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New evidence on platform workers in Europe.

Results from the second COLLEEM survey

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Executive Summary

Digital labour platforms are a new form of coordinating the provision of labour services enabled by the latest technological revolution. Many authors claim that digital labour platforms have the potential to disrupt the world of work, both positively by boosting participation in the labour market through better matching procedures, and negatively by circumventing regulation and lowering the quality of employment.

To assess the impact of digital labour platforms on employment and on working conditions, we need precise estimates of the number of people doing platform work; in addition we need information on what type of services they provide, how frequently these services are provided, how much money is earned as a result of this provision and so on. At the same time, when we talk about the impact of digital labour platforms on working conditions, it is imperative to understand whether platform work is just a side gig as it is often claimed, or whether it represents a major source of income and for whom. Thus, we need to ascertain the regularity, time allocated and income generated from platform work, as well as the employment status of platform workers, since this will provide information as to whether they have other forms of social protection from other jobs.

In 2017, the JRC conducted the COLLEEM pilot survey, an initial attempt to provide quantitative evidence on platform work. This report builds on previous findings and contributes by describing the results of the second wave of COLLEEM (2018).

Estimating the number of platform workers in Europe: the COLLEEM II survey

COLLEEM is an online panel survey carried out by the JRC in partnership with the Directorate General for Employment, Social Affairs and Inclusion (DG-EMPL). The first pilot wave was completed in 2017 and gathered a total of 32,389 responses from 14 Member States. The COLLEEM 2018 survey gathered a total of 38,022 responses from internet users aged between 16 and 74 years old in 16 EU Member States: Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, the Netherlands, Portugal, Spain, Sweden, Slovakia, Romania, and the United Kingdom. In addition, COLLEEM 2018 includes a booster sample of 856 respondents who were identified as platform workers in 2017 and were re-invited to participate in the survey.

In broad terms, the definition of platform workers remains the same in both waves of the survey to ensure comparability. This definition includes those who have ever gained income from providing services via online platforms, where the match between provider and client is made digitally, payment is conducted digitally via the platform, and work is performed either (location-independent) web-based or on-location. According to this broad measure, there is a small but clear increase in the prevalence of platform work in all countries under investigation, except for Italy and Slovakia. However, the broad measure of platform work may refer to people who have been providing services just once in the past and is thus inconsequential. For this reason, only estimates referring to a narrower, but more correct definition are reported here.

Frequency, hours and income generated from platform work are combined to generate different categories of platform workers.

Main platform workers are those who claim to work more than 20 hours a week providing services via digital labour platforms or earn at least 50% of their income doing so. This group is estimated to represent on average 1.4% of the respondents in the surveyed countries in 2018, a drop of 0.9 percentage points compared to 2017.

Secondary platform workers are those respondents who provide services via digital labour platforms more than ten hours a week and earn between 25% and 50% of their income from platform work; this group is estimated to represent on average 4.1% of the respondents in the surveyed countries in 2018, an increase of 0.5 percentage points compared to 2017.

Finally, respondents who work less than 10 hours a week and earn less than 25% of their income providing services via digital labour platform are called marginal platform workers and represent 3.1% of the respondents in the surveyed countries in 2018, an increase of 1.5 percentage points compared to 2017. Respondents who provide services via online platforms only sporadically, that is, less frequently than once a month, are not included in the analysis and therefore not mentioned here.

To sum up, the detailed and compared analysis of the COLLEEM I and II surveys yields two important insights. First, the phenomenon of platform work is increasing slowly but steadily in Europe. Secondly, only a small proportion - around 1.4% of the working age population in the 16 countries participating in COLLEEM II - does platform work as a main form of employment.

The dynamics of Platform Work: an exploratory longitudinal analysis

This longitudinal component of COLLEEM II allows us to analyse individual transitions in and out of platform work and therefore check the robustness of the cross sectional findings described above. By focusing on those who were platform workers in 2017 and were re-interviewed in 2018, we find that 41.4% remained platform workers as opposed to 58.6% who dropped out; the drop-out rates are therefore rather high and suggest that many people may just be trying out platform work, but do not find it rewarding enough to do it for a long time.

By digging deeper in the longitudinal sub-sample, we found that platforms mediating transportation services have a higher turnover rate than those who mediate professional online services or mediate microwork.

Who are the platform workers and why it matters

The first report drawing on COLLEEM data revealed that the typical European platform worker is a young male, educated to a degree level and more likely to have family commitments than offline workers. The results of the COLLEEM II survey confirm some of these findings, as platform workers tend to be younger, more educated, and more likely to live in a larger household and have dependent children. The fact that platform workers are more frequently found in households with dependent children is of high policy relevance, given that the conditions of platform work may have implications that go beyond the service providers themselves, potentially extending to dependent children and spouses.

An important difference between the two waves is that the proportion of younger women has risen across the three categories of platform workers, but especially among those who do it as a secondary or main activity, by 6.4 and 7.1 percentage points respectively. We can therefore say that digital labour platforms are becoming a more important source of income for women, even though they are still less present than men.

Foreign born workers are significantly more likely to provide services via digital labour platforms than native workers. The large presence of foreign born platform workers may suggest that work on digital labour platforms is not particularly attractive, since several studies have demonstrated how foreign born workers tend to be employed in lower quality jobs and be overqualified.

A task-based approach to understanding platform work

The second wave of COLLEEM gathers information on specific tasks by asking frequent (at least monthly) platform workers which task took most of their time, how long it usually took to complete such task, how much they earn and which platform they used to carry out the task they are referring to.

About 40% of platform workers provide more than one type of task and even if in 2018 the proportion of platform workers providing services on location has remarkably increased, the sample still seems to be biased in favour of professional and non-

professional platform workers – which means platform workers who carry out tasks involving accounting legal, creative, translation, software development, clerical work and so on.

Preliminary estimates based on a restricted and consistent sample show that the majority of platform workers get paid by task and not time worked. Independently from the type of service provided, platform workers spend on average 30 minutes to carry out a single task. When the duration of the task is expressed either in hours (7 hours on average) or days (11 days on average), it is less clear if they are referring to a single larger task (i.e. a project) or to the time spell they spent logged onto the app. Payment per hour ranges between approximately €7 for microtasking and €23 for software development.

Work and employment conditions in digital labour platforms

The sporadic, marginal and often even *hidden* nature of platform work makes it very difficult to assess its work and employment conditions, although, in many ways, this is the crucial issue for policy. We know that typically platform work is not protected by employment regulation - certainly not at the same level as regular work - and anecdotal or journalistic evidence suggest that platform workers may be disadvantaged in terms of work and employment conditions compared to similar workers in the regular (non-platform) economy.

In the second wave of COLLEEM, the questions on working conditions are explicitly linked to the type of platform work carried out by the respondent. This resulted in answers which are more consistent and vary more by type of task performed, but are still somewhat problematic. The degree of variability in answers is still lower than expected, and the results suggest some bias in the sample towards online professional types of platform work, which tend to have better conditions than those of on-location personal services such as delivery or transport.

The labour market status of platform workers

Platform workers' employment status is one of the most pressing issues from a policy standpoint. According to some authors, digital labour platforms represent a continuation and acceleration of long-standing trends towards contingent or "non-standard" work, such as temp-agency workers, direct-hire temps, day labourers, contract workers, and independent contractors. The policy challenge is to find a balance between protecting platform workers from exploitation while fostering the innovative potential of the platform economy.

Typically, in their terms and conditions, digital labour platforms claim to be mere intermediaries providing only a 'matching service' between a client who needs a specific task done and a worker who can perform the task. However, such claim is coming increasingly under attack, as the plethora of lawsuits against some of the biggest platforms confirms (for a more detailed description, see box 2).

The European Commission Communication "A European agenda for the collaborative economy" COM(2016) 356 provides some criteria to decide whether people who supply a given type of services on digital platforms are to be considered workers, as opposed to mere users of the platform. However, 'whether an employment relationship exists or not has to be established on the basis of a case-by-case assessment' (p.12 COM(2016) 356). In some instances, such as in a 2015 court case in the Netherlands¹, the Court established that 'the classification of a "self-employed person" under national law does not prevent that person [from] being classified as a worker within the meaning of EU law if his independence is merely notional, thereby disguising an employment relationship'.²

¹ Case C-413/13 FNV Kunsten Informatie en Media v Staat der Nederlanden [2015] 4 CMLR 1.; see forthcoming European Commission (2020) report for more detail.

² C-413/13, para. 35

In general terms, employees differ from the self-employed because they have limited autonomy, given that the employer organizes, directs and controls the activity of the worker. Furthermore, the employer monitors the employee's activity and sanctions any shortcomings. To compensate this lack of autonomy, employees enjoy legal protection and a series of rights and benefits. In particular, the employee cannot receive a salary which is lower than the statutory minimum wage, or that prescribed by collective agreements. An employee cannot work beyond the maximum number of hours allowed by law, and cannot be easily dismissed. In addition to this, a substantial part of the employee's social security contributions are paid by the employer. By contrast, self-employed workers have in principle the autonomy to carry out the work as they see fit: the place, time and way in which the work is performed are decided by the worker; the sole obligation of the self-employed is to achieve the result agreed with the client. Generally, self-employed workers do not benefit from the same protection and rights as employees, for instance, they are not entitled to a minimum wage or paid leave, and are responsible for paying their taxes and social security contributions. There are however substantial cross-country differences, as explained more in detail in section 7.

Aside from conceptual definitions of platform workers' employment status, it is useful to take a look at how the workers perceive themselves. The COLLEEM survey asked respondents to define their main employment status, from their own perspective. It also included a question on self-employment as a side activity. By taking advantage of this question, platform workers can be reclassified in the following four categories: platform workers who claim to be *employees*; platform workers who claim to be *self-employed*; platform workers who claim to have a *side gig as self-employed*; finally, the platform workers who claim to be unemployed, retirees, students, or homemakers are simply classified as *not-employed*.

Results from COLLEEM I and II show that the proportion of platform workers who claim to be employees dropped substantially between 2017 and 2018, but especially so for those who do it as a main job; whereas the proportion of platform workers who claim to be self-employed, either as main occupation or as a side gig, increased slightly.

Conclusions and policy implications

This report contributes to the ongoing debate on digital labour platforms by presenting new estimates on the prevalence of platform work, while describing who platform workers are, what they do, how much they earn, and what their working conditions are. In some cases, we are able to provide clear answers, while in others, a lot more work still needs to be done.

While we are confident that the measure of platform work as a form of employment described in this report is more suitable to gauge the extent of the phenomenon, as it offers information on regularity, time allocated and income generated, we believe that we need to develop a more robust framework to collect data on platform work, beyond opt-in online surveys. COLLEEM is a good attempt at capturing an elusive phenomenon such as platform work; however, there are several sources of concern: first of all, COLLEEM over-represents high frequency internet users and, even despite all the necessary adjustments, generalisations of our findings to the overall population should be avoided. Secondly, it is possible that COLLEEM also over-samples professional (and thus more privileged) platform workers. Finally, the reliability of the answers and quality of the online panels used to conduct the survey are not always as good as what we had hoped for.

1 Introduction

Digital labour platforms are a new form of coordinating the provision of labour services enabled by the latest technological revolution. Because they are a relatively new phenomenon, researchers strive to define and measure them, while policy-makers struggle to regulate them.

JRC's previous report on digital labour platforms (Pesole *et al.*, 2018) defines them as "digital networks that coordinate labour service transactions in an algorithmic way". Implicit in the definition is the fact that they act as mediators, hence not as employers in a traditional sense. Indeed, digital labour platforms share features that are typical of labour market intermediaries, such as temping agencies, as they reduce frictions and facilitate matching between workers and firms. However, they differ from traditional labour market intermediaries in that what they mediate is not a job in the traditional sense, but a single task or service. In the words of Cook *et al.* (2018) digital labour platforms "divide work into small pieces and then offer those pieces of work to independent workers in real-time with low barriers to entry". Pesole *et al.* (2018) refer to this phenomenon as "unbundling of tasks". At the same time, platforms also coordinate, monitor and evaluate service provision - what is sometimes referred to as "algorithmic management", therefore carrying out functions that are typical of employers.

Digital labour platforms have attracted a lot of attention, both from the media and from policy-makers, because of their allegedly exponential growth (Farrel and Greig, 2018) and their potential to disrupt labour markets. However, according to some scholars, so far the only sector of the labour platform economy that has really grown exponentially is the transportation sector (Abrahams *et al.*, 2019) – at least in the US.

The benefits of purchasing labour services via digital labour platforms are quite clear: clients can take advantage of a workforce that is on demand, and therefore when they post a job, they can have it done very quickly. When work is delivered digitally, workers can be recruited anywhere in the world. This means that clients can take advantage of a specialised workforce in different countries potentially at a lower cost.

By contrast, whether digital labour platforms are beneficial for workers is less clear, and tends to depend on the type of platform and the type of tasks carried out. One of the positive effects is that digital labour platforms can increase participation in the labour market through better matching procedures. In theory they can have a positive impact on workers who are penalised in traditional labour markets in at least three ways: firstly, digital labour platforms can provide more flexible working conditions and therefore benefit all workers with family and other commitments; secondly, digital labour platforms can give access to paid work to workers who may face discrimination in traditional labour markets, as clients often do not know the worker's gender, age, education, ethnicity, or sexual orientation. Finally, digital labour platforms can benefit (high skilled) workers in developing countries, by giving them access to clients in developed countries who pay higher wages.

At the same time, digital labour platforms may have a negative impact on employment by circumventing regulation and lowering the quality of employment: generally, digital labour platforms claim to be simply mediating between workers and clients, and require workers to agree that they are self-employed or independent contractors, not employees of the platform or of the client. This implies that platform workers are typically not entitled to basic employment rights, such as a minimum wage; holiday pay, maternity leave or sick leave; overtime; protection from unfair dismissal and social security; as well as the right to organise into unions.

