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What if We All Worked Gigs in the Cloud? The Economic Relevance of Digital Labour Platforms

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Steven Engels and Monika Sherwood

Abstract

This paper explores the increasing diffusion of digital labour platforms, i.e. online software which facilitates the interaction between buyers and sellers of paid labour services through matching algorithms and structured information exchange. Although the phenomenon itself has only recently started to develop, its prevalence is rapidly increasing. We illustrate the various forms digital labour platforms can take, frame the issues they raise in the broader debate on digitalisation and succinctly describe the various angles from which the Commission services have so far approached digital labour platforms in analytical and policy work. The paper also explores the impact the rapid growth of the considered platforms could potentially have on the wider economy and raises three sets of relevant economic policy questions, focusing on:

- the contribution of digital labour platforms to overall labour market functioning (including wages) and productivity;
- the possible impact of digital labour platforms on macro-economic aggregates such as GDP and total employment at EU and Member State level;
- the impact of the growing participation in the labour markets intermediated by online platforms on public finances.

JEL Classification: J01, E24.

Keywords: digital labour platforms, digitalisation, labour market functioning, productivity, public finances.

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CONTENTS

- 1. Digital labour intermediation in the “platform economy” 5
- 2. Types of digital labour platforms 5
- 3. Current market size and anticipated growth 7
- 4. Digital labour platforms from an economic perspective 9
 - 4.1. Digital labour platforms as two-sided market makers 9
 - 4.2. Transactions costs, allocative efficiency and workforce externalisation 11
 - 4.3. Online labour market imperfections 14
- 5. Economic policy issues which warrant further reflection 16

LIST OF FIGURES

- 1. Typology of digital labour platforms 6
- 2. Common tasks facilitated through digital labour platforms by level of complexity 7
- 3. Share of platform workers in the 14 Member States 8

LIST OF TABLES

- 1. Studies on various aspects of the “platform economy” published by the Commission services 18

LIST OF BOXES

- 4.1. Pricing strategies on the digital work platforms 11
- 4.2. Platforms, firm size and online outsourcing 13
- 4.3. Amazon Mechanical Turk: A digital monopsony? 16

REFERENCES

1. DIGITAL LABOUR INTERMEDIATION IN THE “PLATFORM ECONOMY”

Digital labour markets are part of the broader platform economy, which has rapidly become more prominent in recent years. Over the past few years, digital platforms of various kinds have established a strong foothold in many industries, including in the markets for payment services (*Paypal, Indiegogo, Google Pay*), communication and social interaction (*Facebook, Twitter, Snapchat*), retail (*Amazon Marketplace, Bol.com*), entertainment (*Youtube, iTunes, Spotify*), information (*Google News*) and accommodation (*AirBnB, Booking.com, Expedia*), etc. Their commercial success has translated into billion dollar valuations, mounting enthusiasm about their potential to increase consumer choice as well as growing concerns about their potential disruptive impact on traditional business models. Digital labour platforms constitute a subset of this broader “platform economy”. Like the platforms mentioned above, they operate online and use matching algorithms to bring together economic actors and facilitate their transactions. What sets digital labour platforms aside from other types of matching platforms is that they intermediate between providers and users of labour services. By contrast, e-commerce platforms such as *eBay* or *Shopify* act as online intermediaries in goods whereas rental or sharing platforms such as *AirBnB, Zilok* or *Couchsurfing* coordinate the temporary use of physical assets.¹

Digital labour platforms are very much part of the wider debate on the impact of the digitalisation on our economies. This debate has captured the attention of policy makers, the public at large, experts and regulators, raising fundamental questions about politically sensitive issues such as privacy, consumer protection, taxation of digital activities, market power and disruption. While these questions are relevant for digital labour platforms as well, the latter have also given rise to more specific but equally animated discussions, focusing on their impact on the future of work. Advocates laud the increased opportunities digital labour platforms bring for self-employment and entrepreneurship, especially for specific groups that find it difficult to enter the labour market otherwise. Sceptics and critics, however, raise concerns about the erosion of labour and social protection standards, which underpin the so-called European social model, as well as the potential downward pressure on wages due to opening up the labour market to increased global competition.

