Foodora model	Just-Eat model
<ul style="list-style-type: none"> <li>• Small group of employees mainly with open ended contracts</li> <li>• Riders hired with occasional collaboration contracts switching to self-employment if annual compensation exceeds 5,000 euros</li> </ul>	<ul style="list-style-type: none"> <li>• Small group of employees mainly with fixed-term contracts</li> <li>• Riders hired with coordinated and continuous collaboration contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Small group of employees mainly with subordinate contracts (open ended, fixed-term and small amounts on personnel leasing contracts)</li> <li>• Riders hired through auxiliary companies providing coordinated and continuous collaboration contracts</li> </ul>

Source: Guarascio and Sacchi (2016).

Finally, in terms of cost structure, heterogeneity points at a larger share of wages over total costs for big global platforms (Google, Amazon and Facebook), while labour platforms (Deliveroo, Foodora, Just-Eat and Petme) have exactly the opposite stylized fact, suggesting again the presence of heterogeneous organizational strategies.

#### 4.5 Evidence on matching frictions and biases

As revised in detail by Codagnone et al. (2016) and Codagnone et al. (2019), the debate on platforms has been fuelled by discourses advertising the matching mechanism behind platforms; however, the same narrative has stimulated an entire set of critical contributions focusing on the rhetorical and discourse analysis of platforms. Such kind of analysis is not new and as acknowledged by Hirschman (1977) would be of a leading importance given that ideas and rhetoric become endogenous engines of social change, reforms, and policies. One of the rhetorical themes claimed by enthusiasts and by the platforms themselves is that platforms can increase the pool of employers and workers by removing barriers to participation in the labour market through flexible arrangements, reduction of transaction costs, and improvement of the matching quality. For example, women are deemed to participate more to online digital labour markets because they are offered schedule flexibility and the possibility of working remotely, making it easier to reincorporate work in the daily routine while managing other responsibility such as childcare (Dettling, 2016; Rossotto et al., 2012). However, if platforms reproduce the discriminatory bias, stereotyping and resulting segregation of more vulnerable groups, the positive effect of increased participation may be vanished. Moreover, to the extent in which platforms induce precarization, reduction in bargaining power, and limited access to social protection, negative net effects can prevail for these categories. Indeed, gender and ethnicity-based discrimination (voluntary or involuntarily produced by matching frictions, hiring inefficiencies, and cognitive biases) is not uncommon and workers do not have adequate access to social protection systems to protect themselves.

In this respect, several studies have underlined that the most socially excluded groups may lack awareness of digital labour possibilities or may lack the skills to take advantage of them (financial literacy and digitalization in particular). Field experiments show the existence of an entry-level discrimination – as in Pallais (2013) where referred workers are more likely to be hired than non-referred workers. With regards to women, female workers suffer statistically discrimination (Silberzahn et al., 2014 and Uhlmann and Silberzahn, 2014): they are less likely to be hired for jobs that are predominantly male (e.g. programming), and more likely to be hired for those which are predominantly female (e.g. customer services). This discrimination is based on inaccurate beliefs as women applying for stereotypically male jobs possess on average more domain relevant skills than their male counterparts (Silberzahn, et al., 2014). When they are hired, the payment form is



typically different from the male workers, reproducing the risk averse choices that are grounded on gender stereotypes. It is important to stress that these patterns are exactly those observed in non-digital labour markets. Confirmation bias may play a role as well inasmuch employers who choose based on gender stereotypes will never test counter stereotypical hiring, reinforcing their own priors.

More recently, on a sample of over a million drivers operating on the Uber's platform, Cook et al. (2019) document the existence of a 7% gender earnings gap amongst drivers. This gap is due to different experience on the platform (learning-by-doing), different preferences over where to work and, diverging preferences for driving speed. Overall, the authors conclude that there is no reason to expect the "gig" economy to close gender differences.