However, while it is true that, at least in theory, digital labour platforms can disrupt labour markets and the social structures in which they are embedded, their transformative power hinges on how widespread they are today and how widespread they are likely to become in the future. In other words, to assess the potential impact of digital labour platforms, we need reliable estimates of the number of people who spend a

significant amount of time and gain substantial income via such platforms, as they are the ones who will be affected by platform regulation or the lack of it. At the same time, when we talk about the impact of digital labour platforms on working conditions, it is imperative to understand whether platform work is just a side gig as it is often claimed, or whether it represents a major source of income and for whom. Thus, we need to ascertain the regularity, time allocated and income generated from platform work, as well as the employment status of platform workers, since this will provide information as to whether they have other forms of social protection from other jobs. Finally, to investigate the extent to which the unbundling of tasks is feasible, we need detailed information of what type of tasks platform workers actually carry out, and in what conditions.

This report will attempt to deliver an improved estimation of the number of people providing such services in Europe, in line with a call from the European Council³ and the European Parliament⁴. We build on the knowledge acquired during the first phase of the COLLEEM project (Pesole et al. 2018), and conduct an empirical analysis drawing on the second wave of the JRC COLLEEM survey, carried out in 2018. Like its predecessor, COLLEEM II aims to identify platform workers in Europe, their characteristics, the nature of their work, and their working conditions; in addition, it ascertains more specific information on tasks performed, on motivations and working conditions.

1.1 Policy challenges

The regulation of digital labour platforms is challenging from a number of perspectives. Consumer protection, employment protection and taxation issues often arise because of the unclear legal status of digital platforms as well as the lack of a uniform regulation across the EU. Typically, in their terms and conditions platforms state that they are mere intermediaries providing only a 'matching service', thus evading responsibilities in relation to any damage, delay or failure in the performance of the underlying service; similarly, terms and conditions of the platform determine the employment status of the service provider, which means that in most cases platform workers are considered self-employed. In addition, service providers can be either a private individual offering a service on an occasional basis or a professional trader, which makes it difficult for consumers to establish what their rights are and against whom to exercise them when something goes wrong in the transaction.

In general, digital platforms are subject to the EU consumer acquis and bound by European directives regulating market behaviours and consumer issues. In terms of consumer protection, the most relevant directives are the Consumer Rights Directive (2011/83), the Services Directive (2006/123), the e-Commerce Directive (2000/31) and the Unfair Commercial Practices Directive (2005/29). However, the applicability of such directives and regulations is not always clear. This lack of clarity may cause significant differences among the Member States due to national, regional and local regulations as well as case-law, thereby fragmenting the Single Market.

The sector in which platforms operate and the type of service they provide are also object of contention. The 2016 EC Communication on the Collaborative Economy states if platforms offer a service "normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services" then the object

³ The Council conclusions on the Future of Work: making it e-Easy (7 December 2017) invited the Member States and the European Commission to take into account of the changing forms of employment when developing and implementing employment, including occupational health and safety, education and training, and social policies. <http://data.consilium.europa.eu/doc/document/ST-15506-2017-INIT/en/pdf>

⁴ The European Parliament report on the European Agenda for the collaborative economy (11 May 2017) drew attention to the lack of data relating to changes in the employment world brought about by the collaborative economy and called on the Member States and the Commission to gather more reliable and comprehensive data in this respect. <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-%2F%2FEP%2F%2FTEXT%2BREPORT%2BA8-2017-0195%2B0%2BDOC%2BXML%2BV0%2F%2FEN&language=EN>

of the transaction is an “information society service” (COM(2016) 356, page 5). Platforms providing this type of services will be regulated by the e-Commerce Directive, whereas platforms providing other types of services are regulated by “relevant sector-specific regulation, including business authorisation and licensing requirements generally applied to service providers”. The distinction is crucial because sectoral regulation tends to be significantly more restrictive.⁵ According to the Communication, whether a digital platform is a mere intermediary or also provides the underlying service will have to be established on a case-by-case basis. However, it suggests a few key criteria that can play a role in this regard: whether the platform as opposed to the service provider sets the final price paid by the user; whether the platform sets terms and conditions, other than price, which determine the contractual relationship between the underlying services provider and the user; and whether the platform owns the key assets used to provide the underlying service. By contrast, offering user rating or review mechanisms is not an indication that the platform provides the underlying service (COM(2016) 356, page 6).

The resolution on the European Commission’s Communication ‘*European Agenda for the collaborative economy*’ adopted by the European Parliament in June 2017 ([2017/2003\(INI\)](#)) emphasised the need to clarify the applicability of existing EU legislation to different collaborative economy models (p. 10) and stressed the importance “of ensuring a high level of consumer protection, fully upholding workers’ rights and of ensuring tax compliance”.

Other recent EU initiatives aim to address some of the policy challenges associated to new forms of employment, including platform work. Firstly, some guidance can be found in the European Pillar of Social Rights⁶, especially in the chapters on fair working conditions and access to social protection. In December 2017, the Commission presented a proposal for a new Directive⁷ on transparent and predictable working conditions across the EU which would extend new substantive rights to “workers in non-standard forms of employment, such as domestic workers, on-demand workers, intermittent workers, voucher-based workers and platform workers”(COM(2017) 797, page 11), as long as they fulfilled basic criteria (such as a minimum number of working hours).

In addition, in March 2018 the Commission presented a proposal for a Council Recommendation⁸ with the aim to provide access to adequate social protection to all workers, including the self-employed, in Member States. Other initiatives such as the New Skills Agenda for Europe⁹, which will also be updated, include measures to tackle the implications of on-going changes in the world of work for education and skills.

Finally, President von der Leyen states in her political guidelines that ways of improving the labour conditions of platform workers will be explored, so as to guarantee dignified, transparent and predictable working conditions.

⁵ Uber is an emblematic case of a digital labour platform that alleges to provide an information society service - the intermediation between a client who needs a service (namely a ride) and an independent driver who can provide that service – and that is constantly being challenged. In 2017, the European Court of Justice settled the dispute, at least in Europe, and established that Uber must be classified as ‘a service in the field of transport’ within the meaning of EU law (Judgment in Case C-434/15 Asociación Profesional Elite Taxi v Uber Systems Spain SL).

⁶ Following a proposal from the Commission in April 2017, the European Pillar of Social Rights was jointly proclaimed by the European Commission, the European Parliament and the Council in November 2017. For more information see: https://ec.europa.eu/commission/sites/beta-political/files/social-summit-european-pillar-social-rights-booklet_en.pdf

⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017PC0797>

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2018:0132:FIN>

⁹ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0381&from=EN>

1.2 Aims and structure of this report

This report contributes to the debate on the socio-economic impact of digital labour platforms by providing tentative answers to some simple but important questions. How many platform workers are there in Europe? What kind of people are they? What kind of work is provided and coordinated via platforms? What are the conditions of platform work? To this end, we analyse the results of a unique source of data on digital labour platforms: the COLLEEM survey.

COLLEEM is an online panel survey carried out by PPMI on behalf of the JRC in partnership with the Directorate General for Employment, Social Affairs and Inclusion (DG-EMPL). The first wave of interviews, conducted in 2017, covers 14 Member States, while the second 16. The second survey also includes additional features, such as a longitudinal component, more detailed questions and more information on the type of tasks performed by the interviewees. To revise and improve the questionnaire for the second wave, we organised an expert workshop and discussed methodological issues related to sampling frame; non-response rate; and the creation of a longitudinal subsample.

The COLLEEM 2018 fieldwork was carried out between September and November 2018. Several tests were devised to identify potentially fraudulent answers, and respondents who failed more than three tests were dropped out of the sample.

This second wave survey gathered a total of 38,878 responses from internet users aged between 16 and 74 years old in 16 EU selected countries: Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, the Netherlands, Portugal, Spain, Sweden, Slovakia, Romania, and the United Kingdom.

- The main sample comprises 34,450 main respondents (88.6%);
- The pilot section - the very first respondents - comprises 1,608 observations (4.1%);
- 856 (2.2%) is the number of the re-invited respondents (people who had participated in the previous survey) who completed the survey; this subsample is to be considered a booster sample and should not be used to estimate prevalence rates.
- 1,964 respondents from 2 top up samples (additional interviewees to make up the quotas).

The remainder of this report is organised as follows: section 2 provides a quick overview of the literature on digital labour platforms, with a focus on measuring issues, working conditions and motivations to take up platforms work; section 3 presents the most recent estimates of the size of the platform workforce drawing on the COLLEEM data; section 4 illustrates the socio-demographic profiling of platform workers and compares them with findings from the previous year; section 5 investigates what platform workers actually do by following a task-based approach; section 6 describes platform workers' working conditions, discussing hours worked and shift patterns, income earned, and job quality indicators; section 7 discusses the challenges related to the labour market status of platform workers; and section 8 concludes.

2 An overview of the literature on Digital labour platforms

The provision of labour services mediated by online platforms is a relatively recent phenomenon; the crowdsourcing platform Amazon Mechanical Turk was publicly launched in 2005¹⁰, the site for freelancers PeoplePerHour in 2007¹¹, while the ride hailing company Uber was founded as UberCab in 2009¹². Similarly, most studies of platform work are only a few years old; in the context of the COLLEEM project, an attempt to compile a comprehensive mapping of Europe's platform economy has been carried out by Fabo *et al* (2017a), who summarise service platforms active in the EU 28 Member States in the first half of 2017. According to this study, most platforms have been set up from 2010 onwards.

In general, the literature on digital labour platforms can be broadly divided into studies estimating the current and predicted future size of the platform economy and studies focusing on specific aspects of platform work, such as working conditions or legal matters regarding platform workers' labour market status.

Pesole *et al* (2019) carried out a review of the literature estimating the number of platform workers and found 13 relevant papers on the topic. Eight of the studies selected for the literature review are based on survey data - which provided information on participation in platform work eliciting it directly from respondents; two studies collected and collated publicly available data on main platforms, while the remaining three devised a way to infer the overall number of people working on digital labour platforms by combining information on google searches and the number of Uber drivers.

The oldest studies were carried out in the US (McKinsey, 2015, Harris and Krueger, 2015) and were more explorative in nature, since they estimated the number of platform workers indirectly by exploiting the scarce available data (see Pesole *et al* 2018 for a more detailed literature review). A study by European Commission's DG GROW (Nunu *et al*, 2018) tried to estimate the number of people providing services via online platforms indirectly, by combining Eurostat aggregate data on sectoral employment with information on platform revenues. The authors of the study estimate that approximately 1.79% of the European workforce provide services via online platforms.

Most studies measuring the prevalence of platform work via survey are not really comparable to each other as they generally cover different countries and tend to vary in scope; some include in the definition of platform workers respondents who have provided services via digital labour platforms at least once in the past 12 months (Lepanjuuri *et al*, 2017; StatCan 2017), or past six months (Robles and McGee, 2016); others include anyone who has ever provided services (Bonin, 2017), but also provide different estimates based on income derived from platform work and frequency of service provision (Flash Eurobarometer, 2016; Huws *et al*, 2017; Pesole *et al*, 2018). For instance, Pesole *et al*, 2018 start from a broad estimate of how many people have ever provided services via digital labour platforms, and then show how many do it at least monthly, those who earn at least a certain proportion of their income or spend a significant amount of hours doing platform work.

The overview of the literature measuring the prevalence of platform work via survey methods confirmed the necessity to harmonise definitions and include information in terms of the regularity, time intensity and income that respondents derive from the provision of services via digital labour platforms (Pesole *et al*. 2019).

Another strand of the literature on digital labour platforms examines and discusses the working conditions of platform workers – often adopting qualitative methods such as in-depth interviews. Some studies looked at the overall population of service providers, while others focused on a few specific tasks or platforms.

¹⁰ <https://blog.mturk.com/bringing-future-innovation-to-mechanical-turk-c67e489e0c37> .

¹¹ <https://www.peopleperhour.com/site/aboutus> .

¹² <https://www.uber.com/newsroom/company-info/>; <https://www.businessinsider.com/ubers-history>

The main empirical study of micro-workers has been carried out by the ILO Research Department in collaboration with the Inclusive Labour Markets, Labour Relations and Working Conditions Branch (INWORK); the authors of the study, Berg *et al.*, conducted two surveys in 2015 and 2017, covering 3,500 workers living in 75 countries around the world. Berg *et al.* investigated basic characteristics, workers' motivations and the working conditions of respondents working on five major globally operating microtask platforms. The report revealed a lack of access to social protection benefits, underemployment (in the form of waiting around for available tasks), and discrimination for a significant proportion of crowd-workers.

As part of its long-term research on the platform economy, Eurofound carried out a qualitative study exploring the working and employment conditions of three of the most common types of platform workers. The authors first produced an exhaustive taxonomy of platform work based on skills required, scale of the task, selection process, and the form of matching, as well as the locus of provision (Eurofound, 2018). They then focused on three types of workers, namely "on-location platform determined" (e.g. Uber drivers or deliveroo riders), "on-location worker initiated" (e.g. task rabbit, listminut) and online contest (e.g. freelancer) and analysed motivations (push and pull factors) to work via online platforms as well as issues related to the employment status. The underlying idea is that different categories of platform workers are subject to very different working conditions, so they should be analysed and eventually regulated separately. One of the main discriminants is the degree of autonomy with respect to the platform, and thus whether the applicable employment status should be that of employee as opposed to self-employed. The study carried out by Eurofound has also highlighted some pull factors that made platform work attractive. One of them is the lack of entry barriers, such as a formal interview or the requirement to have work experience; other workers were attracted by the flexibility both to choose when and how much to work, and to choose from a variety of tasks and clients.

The European Agency for Health and Safety at Work (EU-OSHA) published a discussion paper in 2015 (EU-OSHA 2015) examining the safety and health implications of platform (crowd)work. Many of the typical physical risks of online and offline work, such as fatigue or musculoskeletal problems, stress and exhaustion, are exacerbated by a number of factors that are more frequent among platform work, such as the lack of training, the lack of certification, the lack of knowledge of the relevant regulations and the lack of safety equipment. Besides, platform workers are exposed to psychosocial risks because of the precariousness of the work; of the pressure due to monitoring, the rating system, and tight deadlines; the psychological toll that may derive from having to tag offensive content on the internet. A more recent paper by OSHA (2017) examined the regulation and policy responses to the online platform economy, and more specifically to the labour market status of platform workers, in several EU Member States.