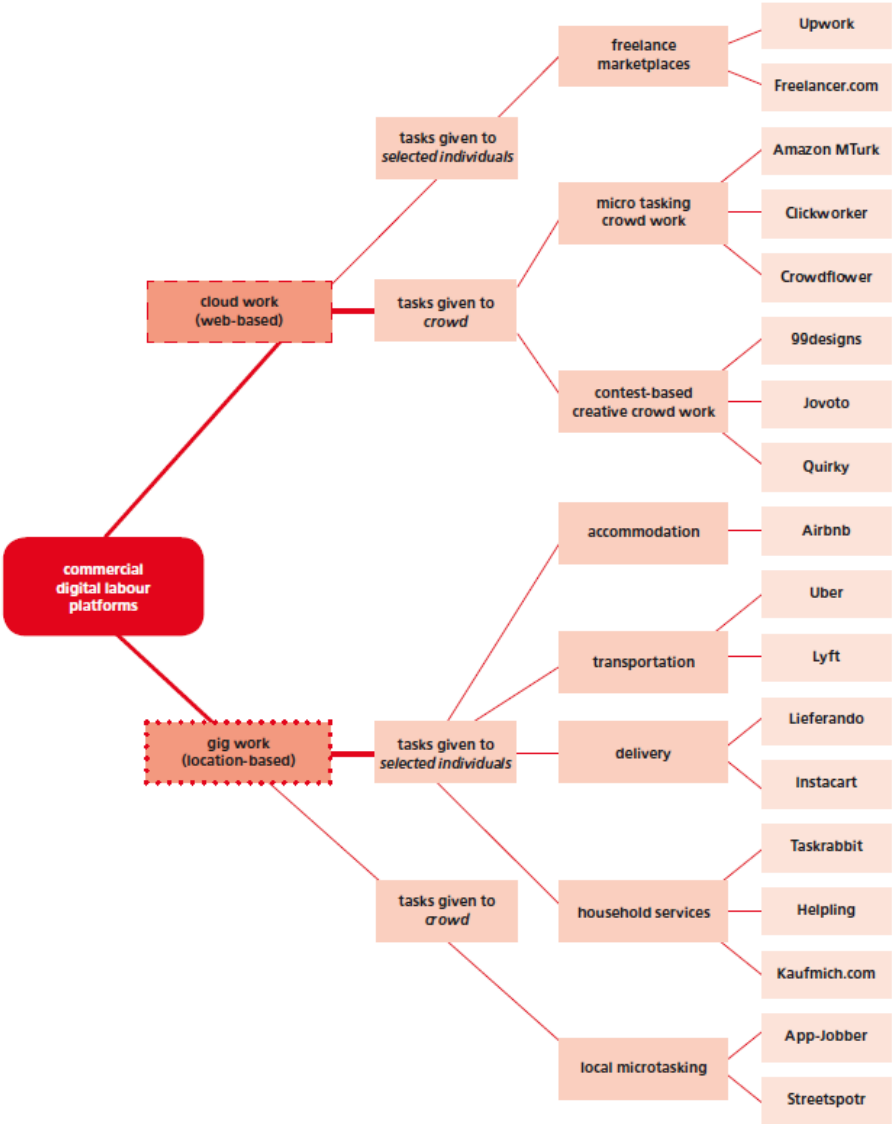
2. TYPES OF DIGITAL LABOUR PLATFORMS

The type of labour that is mediated by online labour markets varies greatly across platforms as well as within one and the same platform. For analytical purposes, it is possible to distinguish between digital labour platforms facilitating the provision of location-based labour services and those relying on location-independent labour (CODAGNONE et al. 2016; SCHMIDT 2017; HUWS et al. 2017). Typical examples of location-independent work include such high-end services as web development, creative writing and translations, graphic design, accounting and legal advice as well as more routine-based micro-tasks such as photo recognition, audio transcription, filling out surveys, etc. The most well-known forms of location-based work include (food) delivery services, household services and transport services as well as location-based micro-tasks such as taking pictures of shelves in supermarkets. Within each of these two categories, some platforms assign tasks to specific individuals whereas others farm out tasks to a broader group of people. Figure 1, taken from SCHMIDT (2017),

¹ The distinction between digital labour platforms and asset-based sharing or rental platforms is not always clear-cut. On platforms such as *AirBnB* and *Über*, the service provider offers the use of an asset as well as some labour services that go with it. For the purposes of this note, we do not consider *AirBnB* to be a digital labour platform as the relative importance of the asset clearly outweighs that of the labour services provided and as traditionally property owners living off the revenues of their real estate are not considered workers. Since taxi drivers are usually considered self-employed workers or employees and since the asset used to offer the service is of lesser importance than the service itself, platforms such as *Über* or *Lyft* will be considered as digital labour platforms in what follows.

visualises these subcategories and illustrates the various types of digital labour platforms by means of specific examples.

Figure 1. Typology of digital labour platforms



Source: SCHMIDT 2017

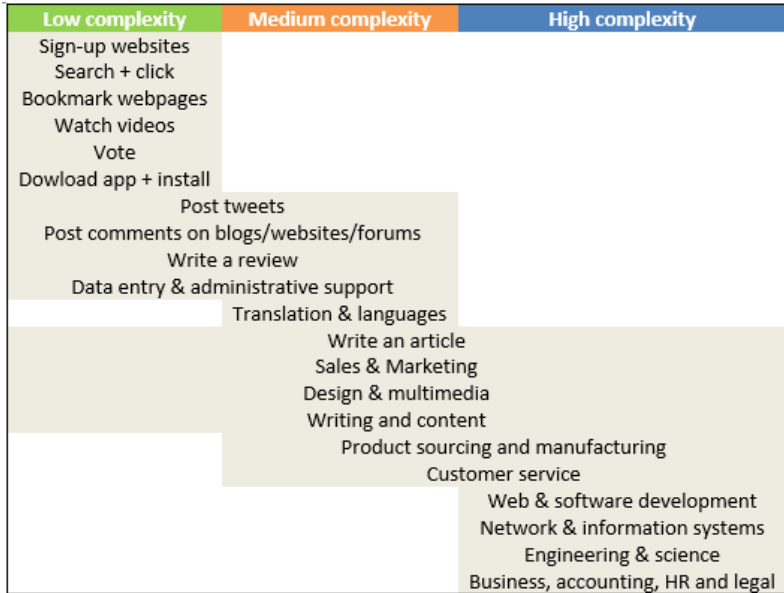
Digital labour platforms do not only facilitate economic transactions between individuals but also enable larger corporations to outsource online. While mobility platforms such as *Lyft* and *Über* and local service provider platforms such as *Zaask* or *Listminut* are predominantly oriented towards peer-to-peer exchanges, others list a growing number of small and medium-sized companies and even large corporations among their clients. A platform like *AppJobber*, for example, which specialises in micro-tasks in the area of retail execution, lists companies like Nestlé, Sony and Telefonica among its clients, while *Clickworker* has facilitated the provision of various types of labour outsourcing services for *Deutsche Telekom*, *Honda*, *Sharewise* etc. The freelancing platform *Upwork* claims it is being used by over 5 million businesses, including *Accenture*, *AirBnB*, *UCLA*, etc.² It

² Cf. <https://www.clickworker.com/how-it-works/>; <http://enbe.appjobber.com/> and <https://www.upwork.com/> For more elaborate descriptive case-studies on online outsourcing, see CORPORAAL et al. 2017, RAY 2017 and KUEK et al. 2015. Both provide some historical background and some tentative estimates and forecasts of the global online outsourcing market.

would be misleading, therefore to equate digital labour platforms with the so-called “collaborative economy”, a term which is best reserved for “business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals.” (EUROPEAN COMMISSION 2016a). When digital platforms are used by established companies to facilitate the temporary contracting of workers outside the firm, it is more appropriate to refer to “online outsourcing” or “platform sourcing” (KUEK et al. 2015; RAY 2017; CORPORAAL et al. 2017).

Contrary to what is sometimes assumed, digital labour platforms are not exclusively used for routine-tasks and/or low-skilled labour services. Although mobility platforms (*Uber, Lyft*), (food) delivery services (*Deliveroo Postmates, Übereats*) and micro-task platforms (*Amazon Mechanical Turk, Clickworker, Streetspotr*) fall into this category, the same cannot be said about the specialised freelance services offered on *Upwork, Peopleperhour, 99Designs* or *iWriter*. The professionals offering their services via these platforms most often are highly-qualified and well-educated specialists performing relatively complex and technical tasks for which they receive a relatively high wage. Figure 2, taken from KUEK et al. (2015), provides an overview of the various types of low, medium and high complexity tasks that are commonly delivered through location-independent platforms.