Furthermore, considering the nature of what is exchanged on digital labour markets – that is human labour – another important issue should be clearly pointed out, that is an adequate access to social protection systems for platform workers. As recently underlined by Codagnone et al. (2018) and Bogliacino et al. (2019) new digital trends are causing concerns on issues (accessibility, adequacy, transferability and transparency) related to social protection and employment related services for non-standard forms of employment under which platform workers are classified. Various policy options are being discussed on how social protection systems can adapt to the changing nature of work and close social protection gaps. Contractors in digital labour markets are excluded from any form of social protection. The portability proposal advanced in 2015 may be a starting point to address this problem (Berg, 2016; Harris and Krueger, 2015; Hill, 2015; Strom and Schmitt, 2016). As summarised by Berg (2016, p. 2), the proposal consists in creating 'individual security accounts to protect the worker as they move from gig to gig'. The proposal requires the creation of universal benefits (wage insurance, health insurance, disability and injuries insurance) that are not tied to specific employers (Strom and Schmitt, 2016, p. 14). In this framework, the final employers are either charged with similar obligations as those protecting regular workers or may share the contribution with the platform. Overall, the issue of working conditions and access to adequate social protection systems are still open and debated.



## References

- Acemoglu, D and Autor, D (2011) Skills, Tasks and Technologies: Implications for Employment and Earnings, in Ashenfelter, O, Card, D (Eds): Handbook of Labor Economics, volume 4, North Holland
- Armstrong, M. (2006). Competition in two-sided markets. RAND Journal of Economics, 37(3), 668-691. doi:10.1111/j.1756-2171.2006.tb00037.x
- Auer, D. and Petit, N. (2015) Two-sided markets and the challenge of turning economic theory into antitrust policy. *The Antitrust Bulletin*, 60(4), 426-461.
- Berg, J., Furrer, M., Harmon, E., Rani, U., & Silberman, M. S. (2018). Digital labour platforms and the future of work: Towards decent work in the online world. Geneva: International Labour Organization, September 20.
- Berg, J. (2016). Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers. *Comparative Labor Law & Policy Journal*, 37(3).
- Bogliacino, F; Cirillo, V; Fana, M, Codagnone, C, Lupiáñez-Villanueva, F, Veltri, GA (2019) "Shaping individual preferences for social protection: the case of platform workers," *LEM Papers Series 2019/21*, Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy.
- Bogliacino, F and Vivarelli, M, (2012) The Job Creation Effect of R&D Expenditures. *Australian Economic Papers*, Vol. 51, Issue 2, pp. 96-113.
- Choudary, S.P. (2018) "The architecture of digital labour platforms: Policy recommendations on platform design for worker well-being," ILO Future of Work Working Paper Series.
- Codagnone, C., Karatzogianni, & Matthews, J. (2019). *Platform Economics Rhetoric and Reality in the "Sharing Economy"*. London: Emerald Publishing. C
- Codagnone, C., Abadie F. & Biagi, F. (2016). The Passions and the Interests: Unpacking the Sharing Economy, JRC Science for Policy Report, Luxembourg: Publications Office of the European Union Studies, forthcoming.
- Codagnone, C., Lupiáñez-Villanueva, F., Tornese, P., Gaskell, G., et al. (2018). Behavioural study on the effects of an extension of access to social protection for People in all forms of employment. Brussels: European Commission, DG Employment Social Affairs and Inclusion.
- Collier, R. B., Dubal, V. B., & Carter, C. (2017). Labor platforms and gig work: the failure to regulate.
- Cook, C, Diamond, R, Hall, J, List, J, Oyer, P (2018) The Gender Earnings Gap in the Gig Economy: Evidence From Over a Million Rideshare Drivers. Natural Field Experiments 00634, The Field Experiments Website.
- Cullen, Z., & Farronato, C. (2015). Outsourcing Tasks Online: Matching Supply and Demand on Peer-to-Peer Internet Platforms. Department of Economics, Stanford University. Stanford. Retrieved from [http://web.stanford.edu/~chiaraf/matching\\_p2p\\_latest.pdf](http://web.stanford.edu/~chiaraf/matching_p2p_latest.pdf)
- Degryse, C. (2016). Digitalisation of the economy and its impact on labour markets. ETUI Research Paper-Working Paper.
- De Stefano V. and Aloisi A. (2018) European Legal framework for digital labour platforms, European Commission, Luxembourg, 2018, ISBN 978-92-79-94131-3, doi:10.2760/78590, JRC112243.
- Drakoupil and Piasna (2017). Work in the platform economy: beyond lower transaction costs. *Intereconomics*, 52(6), 335-340.
- Eisenmann, T., Parker, G., & Van Alstyne, M. (2006). Strategies for Two-Sided Markets. *Harvard Business Review*, 84(10), 92-101.
- Eurofound (2018a), Automation, digitalisation and platforms: Implications for work and employment, Publications Office of the European Union, Luxembourg.
- Eurofund (2018b) Employment and working conditions of selected types of platform work. Publications Office of the European Union, Luxembourg.
- Evans (2016) Communication from the Commission to the European parliament, the council, the European economic and social committee and the committee of the regions. A European agenda for the collaborative economy - COM/2016/0356 final.