In terms of motivations to join digital labour platforms, most studies agree that the need for flexibility and the desire to earn additional income are the main pull factors. Hall and Krueger (2015) find that most of Uber drivers had full-time employment prior to joining Uber and that they did so because of a desire for flexibility and the need to smooth fluctuations in their income. Similarly, Koustas (2019) found that financial distress due to outside shocks was one of the reasons for starting platform economy jobs (especially providing services in the transportation sector via Uber or Lyft).

However, motivations to join the platform economy vary according to the type of task performed and are also likely to depend on the relative difference between average incomes in the country of the client and the country of the worker. Berg *et al.* (2018) reveal that motivations for participating in the platform economy tended to change by country of origin, with Indian workers more likely to rely on it as a source of main income as opposed to US workers who considered it as secondary income. Aleksynska *et al.* (2019) carried out a qualitative and a quantitative survey of platform workers in Ukraine and also found that the largest proportion of platform workers took up platform work to supplement their income.

Finally, it is worth mentioning that an interesting source of information on labour platforms is provided by the Online Labour Index (OLI), developed by the Oxford Internet Institute (Kässi and Lehdonvirta, 2016)¹³. The OLI is an economic indicator "that provides the online gig economy equivalent of conventional labour market statistics; it measures the utilisation of online labour across countries and occupations by tracking the number of projects and tasks posted on platforms in near-real time" (Kässi and Lehdonvirta, 2016, p. 1).

¹³ see <http://ilabour.oii.ox.ac.uk/online-labour-index/>.

3 Estimating the number of platform workers in Europe: the COLLEEM II survey

The 2017 COLLEEM survey provided some preliminary evidence on the prevalence and characteristics of platform work in Europe. Since it is a new phenomenon which is still evolving, and for which there are no agreed definitions, the survey necessarily had an exploratory nature. It mostly attempted to advance our understanding of platform work and provide some initial estimates.

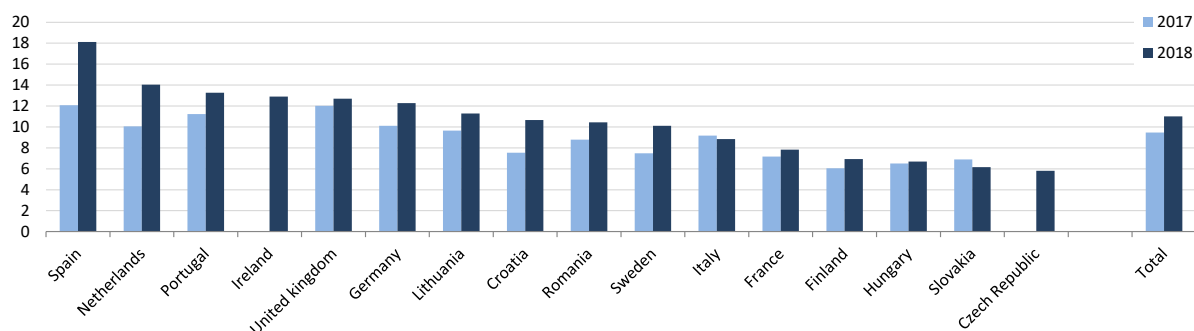
After completing the 2017 COLLEEM study, the research team built upon the information collected and the lessons learnt to develop an improved questionnaire and survey methodology, and to refine the measurement of platform work and the identification of its attributes. On this basis, in Autumn 2018 the fieldwork for COLLEEM II was carried out, covering all the countries included in COLLEEM I plus two (Czech Republic and Ireland). A total of 38,878 responses were collected in the 16 participating countries, representative of internet users aged between 16 and 74, with a questionnaire administered online using a non-probability quota sampling approach (see Annex 1 and the methodological report by PPMI 2018 for more details).

There are several improvements in COLLEEM II relative to COLLEEM I. The questionnaire was revised on the basis of the information obtained from the first wave, adjusting some questions and replacing others, while retaining a core of comparable questions to allow the analysis of trends. A sub-sample of platform workers identified in the first COLLEEM survey was added, to boost the sample of platform workers for the cross-sectional analysis and allow an exploratory longitudinal analysis of transitions in platform work. The sample was optimised using information obtained in the first COLLEEM survey, targeting the population panels which produced more representative results. The sample of COLLEEM II is more balanced and the need to use very large weights to ensure representativeness of results has decreased very significantly.

In general terms, the definition of platform workers remains the same in both waves of the survey to ensure comparability. However, knowledge obtained from COLLEEM I led us to slightly revise our classification of platform workers (see Pesole et al. 2018 for a discussion of measurement issues). This slightly revised classification can be perfectly reconstructed using the COLLEEM I survey data, so that comparability is not compromised and we can assess the change in the general prevalence of the phenomenon between 2017 and 2018.

The broadest definition of platform workers includes those who have ever gained income from providing services via online platforms, where the match between provider and client is made digitally, payment is conducted digitally via the platform, and work is performed either (location-independent) web-based or on-location. This definition is identical in COLLEEM I and COLLEEM II. Weighting and adjusting the COLLEEM figures for frequency of internet use (see Pesole et al. 2018, pp. 14-20 for more details), we get the following estimates of adult people who have ever done platform work in 2017 and 2018. There is a small but clear increase in the prevalence of platform work in this broader definition, which for the EU (14/16) as a whole goes from 9.5% to around 11%. This increase can be observed, to varying degrees, in all countries except two (Italy and Slovakia). It is particularly stark in Spain (from 12% to 18%) and Netherlands (from 10% to 14%).

Figure 1: How many people have ever provided services via digital labour platforms?



Source: authors' elaborations using COLLEEM 2017-2018 data. Data are adjusted for frequency of internet use using the ICT survey (isoc_ci_ifp_fu).

However, that definition is too broad, because it refers to people who have *ever* provided labour services via platforms, which could have been just once in the past and thus totally inconsequential. As in COLLEEM I, we use frequency, hours and income generated from platform work to successively narrow the definition and get to a category of platform workers that is comparable to standard (main) employment, with intermediate categories for secondary and not significant platform work. This classification has been slightly amended according to the following principles:

- Those who have provided labour services via platforms but less than once a month over the last year are classified as **sporadic platform workers**. This is a fringe category, and is not included in most of the analysis (they may have tried platform work, but it is not a consistent part of their working lives).
- Those who provide labour services via platforms at least monthly, but who spend less than 10 hours a week and get less than 25% of their income via platforms, are classified as **marginal platform workers**.
- Those who provide labour services via platforms at least monthly, and spend between 10 and 19 hours or get between 25% and 50% of their income via platforms are classified as **secondary platform workers**. We also include in this intermediate category those platform workers which provide uneven information in terms of income and hours: those who spend more than 20 hours a week doing platform work but say they get less than 25% of their personal income via platforms; and those that say they get more than 50% of their income via platforms but say they spend less than 10 hours a week in platform work.
- Finally, those who provide labour services via platforms at least monthly, and work on platforms at least 20 hours a week or get at least 50% of their income via platforms (excluding the cases previously mentioned: e.g. first cell-third column, third cell- first column in Table 1) are classified as **main platform workers**.

Table 1: defining platform work based on income and hours worked

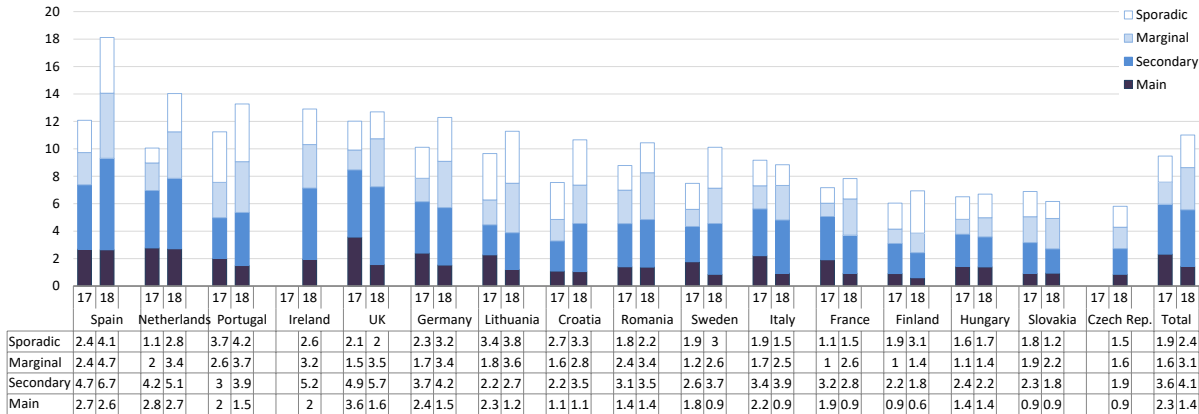
	Less than 10 hours a week	Between 10 and 19 hours a week	More than 20 hours a week	No answer
Less than 25% of personal income	Marginal	Secondary	Secondary	Marginal
25%-50% of personal income	Secondary	Secondary	Main	Secondary
More than 50% of personal income	Secondary	Main	Main	Main
No answer	Marginal	Secondary	Main	(missing)

Source: authors' elaborations using COLLEEM 2017-2018 data; information on income and hours worked is only present for platform workers who provided services at least monthly in the last 12 months.

There are two main differences between this classification of platform workers and the one we proposed in COLLEEM I (Pesole et al. 2018). First, we now give the same importance to income and working hours to classify platform workers, whereas before we gave more emphasis to income. The reason is that if someone works more than 20 hours a week via platforms, even if he or she makes 25%-50% of their income that way, platform work can be considered their main employment. Secondly, we now classify as secondary those cases where the variables of income and hours seem contradictory, but at least one of them suggest a significant amount of platform work (i.e. working less than 10 hours per week but gaining more than 50% of income). In the absence of other information, classifying those cases in the intermediate category minimises possible error while maximising the numbers of observations that can be classified.

The following chart (and table) shows the percentage of the working age population that corresponds to each of the four categories of platform workers across the countries participating in the COLLEEM I and II surveys (indicated by the year of data collection, 2017 and 2018 respectively). We can see that in general, as with the overall prevalence using the broadest definition, the percentage of platform workers in all categories tend to increase slightly in most countries, except for the narrowest category of main platform workers which marginally but consistently declines, with very few exceptions. For the total COLLEEM sample, sporadic platform workers go from 1.9% to 2.4%; marginal platform workers go from 1.6% to 3.1%; secondary platform workers go from 3.6% to 4.1%; and finally, main platform workers go from 2.3% to 1.4%.

Figure 2: Intensity and relevance of platform work – estimates combining information on income and hours worked



Source: authors' elaborations using COLLEEM 2017-2018 data. Data are adjusted for frequency of internet use using the ICT survey (isoc_ci_ifp_fu).

It is striking that the broad measure of platform work and all categories except main go up marginally but consistently, while the category of main platform workers (the one most comparable to regular employment) decreases also marginally but consistently. How can this be? Did the phenomenon of platform work increase or decrease between 2017 and 2018? What is the best estimate of the phenomenon?

The decrease in the category of main platform workers is entirely due to a sharp decrease in the proportion of platform workers who say that more than 50% of their income comes from platform work. In 2017, nearly one in four (24%) platform workers said they made at least 50% of their income through platforms, whereas in 2018 this proportion falls to almost one in 10 (11%). This decline seems unlikely to reflect a real change in the phenomenon being measured, and, as can be seen in the figure above, it affects main platform workers significantly in many countries. In fact, all the other variables used for measuring and classifying platform workers (broad incidence, frequency and working hours) are remarkably stable between 2017 and 2018, so the decline is purely the result of this single factor. We can also see that the inconsistency in the measure of income from platform work is concentrated in a few countries, where the

decline in the category of main platform workers is particularly dramatic: UK, Italy, Sweden, France and Lithuania. So did the phenomenon of platform work increase or decrease between 2017 and 2018? The evidence clearly suggests that it increased slightly. Indeed, all the measures and categories for which the variables in both years remain consistent reflect a small but significant increase. These are in fact the categories of platform work as sporadic, marginal or secondary forms of employment, which are the most common forms of platform work at the moment. However, when it comes to the category that most closely mirrors standard working arrangements (e.g. main platform workers) the comparison between COLLEEM I and COLLEEM II estimates suggest a small decline. But this decline is entirely linked to a particular variable (percentage of income derived from platform work) which was not entirely consistent between the two surveys, and thus the two values (2.3% in COLLEEM I and 1.4% in COLLEEM II) are probably not strictly comparable. Although it is impossible to say with complete certainty, the most recent estimate of 1.4% of main platform workers according to COLLEEM II seems the most plausible one. It is based on 11% of platform workers making more than 50% of their income via platforms, which is more plausible than the previous estimate of 24% of platform workers making more than 50% of their income via platforms based on the COLLEEM I survey.

To sum up, the detailed and compared analysis of the COLLEEM I and II surveys yields two important insights. First, the number of people who tried platform work is increasing slowly but steadily in Europe. Especially for the categories of sporadic, marginal and secondary platform workers, which are in fact the most important ones numerically in Europe. Second, we can now provide a more adjusted and plausible estimate of platform work as a main form of employment (comparable to regular employment in standard labour force statistics), of around 1.4% of the working age population in the 16 countries participating in COLLEEM II, ranging from 2.6% in Spain to 0.6% in Finland. This estimate is slightly lower than the one provided by the COLLEEM I survey (which overestimated the share of income obtained via platforms). The overall significance of this estimate, however, remains similar: although platform work as a main form of employment is still a small phenomenon in Europe, it is significant enough to merit attention and possibly policy action.