Figure 2. Common tasks facilitated through digital labour platforms by level of complexity



Source: KUEK et al. 2015

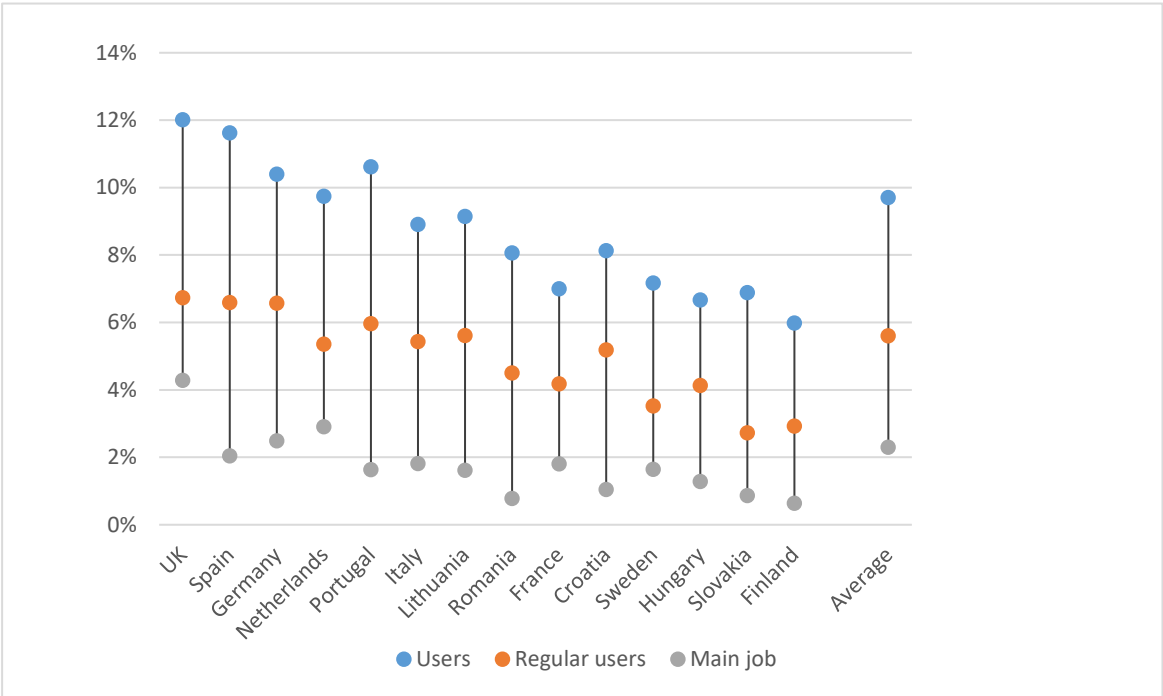
3. CURRENT MARKET SIZE AND ANTICIPATED GROWTH

Reliable estimates of the total amount of platform workers (and hours worked) are hard to come by but there is a growing interest in measuring the activity facilitated by them. The diffusion of digital labour platforms is a relatively recent phenomenon. The majority of the platforms which today have become household names were founded less than 15 years ago. The current size of the phenomenon is hard to estimate, but survey data can provide a first approximation. A recent study performed by the Pew Research Center (2016) found that 8% of Americans earned at least part of their labour income through digital platforms. An online survey carried out by the Commission's Joint

According to KUEK et al. 2015, gross service revenue within the Online Outsourcing industry equalled about \$2 billion in 2013, involving some 48 million registered workers, some 10% of which are considered to be active.

Research Centre and covering 14 Member States estimated that on average 10% of the adult population has ever used digital platforms to provide some type of labour services (platform work). Less than 6% can be considered regular users, i.e. spending at least 10 hours per week on platform work while only slightly over 2% on average gained more than half of the labour income from platform work. As illustrated in Figure 3, the share of regular labour platform users and the share of users for which platform work represents the main job varies considerably between Member States (PESOLE et al. 2018). While non-negligible, these estimates only represent modest shares of the overall labour force. This is all the more true since for most of the people concerned, participation in online labour markets indeed accounts for only a small portion of their total hours worked.

Figure 3. Share of platform workers in the 14 Member States



Source: PESOLE et al. 2018

The available evidence suggests that digital labour platforms have been enjoying considerable growth rates over the past few years. Thus, for example, the World Bank reports that the revenues of the top microwork and digital freelancing platforms increased by an average of 33% between 2011 and 2014 (KUEK 2015). More recently, the Online Labour Index, which keeps track of activity on the 5 largest English-language cloud-work platforms (i.e. not including platforms for location-based tasks) reported an increase of about 21% in terms of posted service requests between May 2016 and mid-January 2018 (LEHDONVIRTA et al. 2018).

The rapid growth observed so far is likely to be maintained in the coming years given the rising demand for flexible labour, an increasingly enabling technological environment and the absence of immediate supply constraints. While it is hard to make any precise predictions about future developments, there are several reasons to assume that platform work will account for a rapidly growing share of the global labour market in the near future. With respect to the demand drivers, the rise of platform work fits the rapid increase of atypical work as a share of total employment. Clearly, the rising incidence of temporary and part-time work signals a growing demand for the type of flexibility which contract work through platforms also provides³. The rising importance of digital

³ KAY and VANBORREN (2017) demonstrate that digitalisation is associated with an increase in flexible types of employment (self-employment, temporary and part-time) and therefore it can be assumed that growing digitalisation will result in a higher proportion of flexible employment in the labour market. Digitalisation seems to have the strongest effect on temporary

labour platforms is also likely to be facilitated by an increasingly enabling ICT environment, as Internet access and use as well as the propensity to use digital platforms for buying and selling services are all on the rise⁴. Labour supply constraints to growth seem to be rather limited as the industry itself reports that the number of workers offering their services via digital platforms is growing almost twice as fast as demand⁵. The fact that currently platform workers are on average 10 years younger than offline workers and that for the moment the younger the cohort the bigger the significance of platform work also suggests that supply may continue to rapidly grow in the future (PESOLE et al. 2018).

4. DIGITAL LABOUR PLATFORMS FROM AN ECONOMIC PERSPECTIVE

The remainder of this paper explores the phenomenon of digital labour platforms by looking at two main strands of economic literature. On the one hand, the economics of two-sided markets allows conceptualising digital platforms as private market regulators creating new possibilities for economic exchange, while determining the nature of these exchanges and their efficiency through their users' agreement and interface design. On the other hand, the theory of the firm developed by Coase, Williamson and others allows to better understand the potential impact of digital labour platforms on firm size and the externalisation of contingent labour. Combined, these two perspectives help raise a number of questions about 1) the potential impact of digital labour platforms on macro-economic aggregates such as total output and total employment; 2) their impact on public finances and 3) their potential contribution to labour market efficiency and overall productivity.