- European Parliament (2017) Resolution of 15 June 2017 on a European Agenda for the collaborative economy (2017/2003(INI))
- Evans, D. (2003). Some Empirical Aspects of Multi-sided Platform Industries. *Review of Network Economics*, 2(3), 2194-5993. doi:10.2202/1446-9022.1026
- Evans, D. (2011). *Platforms Economics: Essays on Multi-Sided Businesses*: Competition Policy International.
- Evans, D., & Noel, M. (2005). Defining Antitrust Markets When Firms Operate Two-Sided Platforms. *Columbia Business Law Review*, 3, 667–702.
- Evans, D., & Schmalensee, R. (2007). The Industrial Organization of Markets with Two-Sided Platforms *Competition Policy International*, 3(1), 151-179.
- Faioli, M. (2018) Gig Economy and Market Design. Why to Regulate the Market of Jobs Carried Out Through Digital Platforms (January 2, 2018). Available at SSRN: <https://ssrn.com/abstract=3095403> or <http://dx.doi.org/10.2139/ssrn.3095403>
- Farronato, C., & Fradkin, A. (2015). Market Structure with the Entry of Peer-to-Peer Platforms: The Case of Hotels and Airbnb. Stanford University, in progress.
- Filistrucchi, L., Geradin, D., & Van Damme, E. (2013). Identifying Two-Sided Markets. *World Competition: Law & Economics Review*, 36(1), 33-60.
- Filistrucchi, L., Geradin, D., van Damme, E., & Affeldt, P. (2014). Market Definition in Two-Sided Markets: Theory and Practices. *Journal of Competition Law and Economics*, 10(2), 293-339. doi:10.1093/joclec/nhu007
- Gawer, A., & Cusumano, M. (2002). *Platform Leadership*. Boston, MA: Harvard Business School Press.
- Guarascio, D., & Sacchi, S. (2018). Digital platform in Italy. An analysis of economic and employment trends. INAPP Policy brief 8/2018
- Hagiu, A., & Wright, J. (2015a). Enabling Versus Controlling. Harvard Business School Strategy Unit Working Paper No. 16-002. Retrieved from <http://ssrn.com/abstract=2627843> (20-11-2015)
- Hagiu, A., & Wright, J. (2015b). Marketplace or Reseller? *Management Science*, 61(1), 184-203. doi:10.1287/mnsc.2014.2042
- Hagiu, A., & Wright, J. (2015c). Multi-sided platforms. *International Journal of Industrial Organization*. doi:10.1016/j.ijindorg.2015.03.003
- Hall, JV, Krueger, AB (2018) An Analysis of the Labor Market for Uber's Driver-Partners in the United States. *ILR Review*, 71(3): 705-732
- Harris, S., and Krueger, A. (2015). A Proposal for Modernizing Labor Laws for Twenty-First-Century Work: The 'Independent Worker'. Washington, D.C.: The Hamilton Project, Brookings, Discussion Paper 2015-10.
- Hill, S. (2015). New Economy, New Social Contract: A plan for a safety net in a multiemployer world: New America Foundation. Retrieved from: [https://static.newamerica.org/attachments/4395-new-economy-new-social-contract/New Economy, Social Contract\\_UpdatedFinal.34c973248e6946d0af17116fbd6bb79e.pdf](https://static.newamerica.org/attachments/4395-new-economy-new-social-contract/New%20Economy,%20New%20Social%20Contract_UpdatedFinal.34c973248e6946d0af17116fbd6bb79e.pdf) (20-11-2015).
- Hirschman, A. O. (1977). *The Passions and the Interests: Political Arguments for Capitalism before Its Triumph*. Princeton: Princeton University Press.
- Horton, J. (2010). Online Labor Markets. *Internet and Network Economics*, 6484, 515-522. doi:10.1007/978-3-642-17572-5\_45
- Ipeirotis, P. (2010). Analyzing the Amazon Mechanical Turk marketplace. *XRDS*, 17(2), 16-21.
- Khan, L.M. (2017). Amazon's Antitrust Paradox. *The Yale Law Journal*, Vol 126, No 3, pp. 564-907, January 2017, <https://www.yalelawjournal.org/note/amazons-antitrust-paradox>
- Lepanjuuri, K., Wishart, R., & Cornick, P. (2018). The characteristics of those in the gig economy. UK Department for Business, Energy and Industrial Strategy. Accessed, 10
- O'Regan, M. (2016, November 10), Seanad passes Bill providing collective pay bargaining for self-employed, retrieved from <https://goo.gl/whJaHP>.
- O'Regan, M. (2009). New technologies of the self and social networking sites: Hospitality exchange clubs and the changing nature of tourism and identity. In Y. Abbas & F. Dervin (Eds.), *Digital Technologies of the Self*, Newcastle upon Tyne (pp. 171-198). Cambridge: Cambridge Scholars.