3.1 The dynamics of Platform Work: an exploratory longitudinal analysis

A series of studies carried out by the J.P. Morgan Chase Institute documented the exponential growth in platform mediated transportation services in the US, which went from virtually zero Uber drivers in 2012 to about 465,000 by the end of 2015. However, in 2016, Farrel and Greig used the J.P. Morgan Chase Institute data to show that more than half of online platform participants end their activity within twelve months, hence talked about "peak growth". Our own findings do not suggest exponential growth either: although the proportion of the working age population that use labour platforms as a source of secondary income (the categories of sporadic, marginal and secondary platform workers) did grow between 2017 and 2018, it was a small expansion that suggests a stabilisation rather than an explosive expansion of the phenomenon. This is reinforced by the very small prevalence of platform work as a main form of employment, which in fact seemed to slightly decline between 2017 and 2018 (although the results are not strictly comparable). But in any case, because it is such a new and still fluid phenomenon, it seems particularly useful to introduce a dynamic component in the analysis of platform work to better understand its evolution. For these reasons, the second wave of the COLLEEM survey included a longitudinal sub-sample, consisting of respondents who were interviewed both in 2017 and 2018. This longitudinal component of COLLEEM II allows us to analyse individual transitions in and out of platform work and therefore check the robustness of the cross sectional findings.

However, adding a longitudinal component to the COLLEEM survey has some important methodological difficulties, and this section should be considered just an initial and partial approximation. Because sample attrition is particularly high in online surveys such as COLLEEM, we did not presume to be able to re-interview all respondents from the previous year and opted for a split panel, that is, a design that contains both cross-sectional and panel samples. This way, we ensured that the main cross-sectional sample of COLLEEM II (35,944 observations) was fully comparable to that of COLLEEM I, while additionally being able to collect a large enough longitudinal subsample, consisting of 3,323 observations.

It should be noted that the longitudinal sub-sample consists of two parts: one part of the sub-sample is made up of re-invites: all people identified as platform workers in COLLEEM I were reinvited to take part in COLLEEM II. Among them, only 856 returned completed questionnaires. The re-invites are not part of the main sample, so they cannot be used to estimate prevalence rates and are to be considered a “booster” sample. The second part of the longitudinal sub-sample consists of people (identified as platform workers or not) who were by chance selected again from the sampling frame to be part of the COLLEEM survey, and that could be identified because they had the same ID as the previous year (see methodological annex for a detailed explanation).

By analysing the longitudinal component of COLLEEM we can estimate how many platform workers stopped providing services between 2017 and 2018 as opposed to those who remained in the digital labour platform economy. Theoretically, we could also attain information on new entries by estimating how many of those who were not providing services via digital labour platforms in 2017 did provide services in 2018; however, while we know that respondents in the booster sample were specifically re-invited, we don't really know the *a priori* probability for other respondents to end up in the longitudinal sample, so we need to be very cautious.

Table 2 shows the number of (monthly) platform workers and non-platform workers in 2017 and in 2018, and highlights (in blue) transitions in and out of platform work for the longitudinal sample. The first row shows how many respondents who provided services via digital labour platforms at least monthly in 2017 continue to do so in 2018 (340); how many platform workers in 2017 did not provide services in 2018 (481); and how many platform workers in 2017 did not respond to the re-invite and thus were not part of the COLLEEM survey in 2018 (1,879); by contrast the second row provides information on respondents who were not platform workers in 2017, and became platform workers in 2018 (144), remained non platform workers (2,358) or simply were not part of the sample (27,187).

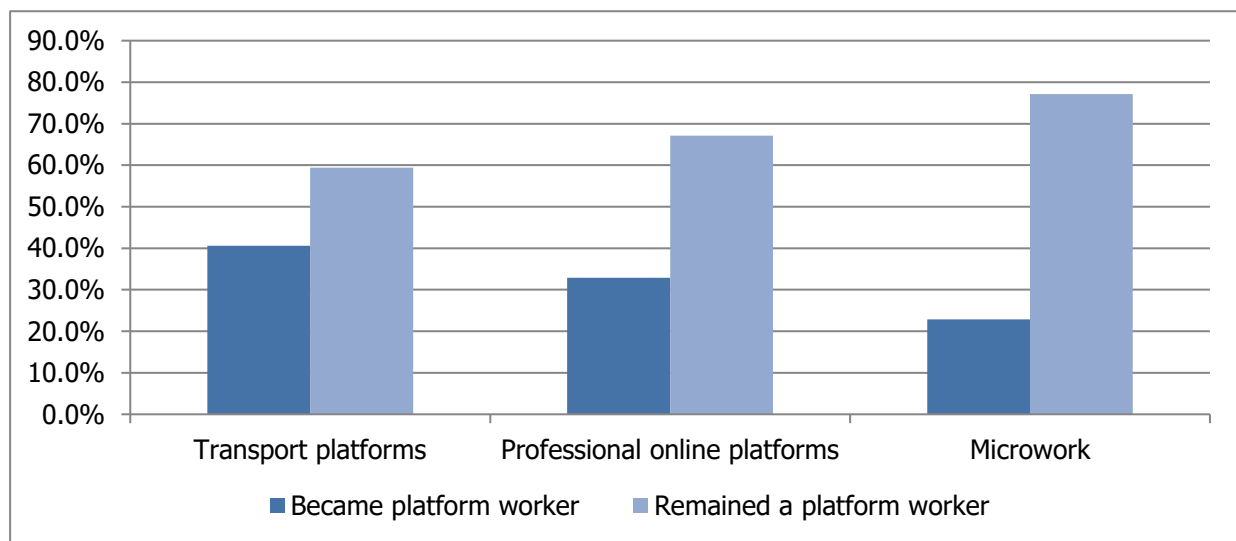
By focusing on those who were platform workers in 2017 and were re-interviewed in 2018 (third row of Table 2, highlighted in blue) we find that 41.4% remained platform workers as opposed to 58.6% who dropped out; the drop-out rates are therefore rather high and suggest that many people may just be trying out platform work, but do not find it enticing enough to do it for long time. The last row in Table 2 shows the number of people who were not platform workers in 2017 but became platform workers in 2018. It would be tempting to compare the proportion of new entries (5.8%) to the proportion of drop-outs (58.6%); however, as already mentioned, the two are not directly comparable, because we do not have enough information on the sub-sample of non platform workers who ended up in COLLEEM II without being re-invited. However, the estimate of new entries we get from the longitudinal sub-sample of COLLEEM II is remarkably similar to the proportion of people who did platform work for less than a year (approx. 5% in COLLEEM I; no info in COLLEEM II), so we can speculate that the figure of 5.8% is not too far from the truth. However, we cannot really say whether the digital labour platform economy is growing or not until we have more reliable estimates of the proportion of new entries, and therefore we can only conclude that the phenomenon is very fluid and that it has a potentially large turnover.

Table 2: Transitions in and out of platform work (COLLEEM I and II)

	Platform worker in 2018		Not platform worker in 2018		Not in Colleem II	Tot
	#	%	#	%	#	#
Platform worker in 2017	340		481		1,879	2,700
Not platform workers in 2017	144		2,358		27,187	29,545
<i>PW in 2017 (longit sample)</i>	340	41.4%	481	58.6%		821
<i>Non PW in 2017 (longit sample)</i>	144	5.8%	2,358	94.2%		2,502

Source: authors' elaborations using data from COLLEEM I and COLLEEM II; only respondents who provide services at least once a month are considered platform workers.

By digging deeper in the longitudinal sub-sample, we can retrieve some information on the type of platforms that are better able to retain workers as opposed to those which are more likely to lose them. Figure 3 shows the proportion of respondents who became or remained platform workers according to the platform they mention as their main one in 2018; it should be stressed the sample sizes are extremely reduced, so any findings are to be considered as purely indicative. Platforms mediating similar types of tasks have been grouped together, wherever possible¹⁴. Figure 3 suggests that transportation platforms have a higher turnover rate than professional online platforms or platforms that mediate microwork.

Figure 3: Which platforms can retain or attract more workers?

Source: authors' elaborations using the longitudinal sub-sample in COLLEEM 2017 and 2018.

¹⁴ For instance, the category "microwork" includes platforms such as Crowdfunder, ClixSense, Figure Eight, Appen, Amazon Mechanical Turk, and so on. The category "online professional platforms" includes mainly Freelancer, as well as UpWork, Fiverr and PeoplePerHour. Uber and Taxify are the only two platforms mediating on-location, transport services, so they are grouped together; however, Uber accounts for 98% of the group.

4 Who are the platform workers and why it matters

Assessing the socio-demographic characteristics of platform workers is of critical importance from a number of perspectives. On the one hand, different demographics may call for different policy responses. On the other hand, the demographic characteristics of the workforce may reveal something about the structure of the platform labour market itself. The term “gig-workers”, often used in the literature to define people who provide services via digital labour platforms, suggests that such platforms are in essence a secondary segment of the labour market, that is a segment with less favourable working characteristics, little job security and high turnover rates. Primary segment jobs tend to be the preserve of ‘prime age’ men, while secondary jobs are often filled by groups whose attachment to paid employment has traditionally been weak, notably , women and young workers. In this section, we summarise the socio-demographic characteristics of platform workers, compare them with offline workers, that is, respondents who are in the workforce but do not provide services via platforms, and see whether these patterns have changed between 2017 and 2018.

The first report drawing on COLLEEM data (Pesole et al, 2018) revealed that the typical European platform worker is a young male, educated to a degree level and more likely to have family commitments than offline workers. With the second wave, we are going to update these findings and provide more robust estimates of the socio-demographic composition of the digital labour platform economy.

The information reported in the following refers to platform workers who provided services via online platforms at least monthly during the last 12 months. The classification of platform workers into marginal, secondary and main follows the definition of the previous section.

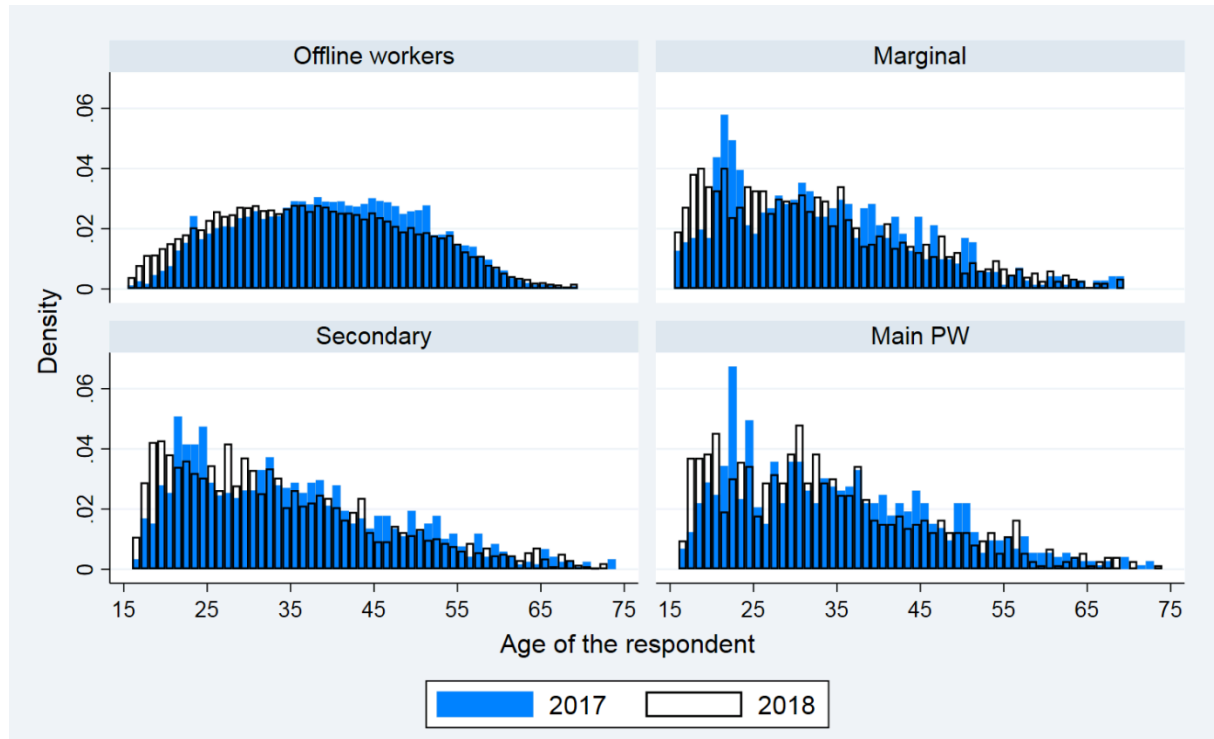
4.1 Socio-demographic profiles

How old are platform workers?

A first look at the data reveals that platform workers are younger than offline workers in 2017 and in 2018; more specifically, the average age of offline workers in COLLEEM is 43.1 in 2017 and 42.6 in 2018, while the average age of platform workers (who provide services at least monthly) is 34.7 in 2017 and 33.9 in 2018. It should be mentioned that the results in 2018 are more in line with findings from other studies, such as the one carried out by the ILO (Berg et al, 2018) which sets the average age of platform workers at 33.2 years.

Figure 4 shows the entire age distribution of the three main categories of platform workers in 2017 and 2018 and allows us to compare it with the age distribution of offline workers in both periods. While the age distribution of offline workers is fairly symmetrical and looks closer to a normal distribution, the (unweighted) age distribution across all three categories of platform workers is skewed to the right; in other words, platform workers’ median age is lower than average age in all cases. This means that among offline workers we have similar proportions of younger (aged 16-25) and older (55-65) workers, which amount to 9.4% and 14.2% respectively, in 2018. By contrast, we find that 29.5% of marginal platform workers, 26.7% of secondary platform workers, and 23.6% of main platform workers are aged 16-25, as opposed to only 5% who are aged 56-65.