4.1. DIGITAL LABOUR PLATFORMS AS TWO-SIDED MARKET MAKERS

By bringing together requesters of labour services and workers seeking to market their skills, digital labour platforms act as two-sided market makers. They create new opportunities for economic exchanges which would not have been possible or profitable without them. As such, online labour markets share a number of features with other two-sided markets that set them apart from the ordinary single-sided businesses that most of economic theory focuses on. Like credit card companies, newspapers and operating systems (but unlike pharmaceutical companies, toy manufacturers or consulting firms) online labour platforms create value by bringing together two distinct user groups. The demand these users have for the platform's services is interdependent in the sense that the behaviour of one side of the market, positively or negatively, affects that of the other side (ROCHET and TIROLE 2003; ROCHET and TIROLE 2004; EVANS 2003; RYSMAN 2009). Thus for example, a larger group of requesters of labour services (henceforth: service requesters)– or a group which posts more or more attractive service requests – attracts a larger group of workers. Conversely, a larger group of workers – or a group of workers which responds more promptly to service requests or delivers work of a higher quality for the same price – attracts a larger group of service requesters.

The interdependent demand of platform users creates network effects across market sides. Industries such as telecommunications are governed by traditional network effects, i.e. it is more attractive for users to become part of the network as more people sign up. In the case of two-sided

employment whereby a 1 p.p. increase in the proportion of ICT value added is associated with a 1.23 p.p. increase in the proportion of temporary employment in the total amount of wage and salary workers.

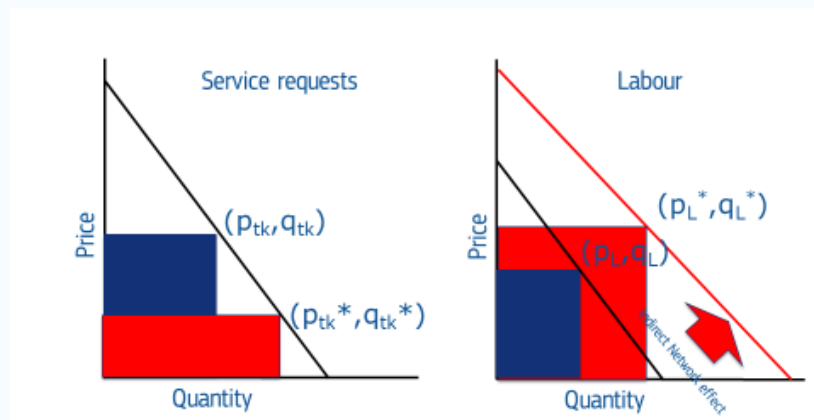
⁴ On this, see also the study, commissioned by DG GROW and carried out by Technopolis, VVA Consulting and Trinomics on the Economic Development of the Collaborative Economy in the EU (EUROPEAN COMMISSION 2018).

⁵ See the Crowdsourcing.org Annual Industry Report of 2012 cited in KUEK et al. 2015. That supply of service providers exceeds demand is also confirmed by the findings of the ILO survey of crowdworkers conducted in 2015 and 2017. Of the 3 500 crowdworkers surveyed across 75 countries, 88% reported that they would like to do more crowdwork – on average 11.6 hours more per week and 58% reported that the availability of service requests was insufficient. See BERG et al. (2018).

markets, however, platform workers compete with each other for remunerated tasks, while service requesters compete with each other for contingent labour. Here the network effects operate across market sides since the probability of finding one's match on one side of the market is a function of the density and the behaviour of the other side of the market. It is because of these “indirect” or “cross-side” network effects that digital platforms make large up-front investments in order to establish critical mass of users on each side of the market. The same mechanism also creates a risk of anti-competitive behaviour. For instance, in the absence of regulatory disincentives, platforms could try to lock-in their users by increasing the costs for them to switch to other platforms and/or to use several platforms at the same time (i.e. the so-called “switching” and/or “multi-homing” costs). As illustrated in more detail by the example of pricing (see Box 4.1), the efforts to establish a user base on both sides of the market are not necessarily symmetrical in nature but depend on the propensity of each group to make use of the services the platform provides.

Box 4.1. PRICING STRATEGIES ON THE DIGITAL LABOUR PLATFORMS

The interdependent demand of the user groups interacting on online platforms creates a chicken-and-egg problem, which is solved through asymmetric pricing and other cross-subsidisation strategies (CAILLAUD and JULLIEN 2003). In order to attract service requesters, digital labour platforms need to attract a critical mass of platform workers and vice versa. This has an impact on the optimal pricing of the services offered on the platform. Ordinary firms usually take pricing decisions on the basis of price elasticity of demand for their products or services and their marginal cost of production. In the case of two-sided markets, however, the optimal price of the service offered to a specific user group does not only depend on the demand for and the marginal cost of providing the service to the users in question, but also on how the latter's participation in the market affects the participation of the other user groups. *Ceteris paribus*, the same is true for all user groups concerned. Therefore, prices on both sides of the market depend on the joint set of price elasticities of demand and marginal costs on each side as well as on the size of the cross-side network effects (i.e., the value to the buyers of more sellers on the market and vice versa). In some cases, therefore, it makes sense for the platform to lower prices on one side of the market to below marginal cost to attract more users which in turn has a positive effect on the demand for the platform services on the other end of the market⁶. This is illustrated by the graph below adapted from PARKER and VAN ALSTYNE 2005.



The blue areas in each of the panels maximise revenue on each side of the market independently. When indirect network effects are taken into account, however, it might be more profitable to lower the price on one side of the market so as to increase revenues on the other side. In the graph, the price of posting a service or task request is lowered from p_{tk} to p_{tk}^* so as to attract more potential service requesters on one side of the market. This, then, shifts the demand curve for labour services in the right hand panel outward, allowing to increase revenues on that side of the market. If $[(p_L^*, q_L^*) + (p_{tk}^*, q_{tk}^*)] > [(p_L, q_L) + (p_{tk}, q_{tk})]$ this strategy increases revenue.

4.2. TRANSACTIONS COSTS, ALLOCATIVE EFFICIENCY AND WORKFORCE EXTERNALISATION

Digital labour platforms can potentially contribute to overall labour market efficiency by reducing various types of transaction costs. Search and information costs incurred by both potential service requesters and platform workers are reduced by digital platforms through the use of listing directories (such as on *Upwork* or *WritersAccess*) or direct matching algorithms (such as on *Über* or *Lyft*). Bargaining and contracting costs are minimised by the provision of various types of bidding and auction tools that mediate between the two sides of the market (such as on *99Designs*), by providing precise guidance on pricing or directly setting prices (such as on *iWriter*, *Clickworker*, *Über* or

⁶ Depending on the nature of the work performed, labour platforms can subsidise either the buyer or the seller-side of the market. In the case of *Upwork*, for example, service requesters are offered free access to the platform, whereas platform workers are charged a sliding fee based on their billings with each client. In the case of *Amazon Mechanical Turk* or *Clickworker*, on the other hand, it is the seller's side of the market that is subsidised, whereas services requesters are charged a commission of 20% to 40% of what they pay to platform workers.