- Pallais, A. (2013). Inefficient Hiring in Entry-Level Labor Markets. NBER Working Paper Series, 18917. doi: 10.3386/w18917
- Parker, G., & Van Alstyne, M. (2000). Internetwork externalities and free information goods. Paper presented at the Proceedings of the 2nd ACM conference on Electronic commerce, Minneapolis, Minnesota, USA.
- Parker, G. G., & Alstyne, M. W. V. (2005). Two-Sided Network Effects: A Theory of Information Product Design. *Management Science*, 51(10), 1494-1504. doi:10.2307/20110438
- Pesole, A., M. C. U. Brancati, E. F. Macias, F. Biagi, I. G. Vazquez, et al. (2018): "Platform Workers in Europe: Evidence from the COLLEEM Survey," Tech. rep., Joint Research Centre (Seville site).
- RFS. (2015). 1099 Economy Workforce Report: Request for Startup (RFS). Summary of report retrieved from: <http://www.slideshare.net/RequestsForStartups/the-2015-1099-economy-workforce-report-preview> (15-11-2015).
- Rochet, J.-C., & Tirole, J. (2003). Platform Competition in Two-sided Markets. *Journal of the European Economic Association*, 1(4), 990-1029. doi:10.1162/154247603322493212
- Rochet, J.-C., & Tirole, J. (2006). Two-sided markets: a progress report. *RAND Journal of Economics*, 37(3), 645-667.
- Rosotto, C., Kuek, S., & Paradi-Guilford, C. (2012). New frontiers and opportunities in work. Washington DC: World Bank.
- Rysman, M. (2009). The Economics of Two-Sided Markets. *Journal of Economic Perspectives*, 23(3), 125-143.
- Shapiro, C., Carl, S., and Varian, H. R. (1998) *Information rules: a strategic guide to the network economy*. Harvard Business Press.
- Smorto, G. (2019) Regulating (and self-regulating) the sharing economy in Europe: an overview in BRUGLIERI M. (Ed.), *Multi-disciplinary design of sharing services*, Milano.
- Uhlmann, E. L., & Silberzahn, R. (2014). Conformity under uncertainty: Reliance on gender stereotypes in online hiring decisions. *Behavioral and Brain Sciences*, 37(1), 103-104.
- Veneziani, B. (2009) The Employment Relationship in Hepple B. and Veneziani B. (Eds.), *The Transformation of Labour Law in Europe. A Comparative Study of 15, 1945-2004*, Oxford and Portland, Or.
- Weiss, M. (2016) Tecnologia, ambiente e demografia: il diritto del lavoro alla prova della nuova grande trasformazione in *Dir. rel. in*, 3, p. 654.
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