Figure 4: Age distribution of platform workers by category, in 2017 and 2018



Source: authors' elaborations using COLLEEM 2017-2018 data. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

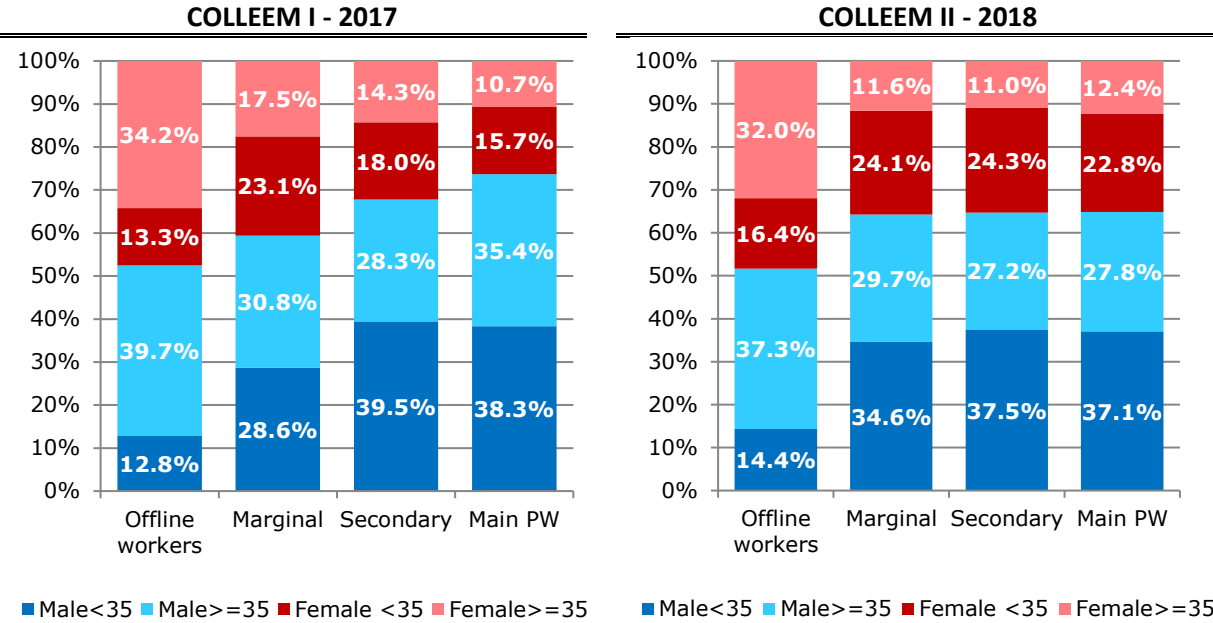
Are platform workers still mostly young males?

The next chart (Figure 5) combines information on age and gender, as in Pesole et al (2018). We created the following four categories: young men (aged <35); young women (aged <35); older men (aged 35 and over); and older women (aged 35 and over).

The first insight that can be drawn from Figure 5 is that platform work is more frequently carried out by men than women both in 2017 and in 2018; however, there are changes in the composition of the platform workforce between the two years. First of all, even though the proportion of both younger men and younger women increases between the two years, the rise is steeper for women than men. In particular, the most significant change is the increase of the proportion of younger women across the three categories of platform workers, but especially among those who do it as a secondary or main activity, by approximately 6.4 and 7.1 percentage points. Unlike in 2017 though, there are no significant differences across the three categories of platform workers for what concerns the presence of younger women. So although platform workers are still mostly young males, the profile of platform workers is becoming less male-dominated.

Pesole et al (2018) found that women were likely to be overrepresented in certain task types, so it is possible that the proportion of young women has increased because the prevalence of platforms catering for relatively more "feminised" tasks, such as translation or interactive services, has also increased. This explanation will be further investigated in the next section.

Figure 5: Composition of the offline and digital labour platform workforce by age and gender combined, in 2017 and 2018



Source: authors' elaborations using COLLEEM 2017-2018 data. Data are weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

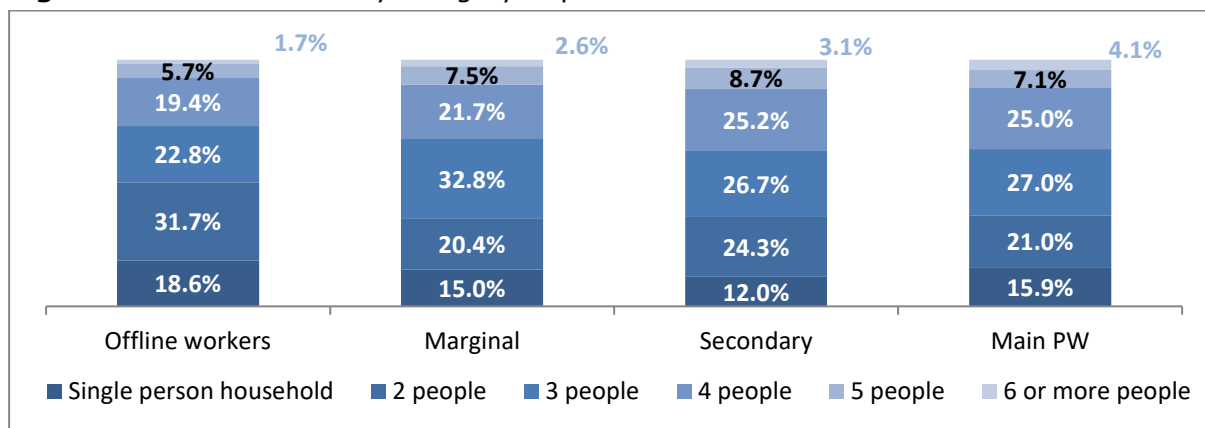
Household composition

The household composition of platform workers is one aspect which is likely to be relevant from a policy perspective, since the conditions of platform work may affect not just the workers themselves, but also their spouses and children. Indeed, the fact that platform workers tend to be younger than offline workers does not necessarily imply that they are free from family commitments. For this reason, we ask whether platform workers have the responsibility of dependent children.

Pesole et al (2018) noticed that, even though the number of dependent children appeared to be significantly higher among platform workers than offline workers, the imprecise wording of the question in the pilot questionnaire made it difficult to automatically infer the relationship between the respondent and the dependent children. The 2017 survey asked: *How many dependent children under the age of 18 are currently living in your household?* For this reason, we could not know if the dependent children mentioned in the answer were brothers or sisters of the respondent, rather than sons or daughters. The authors addressed the issue by combining information on marital status (binary variable indicating whether the respondent is part of a couple or not), age (being above or below 35 years of age) and presence of children in the household (household with or without dependent children) to generate eight different household types, and concluded that, indeed, platform workers were more likely to live in households with dependent children.

Figure 6 summarises household size by category of platform workers and offline workers according to the COLLEEM II survey. The new question brings some evidence to support the findings of Pesole et al (2018), since platform workers seem to live in larger households. In particular, while less than half of the offline workers in the COLLEEM sample live in a household made up by more than two people, the same is true for over two thirds of marginal, secondary or main platform workers.

Figure 6: household size by category of platform workers



Source: authors' elaborations using COLLEEM 2018 data. Data are weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

If respondents answered that two or more people were part of the household, then they were asked a follow up question: *How many of them are under the age of 18 and economically dependent on you?*

Table 3 shows that with the current formulation, the proportion of respondents with dependent children drops slightly for offline workers and secondary platform workers with respect to COLLEEM I (2017); it remains pretty much the same for marginal workers, while it drops dramatically for main platforms workers between 2017 and 2018. Similarly, the average number of children for those who have children seems to decrease, albeit slightly, for most categories, which suggests that the current formulation may be more correct, but that in any case it doesn't make a huge difference.

Table 3: How many children do platform workers have?

	2017		2018	
	Proportion with children	Number of Children	Proportion with children	Number of Children
Offline workers	41.5%	1.60	39.0%	1.62
Marginal	50.7%	1.74	51.5%	1.63
Secondary	62.5%	1.77	58.7%	1.73
Main PW	71.5%	1.91	57.1%	1.80

Source: authors' elaborations using COLLEEM 2017-2018 data. Data are weighted using population weights. We consider platform workers only those who have provided service at least monthly in the last 12 months.

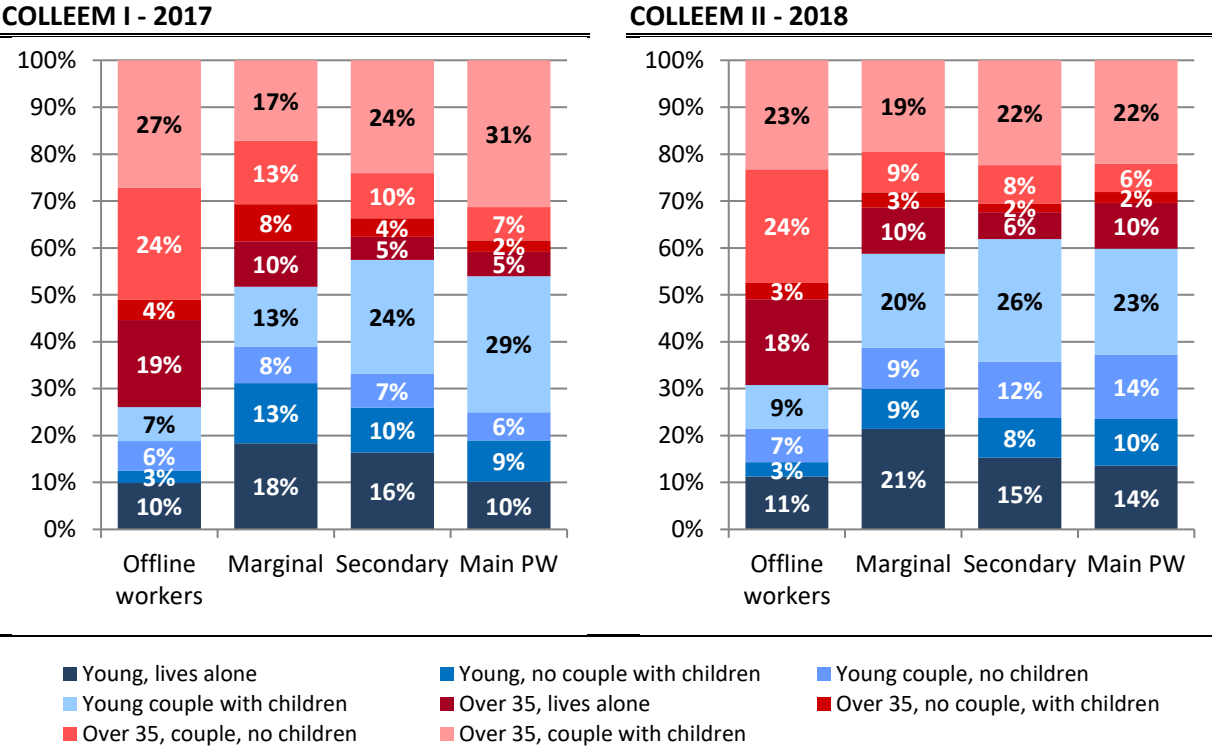
We then proceed to compare household types across categories of platform workers to see whether the family composition has changed between 2017 and 2018. The results are reported in Figure 7.

Overall, the household composition of platform workers (across all categories) looks less similar to that of offline workers in 2018 than in 2017. However, the different categories of platform workers appear more similar to each other in 2018 than in 2017. For example, respondents aged 35 and over, part of a couple and with children in 2017 represent about 27% of the offline workers, 17% of the marginal platform workers, 24% of the secondary platform workers and 31% of the main platform workers, whereas in 2018 they represent between 19% and 23% of all categories. In other cases, differences between the categories of platform workers are relatively small, while those between platform workers and offline workers remain quite large. For example, the proportion of young couples with children is approximately 7% among offline workers in 2017, but ranges between 13% and 29% among platform workers; by contrast, in 2018, it approximates to 9% among offline workers and ranges between 20% and 26% among platform workers.

The proportion of young people living alone is higher in 2018 than in 2017 across all categories of workers, except for those who provide services via online platform as a secondary activity. Similarly, the proportion of young couples without children appears to rise substantially in 2018, and especially among secondary and main platform workers.

Finally, if we look at each variable separately, we see that the proportion of couples (both younger and older) is roughly the same among all types of workers and fairly stable between 2017 and 2018 (drops by less than 1 percentage points in 2018). However, the proportion of households with dependent children drops quite significantly, and especially among platform workers.

Figure 7: Platform workers’ household composition



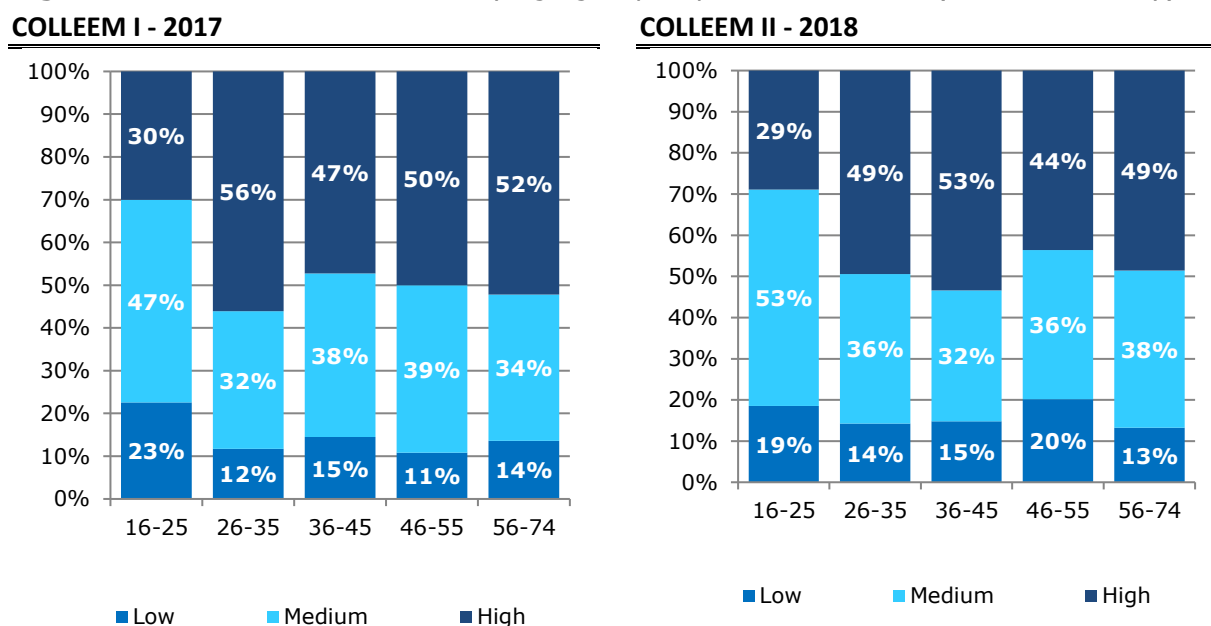
Source: authors’ elaborations using COLLEEM 2017-2018 data. Data are weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

To sum up, the results of the COLLEEM II survey still show that platform workers are more likely to live in households with dependent children, and even to be responsible for those children, than the general population. However, the difference between platform workers and the general population has been significantly reduced compared to the COLLEEM I survey as a result of more precise wording in the questionnaire, which suggests that the 2017 results of COLLEEM probably overestimated this phenomenon. In any case, it is still a very relevant finding for policy that platform workers are more frequently found in households with dependent children, and thus their income and employment conditions may have implications that go beyond the platform workers themselves.