Deliveroo). Contract enforcement costs, finally, are reduced through the provision of escrow accounts (such as on *Upwork*) to hold payments until certain milestones are reached (HENTEN and WINDEKILDE 2016; CHOUDARY 2018).

Digital labour platforms potentially also allow for more efficient resource allocation. Since transaction costs are usually fixed, independent of the size or the importance of the task for which one looks to recruit, they can represent a large share of the total cost of a single job, in particular for smaller tasks. As a result, traditional employers usually prefer to bundle various tasks together in a package large enough to be assigned to an additional recruit on a standard full-time or part-time contract. However, the reduction in transaction costs brought about by platform technology and its ability to tap into a very wide labour pool (in particular for location-independent platforms) enables requesters to unbundle tasks and source workers for smaller or even micro-tasks. This allows for increased specialisation of the work force, which, potentially, can be a source of increased labour productivity and competitiveness (JP MORGAN CHASE & CO INSTITUTE 2016; CODAGNONE et al. 2016; GOMEZ-HERRERA 2017). Labour services fragmentation can also facilitate the matching between supply and demand of complex, specialised services. In addition, it allows workers to further enhance their expertise by focusing exclusively on specific tasks⁷.

From the perspective of the service requesters, sourcing workers through digital labour platforms also offers advantage of flexibility as it does not oblige them to commit to a longer-term employment contract. In some cases, this enhanced flexibility goes hand in hand with a greater degree of control as some digital labour platforms offer surveillance mechanisms that go beyond the ones that are common in a regular firm setting⁸. *UpWork*, for example, allows service requesters to keep a close tab on what freelancers are doing by taking regular screenshots, recording keystrokes and mouse clicks, and by using their webcam. *Deliveroo* monitors the amount of time its riders spend at every stage of the delivery (AJUNWA et al. 2017; WARRIN et al. 2018). The home-care platform Honor connects caregivers with customers, monitoring the former to determine whether they arrive on time, check social media or make calls while on duty and whether they are walking around or sitting down to perform a specific task (CHOUDARY 2018). Service requesters on Amazon Mechanical Turk can even withhold pay for work they deem of insufficient quality. As explained in more detail in Box 4.2, by combining a reduction in transaction costs with enhanced surveillance, platforms augment the trend towards workforce externalisation.

⁷ The potential productivity gains obtained through increased specialisation may be limited in the longer run, however, as task unbundling reduces the potential for intertask learning, whereby workers performance in a particular task is increased when they can apply knowledge and experience from performing another task. On this, see GÖRLICH 2010.

⁸ It is precisely this combination of increased control and flexibility which gives rise to the highly topical and highly contentious debates about the legal status of platform workers and about liability in case of accidents. While these are most definitely issues which are of concern to both national and European policy makers, they fall outside the scope of this discussion note.

Box 4.2. PLATFORMS, FIRM SIZE AND ONLINE OUTSOURCING

From the perspective of transaction cost theory, firms are offered the choice between two primary modes of governance. Whereas markets rely on a decentralised price system to allocate resources, coordination within a vertically integrated firm relies on hierarchical relationships to direct resources (COASE 1937; WILLIAMSON 1973; GROSSMAN and HART 1986; WILLIAMSON 2002). Each mode of governance has its own relative advantages and disadvantages. Markets generally have lower production costs as they allow the individual firm to source its inputs from among the most efficient producers and to fully exploit economies of scale in production, something which is not always possible within a firm, in particular for those inputs for which the latter has only limited demand. In the absence of transaction costs, a given firm will only find it efficient to develop its intermediary inputs in-house if it is itself the most efficient producer in the market. Compared to hierarchical coordination within a firm setting, however, *ex ante* transaction costs are usually higher in a market setting which involves repeated search, bargaining and contract enforcement costs. In addition, the *ex post* control exercised by a firm over a contracted asset is less comprehensive than over its own assets. Whereas in the first case it extends only to the explicit provisions of the contract, in the case of a hierarchical relationship all residual rights of control over the asset accrue to the firm, thereby providing a cost-efficient mechanism to deal with the so-called hold-up problem (HART 1995)⁹.

The general principles of transaction cost economics apply both to physical assets and human resources. With respect to the latter, transaction costs theory predicts that, in addition to *ex ante* transaction costs, the firm decision to take an employee on the own payroll also depends on such factors as i) the degree of certainty with which the productivity of the employed individual can be measured; ii) the degree of transaction-specific investment needs and iii) the likelihood that the tasks assigned to the individual will have to be carried out repeatedly (MASTERS 1998). In case the productivity of the individual is difficult to measure, market-based governance modes are less cost-efficient than hierarchies as contracts between external parties fail to account for all potential circumstances and continue to allow opportunistic behaviour. Similarly, when transaction-specific investment needs (such as specialised or on-the-job training, socialisation within a team, etc.) are sizeable, it makes more sense to bring employees permanently on board than to contract them for the duration of a task. Likewise, if a task is to be carried out multiple times, the relative efficiency of a hierarchical firm-based governance mode increases.

The introduction of platform technology, however, alters the equation as it simultaneously lowers *ex ante* transaction costs while increasing the possibility of measuring the productivity of and exercising control over the external contractor. This can be done through either technological tools (such as in the case of *Upwork*, *Über* or *Deliveroo*) or by means of the way in which the agreement between workers and service requesters are set up (such as on *Amazon Mechanical Turk*). As a result, the cost-efficiency of market-based governance modes increases relative to hierarchical coordination within a firm setting. This facilitates the externalisation of the labour force through "online outsourcing", in particular for those tasks for which transaction-specific investment needs are limited.

Like more traditional forms of business process outsourcing, the online variety can thus be considered a consequence of technological innovation on the nature of the firm. However, whereas traditional outsourcing usually involves two firms, in the case of online outsourcing, the outsourced tasks are most often allocated to a self-employed individual. At the macro-level, this entails risks of underinvestment as it reduces the incentives of ever-shrinking firms to engage in training, skill-building and other forms of human capital development. "Non-transaction specific skills", in particular, might thus end up becoming more of a public good than is currently the case.

⁹ The hold-up problem results from the impossibility of drafting a complete contract, taking into account all potential future contingencies which can possibly affect a cooperation between two economic actors. It refers to a situation in which two parties can make a profit by working together but one of them refrains from doing so for fear that the other party may acquire increased bargaining power once he or she makes an initial sunk investment in the cooperation and may then use this bargaining power to increase his or her share of the profit made. In such a case, party A refuses to invest in the cooperation with party B as party A suspects that party B might hold him or her up for the value of his or her initial investment. If however, it is understood that all the residual rights of control over the joint venture accrue to party A, the hold-up problem is overcome.

From the workers' perspective, digital platforms provide access to flexible additional income generation opportunities by removing market entry barriers. By gathering a large pool of service requests in a single, easily searchable online space, digital labour platforms significantly lower job search costs and expand the reach of workers seeking to market their labour, thereby helping to match demand and supply of labour services. This is particularly relevant for workers living in areas of economic decline, for poorly educated workers as well as those with extensive family care obligations (DILLAHUNT et al. 2015). It also helps highly educated/skilled workers facing low demand in the area where they live to expand their potential market reach. As the large majority of tasks posted on the platform are time-limited, involving a few hours to several weeks of work, flexible arrangements are feasible, allowing workers to decide on the amount of time they want to work and how to possibly combine traditional work with platform work. Obviously, in the case of location-independent cloud-work there is also the added advantage of being able to gain labour income without leaving one's home.

4.3. ONLINE LABOUR MARKET IMPERFECTIONS

Digital labour platforms compete in an imperfect market. The indirect or cross-side network effects at work drive the “winner-takes-most” competition dynamics between platforms, leading to oligopolistic market outcomes. Over time, this may result in platforms capturing a larger share of the added value that is created through the transactions they facilitate, resulting in either higher costs for service requesters, lower wages for workers or both. This might be a natural feature of such markets, inherent to their nature. However, the potential negative impact for users is exacerbated by the information asymmetries digital platforms create between themselves and their users as part of their functional design, which might call for regulating them. As they develop, digital platforms gather massive amounts of data on transactions between service requesters and workers which are then used to improve their management algorithms with a view to maximise revenues. Only a small fraction of the information available to the platform is shared with the users via its interface, limiting the possibility for the platform users to take informed decisions about the transactions they wish to be part of. Thus for example, *Über* requires its drivers to accept ride requests without giving any prior information about the exact destination or the amount that can be earned from the job. While this strategy is profit-maximising for the platform as it helps to ensure a high volume of transactions by keeping drivers' acceptance rates high, it does so at the drivers' expense as they can no longer choose the rides which deliver optimal financial outcomes. (CHOUDARY 2018)

Heterogeneity, information gaps and information asymmetries undermine matching efficiency in the platform users' markets. While they compete against each other to attract users, digital labour platforms create markets in which workers and service requesters compete against other workers and service requesters. Although they are free to drop out of the platform altogether at any time, their interactions thereon are determined by its design features. In this sense, the platform acts as a “private market regulator”, shaping the users’ market by regulating access rights, types of interaction between user groups as well as the extent of information put at the disposal of users to inform their decisions (BOUDREAU and HAGIU 2009). Doing so, the platform also determines the type of competitive environment for participants on each side of the market. These competitive environments are characterised by high heterogeneity and the absence of so-called “high bandwidth” information¹⁰. As the cost of joining an online platform as either buyer or seller of labour services is close to zero¹¹, platforms attract very diverse users on both sides of the markets, with different backgrounds, levels of experience and skills. In the absence of face-to-face interaction, the information these users have access

¹⁰ The conceptual distinction between high and low-bandwidth information was introduced by David AUTOR in his seminal article about the influence of information technology on the labour market (AUTOR, 2001). According to AUTOR, low-bandwidth data are “objectively verifiable information such as education, credentials, experience and salaries.” High-bandwidth data refers to “attributes such as quality, motivation and ‘fit’ that are typically hard to verify except through direct interactions such as interviews and repeated contact.”

¹¹ The financial cost of joining an online platform is usually equal to zero and signing up usually takes only a couple of minutes.

to about each other is limited to so-called “low bandwidth” facts about education, credentials, experience and salary expectations. Platforms try to overcome this through rating systems or by allowing workers to upload samples of their earlier work, but such remedies remain imperfect in the face of information overload. Several studies indeed indicate that, confronted with the extreme heterogeneity of the labour pool that can be accessed through digital platforms, service requesters rely excessively on references and ratings. They have a tendency of going after highly-demanded “superstar” workers, whereas other potential candidates with similar qualifications are disregarded by employers looking to reduce hiring risks (CODAGNONE 2016)¹². This limits the efficiency of the matching and causes service requesters to lose time (when no match can be made because of the sought after superstars’ capacity constraints) or money (if a cheaper alternative is disregarded)¹³. The effectiveness of rating systems can also deteriorate over time as a result of reputation inflation¹⁴. In addition, it should also be noted that some platforms provide more information to one side of the market than to the other¹⁵. As a result, situations of adverse selection and mismatches are quite common on digital labour markets. Survey research suggests that there is indeed little correlation between skill requirements for tasks and level of education of workers and that overqualification is common (BERG et al. 2018, PESOLE et al 2018).

¹² That ratings systems only partially address the lack of high bandwidth information is also indirectly substantiated by the fact that service requesters continue to rely on gender, national or other cultural stereotypes when confronted with the very large and very heterogeneous labour pool platforms bring within reach. On this, see MILL 2011, LEHDONVIRTA et al. 2014 and CODAGNONE et al. 2016.

¹³ Thus, for example, STANTON et al. (2015) find that because they do not capture the full benefit from talent discovery, service requesters hire an inefficiently low number of inexperienced workers. Of those new workers who applied for their first job on *Upwork* between August 2008 and December 2009, only 10% were eventually hired. By contrast, of those that were hired once, 70% find a second job. MUSTHAG et al. (2013) also find that 84% of total earnings on a specific anonymised mobile crowdsourcing platform accrued to 10% of workers.

¹⁴ HORTON et al. (2018) indeed find that the distribution of recent employer feedback for workers is highly top-censored, with an overwhelming majority receiving perfect feedback.

¹⁵ The clearest example of such information asymmetries is provided by micro-work platforms such as *Amazon Mechanical Turk*, *Clickworker* and *Crowdfunder*, where service providers only see the name the service requester uses and receive very little information about the tasks, whereas service requesters themselves can access the whole history of task assignments of service providers. None of the five large English-language microwork platforms studied by the ILO had two-sided rating systems allowing service providers to rate/evaluate their clients. See Box 4.3.