Are platform workers more or less educated than offline workers?

Pesole et al (2018), as well as other studies (Codagnone et al., 2016; Ipeirotis, 2010), found that platform workers are more educated than the general population. This is hardly surprising given that digital platforms are used by frequent internet users, and internet usage tends to be positively correlated with education. By contrast, the presence of so many young platform workers may give us a biased sample in the other direction, since many of them may not have completed their tertiary education yet. Indeed, as shown in Figure 8, the proportion of respondents with high education is substantially lower among the very young platform workers (aged 16-24) both in 2017 and in 2018, since less than a third of the really young are educated to a degree level vs. between 45% and 56% of the other age groups.

Figure 8: Educational attainment by age group of platform workers (at least monthly)

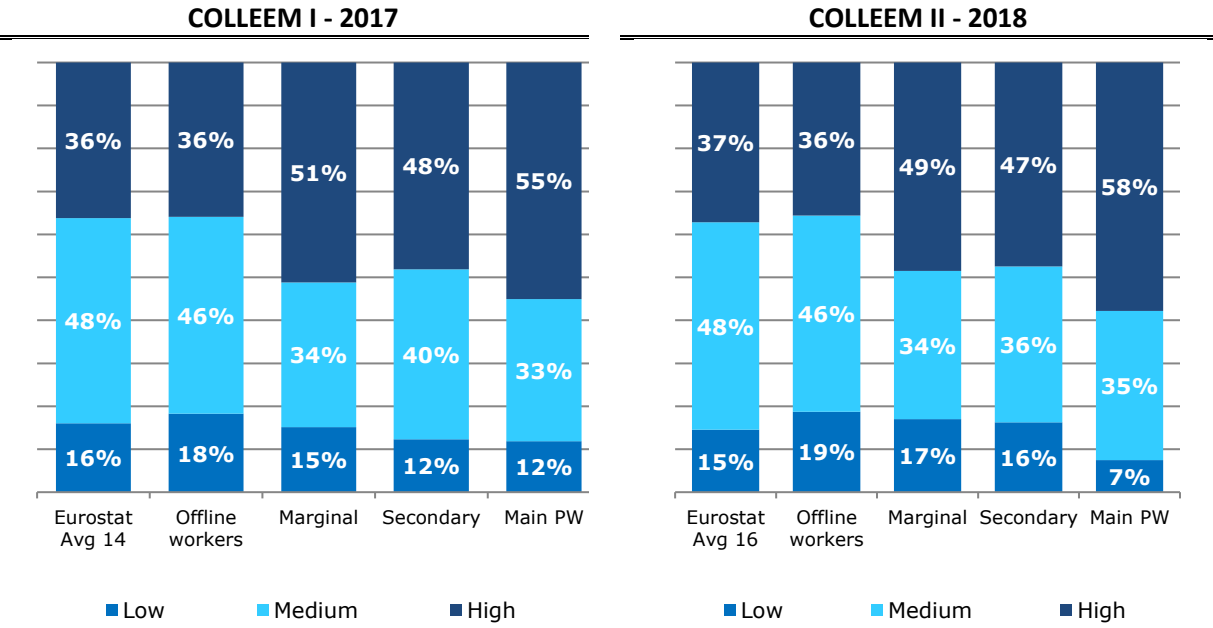


Source: authors' elaborations using COLLEEM 2017 and 2018 data. Low education corresponds to ISCED 0-2; medium education to ISCED 3-4; high education to ISCED 5-8. Data weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

In Figure 9 we compare the educational attainment of platform workers (by separate category) with offline workers in COLLEEM and with a data on workers from the LFS. The idea is to look at Eurostat values to investigate the extent to which the higher level of education of platform workers is due to sampling bias as opposed to a real difference. For the sake of comparison, we limit the sample to people aged 25 to 74 so as to exclude the very young respondents. Eurostat averages are calculated for the 14 countries included in COLLEEM in 2017 and 16 countries in 2018.

The first thing that can be noticed by looking at Figure 9 is that the distribution of education in the COLLEEM sample has not changed significantly between 2017 and 2018, the only exception being a decrease in the proportion of low educated among the main platform workers. The proportion of highly educated people increases with the intensity of platform work, both in 2017 and in 2018, however in 2018 appears to be more pronounced. In addition, the comparison between Eurostat LFS and COLLEEM offline workers reveals that the distribution of education for offline workers is similar in both years.

Figure 9: Educational attainment by category platform workers



Source: authors' elaborations using Eurostat (Employees by sex, age and educational attainment level - lfsq_egaed) and COLLEEM 2017 and 2018 data. Low education corresponds to ISCED 0-2; medium education to ISCED 3-4; high education to ISCED 5-8. Data weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

Migrant status

Whether people are born in the country where they work or abroad has an impact on their labour market outcomes. Generally, migrant workers earn less than their native counterparts, are more likely to be employed in temporary jobs, and enjoy fewer benefits. A recent JRC report conducted by Grubanov-Boskovic and Natale (2017) found robust evidence that foreign born workers across EU15 Member States were more likely to be employed in secondary labour markets, characterised by the least skilled occupations, lowest income and lowest non pecuniary returns, such as high job instability, high involuntary part-time and dissatisfaction with working conditions. An overrepresentation of migrants providing services via digital labour platforms could therefore be used as an indicator of labour market segmentation.

While the first wave of COLLEEM did not include information of country of birth, this question was asked in the second wave. A quick estimate reveals that approximately 7.7% of the total COLLEEM sample consists of people born abroad (either in a different Member State or outside the European Union). The proportion of foreign born respondents is however twice as high among platform workers, with the percentage equal to 16.3% for marginal platform workers, 14.4% for secondary platform workers, and 13.3% for main platform workers.

However, looking at the average for the whole sample does not provide a clear picture of the foreign born workforce across platform workers, since we are likely to be in the presence of massive cross country differences.

Figure 10 shows how heterogeneous the presence of foreign workers across the 16 Member States is, ranging from 0.9% in Romania to 28.3% in Ireland. Clearly, these values do not represent the prevalence of foreign born workers in the real population, since, as we stressed in the first section, COLLEEM strives to be representative of high frequency internet users, and not of the overall population at large. However, it is irrelevant for our purposes, because we are not estimating the prevalence of foreign born workers by country, but simply comparing how they distribute across the different

categories of workers. The last column of Figure 10 reports the (unweighted) number of frequent platform workers just as a warning that some values (e.g. Finland) are less reliable than others because of an extremely reduced sample size.

The proportion of foreign born workers is higher among platform workers than offline workers in all countries, with the exception of Lithuania. Generally, countries with strong labour markets that attract many immigrants tend to have a large proportion of foreigners in the platform workforce. For example, in Ireland the proportion of foreign born platform workers ranges from 36.8% (for those who do it as a secondary activity) to 50.6% (for main platform workers). Countries with weaker labour markets, where workers tend to emigrate like Romania, also report a substantially low presence of foreign born platform workers, ranging from zero to 4.0%. The only country that has a low proportion of foreign born offline workers (5.4%) and a high proportion of foreign-born platform workers (between 25.4% and 37.8%) is Finland. However, as already mentioned, the estimates for platform workers in this country are not too reliable because the sample is really small.

It is also worth mentioning that the extremely high proportion of foreign born offline workers in Ireland (28.3%) depends on a very large number of respondents born in the UK (197 respondents), and is far from representative of the prevalence of migrant workers in Ireland as captured by official statistics.

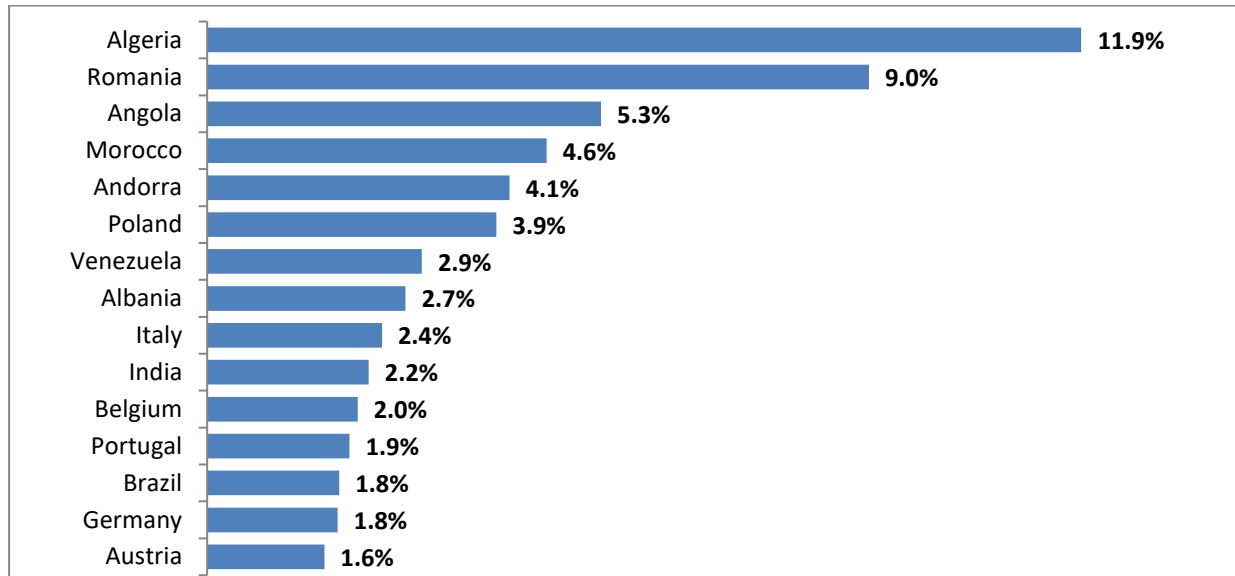
Figure 10: foreign born workers by country and category of platform workers

	Offline workers	Marginal	Secondary	Main PW	Number of platform workers
Ireland	28.3%	39.3%	36.8%	50.6%	322
Portugal	11.2%	13.7%	16.2%	8.8%	382
Spain	10.2%	18.7%	16.0%	13.7%	477
United kingdom	8.9%	21.4%	18.0%	29.2%	297
Sweden	8.6%	24.9%	27.7%	26.8%	210
Netherlands	8.1%	24.1%	16.6%	15.7%	314
Croatia	7.6%	15.0%	14.8%	25.5%	262
Czech Republic	5.4%	17.5%	18.0%	10.7%	143
Germany	4.6%	10.3%	11.2%	6.5%	252
France	4.1%	23.0%	15.1%	5.1%	213
Lithuania	3.1%	0.7%	4.6%	0.7%	213
Slovakia	3.0%	7.0%	4.7%	0.0%	162
Finland	2.9%	25.4%	37.8%	36.7%	99
Italy	2.5%	9.5%	9.0%	8.3%	349
Hungary	2.2%	5.7%	9.5%	0.8%	163
Romania	0.9%	4.0%	0.0%	0.0%	335
Total	6.0%	16.3%	14.4%	13.3%	4,193

Source: authors' elaborations using COLLEEM 2018 data. Data weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

Figure 11 shows the top 15 countries of origin of foreign born platform workers; approximately 1 in 8 foreign born platform workers (11.9%) comes from Algeria (and 40% of them work in France), while 1 in 11 foreign born platform workers comes from Romania (and 66% of them work in the UK).

Figure 11: Country of origin of foreign born platform workers



Source: authors' elaborations using COLLEEM 2018 data. Data weighted using population weights. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

4.2 Summary and Discussion

The socio-demographic profiling of platform workers can provide an understanding of the nature of digital labour platforms as well as insights for policy recommendations.

The empirical analyses carried out in our previous report, Pesole et al (2018), revealed that platform workers were younger, more likely to be males, and highly educated. This section confirms some previous findings, like the fact that platform workers tend to be younger and more educated, but with some relevant changes.

Firstly, while the proportion of younger men has remained somewhat stable or decreased very slightly across all categories of platform workers, the proportion of older men providing services via platform as a main job has dropped by nearly 8 percentage points in 2018 compared with 2017.

Secondly, the proportion of younger women has risen across the three categories of platform workers, but especially among those who do it as a secondary or main activity, by approximately 6.4 and 7.1 percentage points. So while in 2017 women, and especially young women, were more likely to just try platform work, and would therefore be classified as marginal platform workers, in 2018 an increasingly high proportion of young women carry out services via online platform for a significant number of hours or earn significant income from it. We can therefore say that digital labour platforms are becoming a more important source of income for women.

The household composition of platform workers has not changed dramatically between 2017 and 2018; however, in the second wave we found a substantially lower proportion of households with dependent children among platform workers who do it as a main job.

Finally and unsurprisingly, estimates in COLLEEM suggest that a much higher proportion of foreign born workers provide services via digital labour platforms than native workers. The large presence of foreign born platform workers may suggest that work on digital labour platforms is not particularly attractive, since several studies have demonstrated how foreign born workers tend to be employed in lower quality jobs and be overqualified (OECD/EU, 2018). At the same time, the large representation of migrant workers may be an indication of inclusivity.