Box 4.3. AMAZON MECHANICAL TURK: A DIGITAL MONOPSONY?

While platform owners underline the efficiency gains which can be obtained by using their technology, there is a growing body of research into various types of market imperfections which can be observed in the digital world. The best documented example in this context is *Amazon Mechanical Turk* (AMT), one of the largest micro-task platforms, which already in 2015 was estimated to have 500,000 registered users (KUEK et al. 2015).

One of the more striking but not uncommon features of this online market for “humans as a service” is the large concentration on the demand side. Web Scraping research carried out between 2009 and 2010 found that the 0.1% most active requesters using the platform to outsource “human intelligence tasks” accounted for more than 30% of the overall activity of the market (IPEIROTIS 2010). In 2014, other researchers estimated that 10% of all service requesters were responsible for approximately 98% of all services requested on the platform, leading them to conclude that a very small fraction of the total number of service requesters capture the majority of the labour supply on AMT (KINGSLEY et al. 2015). This high degree of concentration obviously has an impact on overall market competitiveness as the concentration of market power on the demand side limits the ability of platform workers to compete for tasks that best match their skills.

In the case of AMT, this is exacerbated by the platform’s design features which determine the amount and quality of information it makes available to each side of the market. AMT’s reputation system, for example, creates asymmetry of information as it only provides information to service requesters about how well workers have performed in the past and not the other way around. This increases the cost for workers of finding reliable information on suitable service requests and deprives them of instruments to hold service requesters accountable for the request they post in the same way that they are held accountable for the work they perform (KINGSLEY et al., 2014 and DUBE et al., 2018)¹⁶.

The wage setting system on AMT also contributes to market power concentration on the demand side. Service requesters are required to post assignments within a specific group of similar tasks (a so-called Human Intelligence Task Group) indicating the wage they offer upfront. This type of *ex ante* and relatively uniform wage setting offers no room for workers to negotiate wages, leaving them no other option than to either drop out of the platform altogether or incur additional search costs looking for more rewarding tasks (KINGSLEY et al. 2014).

5. ECONOMIC POLICY ISSUES WHICH WARRANT FURTHER REFLECTION

The Commission has taken a clear interest in the “platform economy” in the broader sense in the framework of the European Agenda for the Collaborative Economy which is part of the Digital Single Market Strategy (EUROPEAN COMMISSION, 2016a; 2016b). In its communication of June 2016, the Commission describes the collaborative economy as a source of new opportunities for consumers and entrepreneurs, while stressing that its emergence creates a number of issues with regard “to application of existing legal frameworks, blurring established lines between consumer and provider, employee and self-employed, or the professional and non-professional provision of services.”

With respect to digital labour platforms specifically, an inter-service group on the Future of Work has been set up to propose some options for action at EU level to ensure a continuously improving evidence base for informed policy-making on platform work. The inter-service group recognises that platform work brings many opportunities as well as many challenges. Among the latter it focuses mainly on the legal uncertainty about the status of platform workers, the sometimes

¹⁶ That there is a clear desire, on behalf of platform workers, to overcome this asymmetry of information is illustrated by the fact the success of browser extensions such as Turkoption and TurkerView worker-led fora and websites such as TurkerNation and MTurk Crowd, where platform workers exchange information and experiences about service requesters.

demanding nature of platform work, health and safety issues, low income, lack of representation, lack of access to training and social protection. Given the considerable diversity of platform work, the inter-service group is of the opinion that a “one-size-fits-all” approach to regulation is unlikely to prove effective and that before further action is taken, more and improved data on platform work is needed.

A number of recent policy initiatives have been taken which have also impact on digital labour platforms and their users. While not specifically targeted at platform workers, a Council Recommendation politically agreed in March 2019 with formal adoption scheduled for June 2019 calls on the Member States to provide access to social protection to all workers and self-employed, including for those categories of workers under a-typical employment contract which are currently often excluded. Among the latter, platform workers are specifically singled out in the recitals to the Recommendation. In a similar vein, the Commission proposal for a Directive on transparent and predictable working conditions in the European Union is grounded in the recognition that digitalisation has facilitated the creation of new forms of employment and that this has led to both renewed job creation as well as an increased lack of predictability of some working relationships. As a response, the proposed Directive aims to ensure “a basic level of universal protection across existing and future contractual forms”, including but not limited to platform workers.

In terms of analytical work, several Commission services have been involved in studying the phenomenon of digital labour platforms from various angles. The Joint Research Centre (JRC) so far has published seven different studies on the so-called “platform economy” (see Table 1 for more detail), four of which focus exclusively or to a large extent on digital labour platforms. In addition, urged by the European Council and the European Parliament, in April 2018 the JRC together with DG EMPL published a survey-based study on collaborative economy and employment (COLLEEM). COLLEEM project team will release the results of the second survey in summer 2019. DG GROW, commissioned two studies dealing with the economic development of the collaborative economy in the EU in various sectors and measuring the openness of regulatory environments and the supportiveness of administrative actions in EU countries. The results thereof were fed into the Single Market Scoreboard of July 2018 in the form of indicators illustrating how supportive the business environment in individual Member States is with respect to the development of the collaborative economy in the selected sectors. Aware of the growing importance of the digital labour platforms for the economic activity, Eurostat has started looking into ways of including them in the GDP statistics. That work poses many challenges as it is difficult to identify and classify the digital platforms and the currently limited available data from fiscal and regulatory sources as well as survey responses makes providing reliable statistics tricky.

Table 1. Studies on various aspects of the “platform economy” published by the Commission services

Inst.	Year	Author	Title	Scope/contents
JRC	2016	BOCK et al.	<i>The Future of the EU Collaborative Economy. Using scenarios to explore future implications for employment.</i>	Explores the possible future developments of the EU collaborative economy towards 2030; identifies issues that should be further explored in terms of social protection and rights of platform workers, data and reputation as well as competences and skills of those workers
	2016	CODAGNONE et al.	<i>The Future of Work in the 'Sharing Economy'. Market efficiency and equitable opportunities or unfair precarisation?</i>	Provides a typology of digital labour platforms, based on a literature review and an in-depth study of 39 platforms; investigates the available evidence about their possible implications for employment and wages; explores questions with respect to the justification for regulatory intervention from various angles
	2016	MARTENS	<i>An Economic Policy Perspective on Online Platforms</i>	Provides an overview of the relevant economic literature on platforms or multi-sided online markets; discusses platforms from a regulatory policy angle, including potential market failures in platforms, the extent of self-regulation and possible regulatory responses through existing competition policy, consumer protection and data protection instruments
	2017	GOMEZ-HERRERA et al.	<i>Trade, Competition and Welfare in Global Online Labour Markets: a "gig economy" case study</i>	Presents empirical evidence on the trade, competition and welfare effects of digital labour platforms on the basis of a elaborate case-study
	2017	DUCH-BROWN	<i>The Competitive Landscape of Online Platforms</i>	Describes the different forces that shape the market structure of four different 'online platform ecosystems' (e-commerce marketplaces; app stores; social media and online advertising platforms) and the competition between them; provides descriptive, empirical evidence on the relative strength of the forces operating in each case
	2017	FABO et al.	<i>An overview of European Platforms: Scope and Business Models</i>	Draws on a database of 200 service platforms active in Europe, and aims to serve as a resource for the development of a European policy