5 A task-based approach to understand platform work

This section takes a closer look at the type of activities that platform workers do, how much time it takes them to complete their work, and how much they earn from it.

The unit of analysis for the type of activity carried out by platform workers is a task, defined as: the breakdown of a job into atomised units of activity that produces output and can be performed by different people at different times. Task types can be differentiated according to the locus of provision (online or on location); the skill level (professional vs. non-professional) and the scale (large vs. small tasks).

COLLEEM elicits information on ten different types of task, combining locus of provision and skill level. The 10 tasks types defined by the COLLEEM survey are the following:

1. Online clerical and data-entry tasks (e.g. customer services, data entry, transcription, and similar);
2. Online professional services (e.g. accounting, legal, project management and similar)
3. Online creative and multimedia work (e.g. animation, graphic design, photo editing and similar)
4. Online sales and marketing support work (e.g. lead generation, posting ads, social media management, search engine optimisation and similar)
5. Online software development and technology work (e.g. data science, game development, mobile development and similar)
6. Online writing and translation work (e.g. article writing, copywriting, proofreading, translation and similar)
7. Online micro tasks (e.g. object classification, tagging, content review, website feedback and similar)
8. Interactive services (e.g. language teaching, interactive online lessons, interactive consultations and similar)
9. Transportation and delivery services (e.g., driving, food delivery, moving services and similar)
10. On-location services (e.g. housekeeping, beauty services, on-location photography services and similar)

Respondents could select one or more types of tasks; they were also specifically asked to exclude all survey-taking tasks, to reduce bias in the sample. Figure 12 shows the distribution of platform workers who have ever provided services (and monthly) according to the number of task types they performed in 2017 and 2018.

Two findings emerge from Figure 12: first, more than 50% of platform workers carry out more than one type of task. Secondly, the proportion of platform workers who do several tasks is higher among those who provide services at least monthly.

Figure 12: Number of task types performed by platform workers

	Ever Platform work		At least monthly platform work	
	2017	2018	2017	2018
Only 1 task type	39.2%	43.5%	33.4%	38.2%
2	23.5%	23.0%	24.4%	23.2%
3	16.6%	16.6%	18.2%	18.9%
4	9.6%	7.2%	10.9%	8.3%
5	4.6%	4.8%	5.4%	5.6%
6	2.5%	1.8%	2.9%	2.1%
7	1.6%	1.0%	2.0%	1.1%
8	1.1%	0.3%	1.4%	0.4%
9	0.4%	0.2%	0.4%	0.3%
10 task types	0.9%	1.6%	1.1%	1.9%

Source: authors’ elaborations using COLLEEM 2017 and 2018; weighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months.

The information on tasks provided in COLLEEM can be used to classify platform workers into three categories, based on a combination of skill level and locus of provision: professional, non-professional (both online) and on-location (without differentiating between low and high skilled). Figure 13 shows the frequency of each task type chosen by platform workers who provide services at least monthly (all three categories) and for those who do it as main job, and compares estimates in 2017 with 2018.

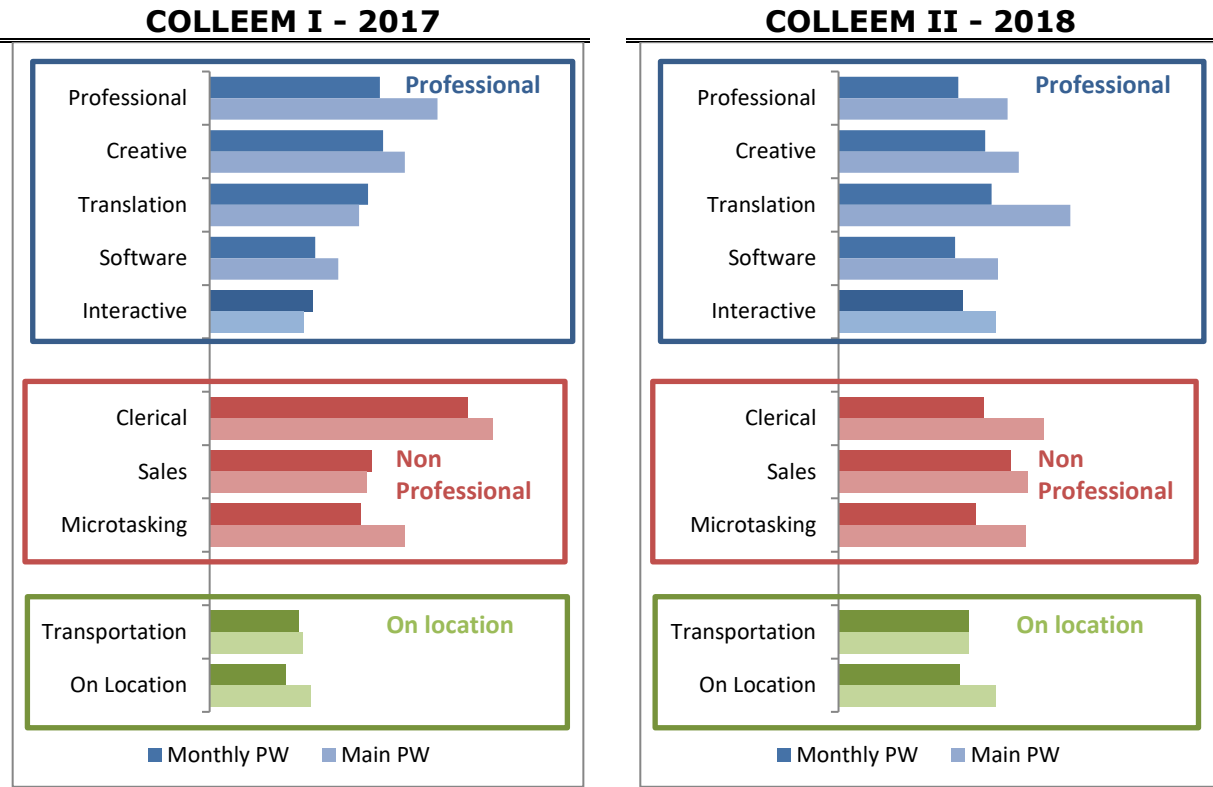
The main difference between 2017 and 2018 is that the proportion of platform workers providing services on location has remarkably increased, while the proportion of platform workers who carry out non-professional tasks has overall decreased, even though there are differences among task types (decrease among platform workers who provide clerical services and an increase among those who do microtasks).

Finally, while overall the proportion of platform workers who provide professional tasks has remained fairly stable, a much higher proportion of main platform workers carry translation tasks in 2018 than in 2017 (40% vs. 26%).

The rise in the proportion of platform workers who carry out translation tasks can also explain the rise in the proportion of women (as sees in the previous section), since, as Pesole et al. (2018) pointed out, translation is the only type of task in which women outweigh men.

On a final note, it should also be highlighted that because COLLEEM is an online survey, platform workers carrying out online tasks may be over-represented with respect to those who carry out on-location services; we should therefore bear in mind this potential source of bias when conducting further analysis.

Figure 13: Which type of work via online platforms takes most of your time?



Source: authors' elaborations using COLLEEM 2017 and 2018; weighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months.

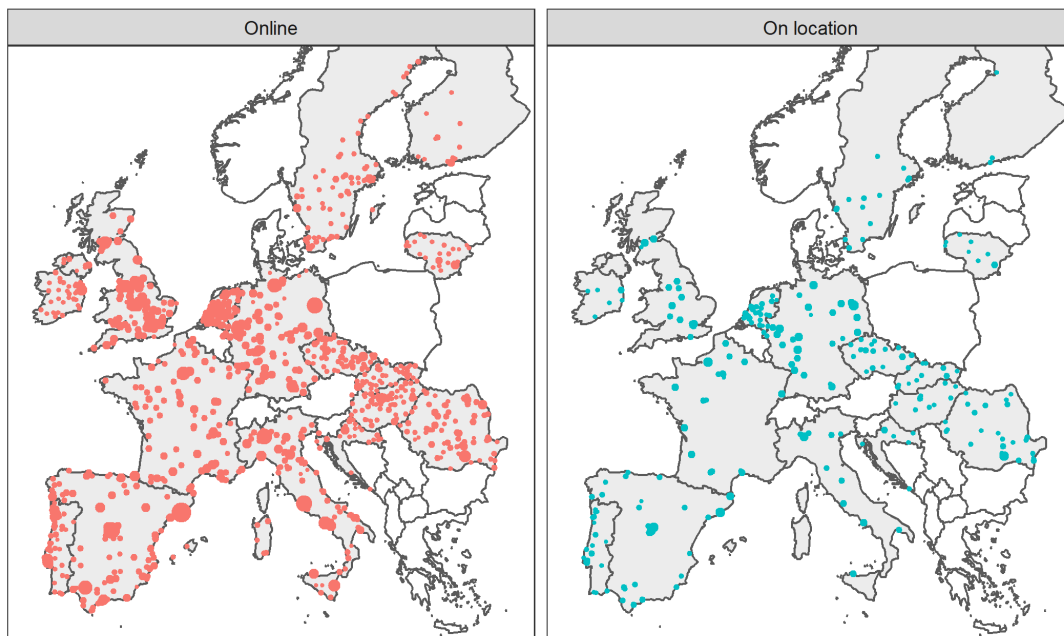
Box 1: An overview of the geography of platform work

When looking at the geographical distribution of platform workers, we should distinguish between workers who provide online, location-independent services (e.g. clerical and data-entry, creative, software development, microtasks, etc.) and those who carry out on-location tasks (e.g. transportation, food delivery, cleaning etc.). The former are, to a large extent, free to work where they wish, as long as there's a good internet connection, given that the relationship with both client and the platform is entirely virtual. Workers in developing countries can access tasks commissioned by clients in richer countries and thus earn higher wages, while workers in developed countries can choose to live in a cheaper area and save money on transport and accommodation. By contrast, platform workers who provide on-location services have to be physically where the client is, and are therefore more likely to be concentrated in fewer areas, where the local demand for their services is big enough.

Data from the 2018 COLLEEM survey shown in the maps below confirm this hypothesis: workers providing services online (map on the left) are generally more spread out throughout the national territory, even though they tend to be clustered in and around big cities. By contrast, workers performing on-location tasks appear to be located only in bigger cities, with the exception of some Eastern countries. To be noted that, even though the data are weighted using population weights, they may not be representative of the entire geographical distribution of platform workers, as we do not adjust for high frequency of internet use and because the sample size is fairly small. However, the information is still useful to provide a snapshot of the current geographic distribution of platform work and suggest topics for further analysis.

Location of platform workers across European cities (Colleem data)

By type of main task performed



Source: Authors' elaboration using data on cities as collected in the COLLEEM survey 2018; larger points indicate a larger number of platform workers in a city.

5.1 Task prototyping

After briefly introducing the types of tasks platform workers carry out, we will try to understand what constitutes a typical task performed via digital labour platforms.

One of the novelties of the second wave of COLLEEM is that it gathers information on specific tasks by asking frequent (at least monthly) platform workers which task took most of their time, how long it usually took to complete such task, how much they earn and which platform they used to carry out the task they are referring to. It must be noted that in many cases there is not a one to one association between a specific digital labour platform and a type of task. For instance, a person who provides services via "Freelancer" may be carrying out online clerical and data-entry tasks, as well as online professional or creative services. However, in the specific case of transportation and delivery services, a one to one association can occur, as those platforms (i.e. Uber, Deliveroo, Taxify, Lyft, etc) generally tend to provide only one type of service.

In Table 4 we report the proportion of platform workers who named one of the 7 most commonly mentioned platforms in COLLEEM (excluding Amazon, Google and Facebook) according to their main task. While some of the figures make sense, others are a bit puzzling. For example, while it is true that Uber is mentioned most frequently by platform workers who provide transportation services, it is also very frequently mentioned by platform workers who carry out other types of tasks. While we do not have a definite explanation, we may speculate that respondents providing different services just mention the most renowned platform, regardless of their main task; the same reasoning applies to Deliveroo. In addition, it should be mentioned that the careers section on the Deliveroo website advertises also "traditional" jobs which could be carried out online, via teleworking; it is therefore possible that COLLEEM captures some of these people who are employed by Deliveroo and work from home, and wrongly classifies them as platform workers because they answer positively to the screening questions. Once again, this points out the importance of finding a shared and understandable definition of platform work.

Table 4: Platform mentioned – by main task

	Uber	Freelancer	People PerHour	Deliveroo	Fiverr	Clickworker	Upwork
Clerical	18.9%	16.4%	2.4%	5.6%	0.3%	1.7%	1.0%
Professional	15.2%	14.5%	2.2%	6.8%	0.0%	0.7%	0.2%
Creative	19.3%	18.1%	1.7%	5.9%	1.3%	0.0%	0.1%
Sales	22.1%	13.2%	0.4%	5.8%	0.6%	1.2%	0.6%
Software	18.2%	21.1%	0.1%	5.0%	0.6%	1.2%	1.2%
Translation	16.9%	19.2%	1.6%	1.6%	3.2%	2.3%	2.4%
Microtasking	15.4%	11.5%	1.5%	5.2%	0.1%	14.6%	0.4%
Interactive	20.2%	18.1%	0.5%	4.4%	0.6%	0.0%	0.0%
Transportation	26.9%	3.9%	0.0%	11.4%	0.0%	0.0%	0.0%
On Location	19.9%	14.5%	0.5%	8.1%	0.0%	0.0%	0.0%

Source: authors' elaborations using COLLEEM 2018; weighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months.