				response; identifies a huge diversity of platforms within the EU in terms of size, geographical scope, services offered and business models; confirms the innovative potential of platforms, notably the way in which they employ technology to facilitate socially beneficial activities, such as volunteering or ridesharing.
	2018	DE STEFANO et al.	<i>European legal framework for "digital labour platforms"</i>	Explores the existing legal framework with respect to the "platform economy" in several European countries and analyses the issue of the legal status of platform-based or -mediated workers by looking at what is at stake in pending litigations on the proper classification
JRC and DG EMPL	2018	PESOLE et al.	<i>Platform Workers in Europe. Evidence from the COLLEEM Survey</i>	Provides quantitative evidence on platform workers in 14 Member States in terms of their age, labour market status, type of services provided (high-skilled, medium-skilled or low-skilled) as well as their motivation
DG GROW	2018	NUNU et al.	<i>Study to monitor the economic development of the collaborative economy at sector level in the 28 EU Member States</i>	Deals with the economic development of the collaborative economy in the EU across the transport, accommodation, finance and professionals sectors
	2018	RABUEL et al.	<i>Study to monitor the business and regulatory environment affecting the collaborative economy in the EU</i>	Develops a 'Collaborative Economy Index' to measure and benchmark the openness of regulatory environments and the supportiveness of administrative actions in EU countries

In addition to the work already done, a number of macroeconomic elements may deserve attention. The swift rise of digital labour platforms over the past few years raises a number of interesting economic policy questions which are not or only tangentially covered from the angles described above. Three sets of issues in particular seem important in light of the rapid growth potential of the phenomenon.

- **A first series of questions pertains to the contribution of digital platforms to overall labour market functioning and labour productivity.** As indicated above, digital labour markets can contribute to labour market efficiency by lowering barriers to entry, reducing transaction costs and widening the pool of service requesters and workers. In principle, this can allow for a better allocation of resources, increased task specialisation and overall labour productivity. As they are driven by strong indirect network effects, however, competition dynamics between platforms have a tendency to produce oligopolistic market outcomes. Given the information asymmetry between the platform owner and its users this may induce rent

seeking behaviour. In addition, the matching quality achieved is highly dependent on the platform's access rules and design features, determining the quality of information available to its users as well as the distribution of market power between them. Since the efficiency of the markets administered by the platforms crucially depends on their specific design choices, the question whether the short-run net effect on labour market efficiency is positive is an empirical one which requires further research¹⁷. In the longer run, the rise of digital labour platforms and the resulting increase of online outsourcing opportunities might even negatively affect productivity growth as it undermines employers' willingness to invest in skills upgrading.

- **A second series of questions relates to the possible impact of digital labour platforms on macro-economic aggregates such as GDP and total employment at both EU and Member State level.** As explained above, digital platforms have the potential to contribute positively to overall economic activity since, by reducing transaction costs and through increased economies of scale, they facilitate economic exchanges between actors, which would not have been possible or profitable without them. By lowering barriers to entry, they may also contribute to boosting contract labour and/or entrepreneurship opportunities of marginalised groups and expand the market reach of certain specialised skill providers. At the same time, digital platforms are having a considerable impact on the geographical distribution of economic activity. The available data clearly indicate that location-independent work facilitated through digital platforms is dominated by long-distance relationships between service requesters and workers, shifting economic activity and employment on a global scale. It can safely be assumed that not all Member States and regions will be affected in the same way by this geographical redistribution of economic activities and employment opportunities. Diverse factors might enhance or impede their capacity to capture the additional economic activity and contract labour opportunities that digital labour platforms can bring. Among these, one might think of, for example, the digital infrastructure available, the number and the size of home-grown platforms, the types and levels of skills available in the workforce (including language), local wage conditions, applicable labour and social security law, etc.
- **A third area of interest is the impact of the growing participation in the labour markets intermediated by online platforms on public finances.** If the increasing trend of more workers being employed via online platforms (and in particular by big companies) continues, there is a risk that eventually it will start bearing on the revenue side of public budgets due to reduced personal income taxes and social contributions since evasion opportunities increase as workers shift away from the traditional labour markets. This impact could be exacerbated given the geographical relocation of work, i.e. employers in high-income countries outsourcing to workers in low-income countries. Whereas the discussion about taxing internet companies is quite advanced, not much thought has been given until now to imposing taxes on workers finding employment via online platforms¹⁸. The initial challenge here would be to get hold of realistic data on the income earned by the digital platform workers (they seem to underestimate it while responding in surveys). As the platforms are also reluctant to provide tax authorities with detailed data on their activity, there might be a case for imposing such reporting by law. Here of relevance is the idea of a Digital Single Window for employment contributions and taxes for online platform workers, put forward by the High-Level Expert Group on the impact of the digital transformation on EU labour markets.¹⁹ Such a scheme would have the potential to reduce compliance costs (both for platforms and workers) as well as to increase coverage. This issue should be looked at in conjunction with the potential impact

¹⁷ Conducting such research, however, is by no means easy as platforms are naturally weary to share information about the matching algorithms they deploy and given that the latter are constantly improved. Hence the calls to impose more transparency through regulatory means.

¹⁸ With the exception of a few countries, such as Denmark and Estonia, where the tax authorities started demanding more detailed reporting from digital platforms.

¹⁹ <https://ec.europa.eu/digital-single-market/en/high-level-expert-group-impact-digital-transformation-eu-labour-markets>

that the operation of digital work platforms could eventually have on the expenditure side of the budget. Given the possible waning interest of employers outsourcing work digitally in investing in upgrading workers' skills, one could imagine that the state could possibly have to pick up the tab in that respect. A reflection would also have to be made on healthcare and pension rights of workers employed solely or predominantly via digital platforms and thus not covered by the traditional safety nets. Serious rethinking of the tax-benefits systems might be in order given the challenges posed by the new type of labour relations.

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