The next step is to analyse the time spent and the amount earned by task-types and platforms. However, given the discrepancy shown in Table 4, we decided to select a consistent sub-sample by eliminating those observations which showed an indisputable incoherence between reported task and platform mentioned. In other words, we restrict Uber and Deliveroo only to platform workers who provide transportation and on-location services. Furthermore, we trim the upper tail of the distribution of earnings using as cut-off point for outliers three times the value of the median of reported payment, by main-task and platform. Table 5 reports the median values for selected platforms and for simplicity we do not report the breakdown by type of task. For those offering

homogenous types of tasks the reported median values do not vary much, whereas in platform such as Freelancer or PeoplePerHour the variation among task-type could be substantial. For example, the lowest median value in Freelancer is €5 per hour for micro-task jobs and €22 per hour for interactive services. There are no other official sources we could use to compare our findings with; however the Fair Crowd Work website collects information on the median payment in some selected platforms. The only two platforms that overlap are Clickworker and Upwork for which they report respectively a median value of €2.92 and €12.91.

The last column reports the total number of observations by platform.

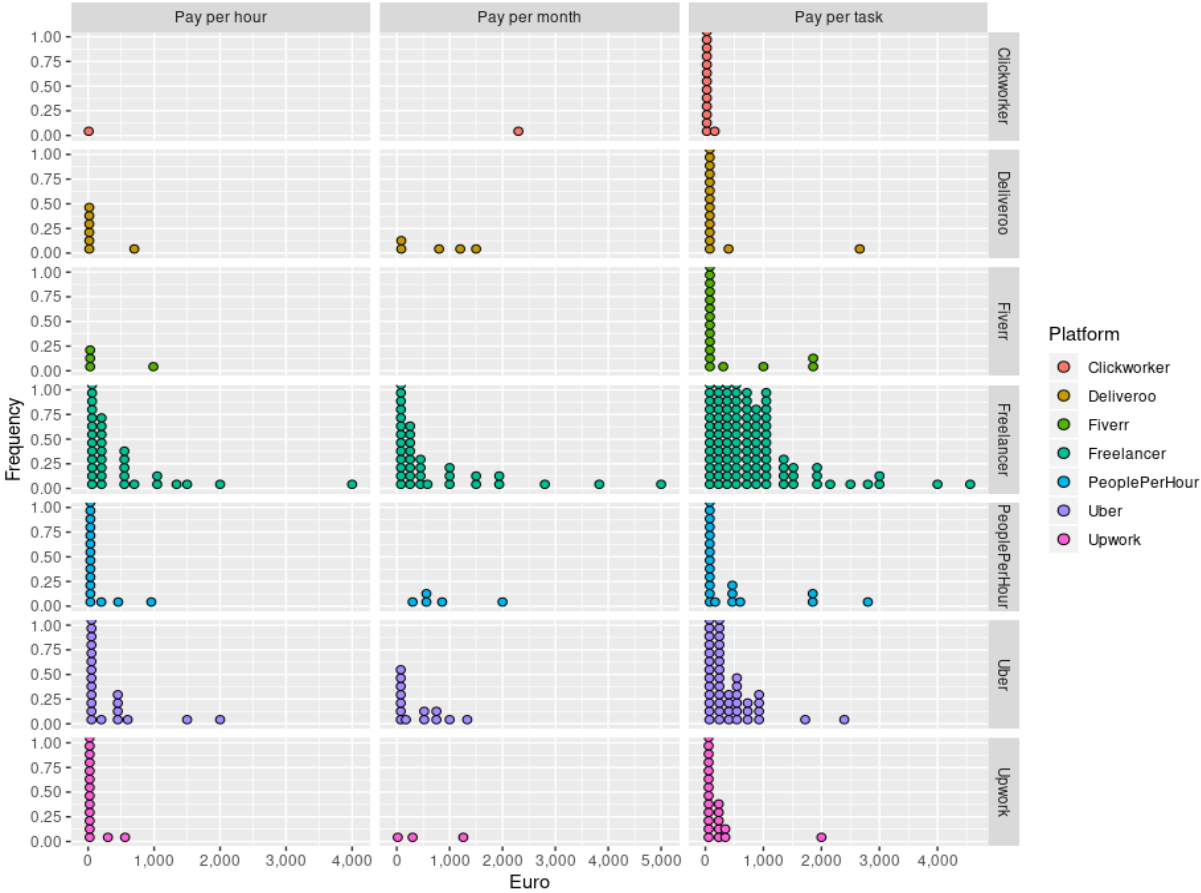
Table 5: Median payment by platforms (€)

Platforms	Pay per hour median	Pay per task median	Pay per month median	Total Observation
Clickworker		2.3		63
Deliveroo	11.5	30	460	27
Fiverr		16		42
Freelancer	11	67	200	793
PeoplePerHour	25	64	560	62
Uber	8.5	67	150	181
Upwork	8	41		67

Source: authors' elaborations using COLLEEM 2018; unweighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months. Information is omitted for cells with less than 5 observations. Total number of observations 3,926.

Figure 14 shows the dispersion in the upper tail of the payment distribution for the different base of payments and the seven top platforms. As shown in Figure 14, respondents report payment above €1,000, which most likely represent either a mistake or the unwillingness to disclose such information. The presence of such outliers justifies their exclusion from our sample. Following standard practices, the dataset has been trimmed in the measure of three times the median value of payment by tasks and platform. In addition, Figure 14 shows that the majority of platform workers get paid based on tasks performed, independently from the type of task performed as confirmed by Figure 15.

Figure 14: Platform workers distribution by payment and selected platforms

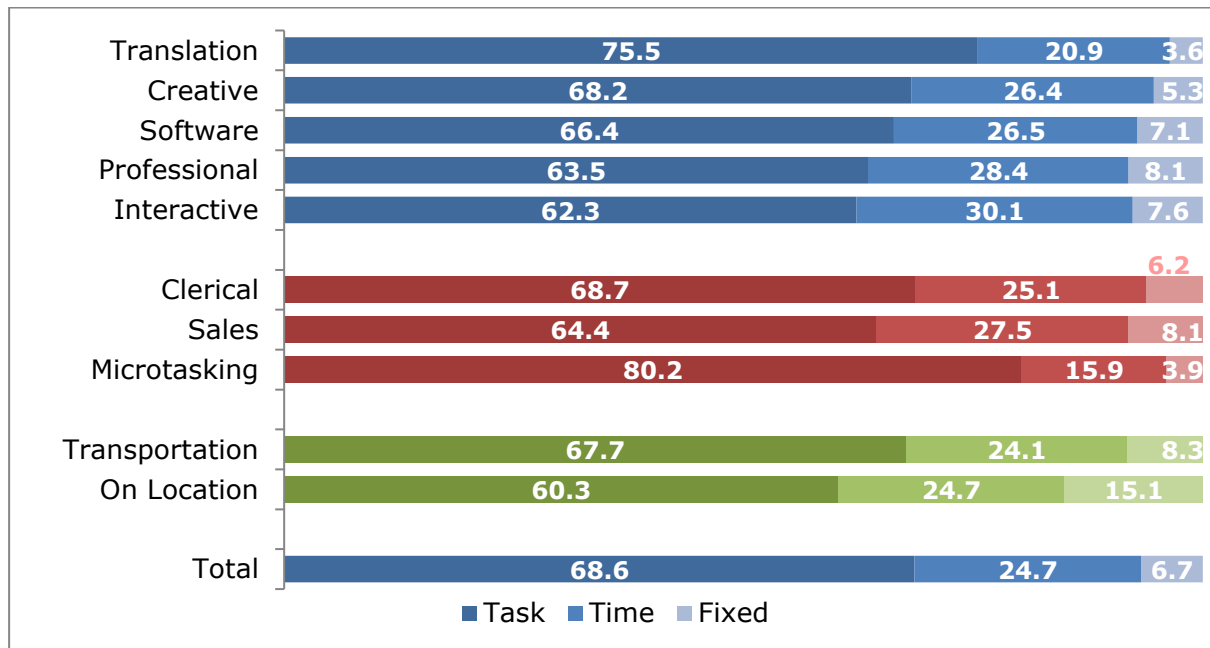


The next section will combine statistical evidence with more illustrative information drawn from the COLLEEM dataset adjusted for inconsistency in the replies and reporting of extreme values (as previously described). Even though we should be careful in generalising these findings, COLLEEM still represents the first attempt to provide reliable data on the average time spent and money earned by service provided and platform in Europe.

5.2 How much do workers earn on digital labour platforms?

Given the vast heterogeneity across platforms, before eliciting information on actual earnings, the COLLEEM survey asks respondents on what basis they get paid: 1) Based on tasks performed; 2) Based on time worked; and 3) Based on fixed daily/weekly/monthly remuneration. Approximately 69% of platform workers get paid based on tasks performed; 25% get paid based on time worked; and 6.7% are paid a fixed daily/weekly or monthly remuneration (total in Figure 15).

Figure 15: On what basis platform workers get paid (%)



Source: authors' elaborations using COLLEEM 2018; unweighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months.

The vast majority of platform workers declare to get paid either by task or time worked; this implies that many of them must undertake a substantial share of unpaid work (searching online, waiting time for assignment, etc.) in order to get paid work.

To better understand the length of both unpaid and paid activities on platforms, we asked platform workers to report not only the number of hours spent providing services via the platform, but also the duration of the last task they performed. Ideally, respondents should have understood that “task” means “a unit of work activity that produces output” and not a scheduled period of work or the time spent logged onto their app; however, this may not be the case.

Table 6 reports the average time spent to carry out the last task by type of task (Panel A) and the proportion of respondents in each category (Panel B). At first glance, the estimates look fairly sensible, in that the highest proportion of respondents who complete their task in minutes is among those who do online micro tasks (59%) and transportation (48%), while the lowest is among those who do creative and multimedia work (20%) and writing and translation work (23%). However, a surprisingly high proportion of platform workers who carry out microtasks or transportation tasks also said that it took them hours to complete their last task, which casts doubts as to how the respondents interpret the concept of “task”. If by transportation task we mean a single ride, then it is unlikely that it would have lasted an hour or more, let alone 6 hours, which is the average duration of a transportation task for respondents who selected “hours” as an option. Similarly, while it is plausible that on average platform workers who perform software development and technology tasks took 11 days to complete their last task, it is quite surprising to find that on average it could take 13 days to complete a single microtask.

When these respondents say that it took them days to carry out their last task, were they thinking of a project? Were they referring to the number of days spent working on the platform without taking a day off? We can only speculate that the inconsistent answers are related to different interpretations of what constitutes a single task by respondents. Furthermore, there is a possibility respondents associate the concept of task to that of payment, so if they got paid weekly for the services they offered, they might associate the length of the task to the length of time worked in the reference week.

A possible way to interpret the results is to assume that the time expressed in minutes refers to a single task; while the time expressed in hours or days can refer both to a single, large task (such as a project), and to the respondents' scheduled work for the day or week. Unfortunately, because there doesn't seem to be a strict interpretation as to what constitutes a task, we cannot really provide statistical evidence or average time taken to complete a type of task nor can we distinguish between the paid and unpaid time spent on platforms. Nevertheless, the information we have per hourly payment could give us an illustration of average hourly payment per type of task.

Table 6: Average time to carry out the last task, by task type

	Panel A:			Panel B:		
	Time to carry out the task			% resp. per option		
	minutes	hours	days	Minutes	hours	days
Clerical	33	6	12	31%	61%	8%
Professional	38	10	7	25%	62%	12%
Creative	40	7	5	20%	66%	14%
Sales	29	6	6	38%	56%	6%
Software	29	9	11	23%	61%	16%
Translation	35	7	8	23%	69%	8%
Microtasking	23	6	13	59%	38%	3%
Interactive	27	7	7	26%	67%	7%
Transportation	25	6	12	48%	46%	7%
On Location	28	9	23	27%	61%	12%
<i>Total</i>	<i>31</i>	<i>7</i>	<i>11</i>	<i>32%</i>	<i>59%</i>	<i>9%</i>

Source: authors' elaborations using COLLEEM 2018; unweighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months.

COLLEEM respondents were asked to report their payment per hour whenever they declared to get paid on the basis of time worked on the platform; if they claimed to get paid on a task basis, they were asked to report the last payment received.

Table 7 summarises the information on payment per hour (column 1) and payment per task (column 2); In theory, combining the information on the duration of the last task and the payment received for it would have given us the opportunity to derive the average hourly payment, even for those workers who did not explicitly report the payment per hour. But, as explained above, respondents interpret the concept of task differently, including its duration. We can however compare the reported hourly payment and the derived hourly payment to see whether there are significant differences.

In column 3 of Table 7 we select those platform workers who declared to be paid by task and report the duration of their last task in hours. The implicit assumption is that respondents interpreted the question relating to the last task as "continuous time-spell logged on the app". Therefore, dividing the payment by task by the number of hours we derived their hourly payment (column 4). The differences emerging by comparing columns (1) and (4) are not extremely remarkable, particularly for homogenous tasks such as transport and software development. By contrast, the somewhat larger differences in reported and derived hourly payment for tasks such as microtasks and translation tasks could be due to the presence of potential economy of scale of a larger project; that is, the longer the hours worked, the lower the payment per hour. The lack of other official sources of information on platform payment by type of task does not allow for a comparison of our results.

Finally, in column (5) we present a conservative estimate of hourly payment by type of task as the average of the two sources of information in the COLLEEM survey.

Needless to say, given the restricted number of observations these estimates should be treated with caution.

Table 7: Average hourly payment by task-type

	Pay per hour	Pay per task*	Number of hours	Derived pay per hour	Adjusted pay per hour
	(1) <i>mean</i>	(2) <i>mean</i>	(3)	(4)	(5) <i>mean</i>
Clerical	16.0	60.6	5.6	10.9	13.4
Professional	15.1	123.8	9.4	13.1	14.1
Creative	15.7	90.2	6.8	13.2	14.5
Sales	16.6	57.4	5.1	11.3	13.9
Software	24.2	162.3	7.4	21.9	23.1
Translation	11.3	38.4	5.8	6.6	9.0
Microtasking	8.8	20.4	4.5	4.5	6.6
Interactive	13.3	134.6	7.1	18.9	16.1
Transportation	8.9	48.3	5.7	8.5	8.7
On Location	17.4	62.2	9.2	6.7	12.1
<i>Obs</i>	693	1,137			

*Source: authors' elaborations using COLLEEM 2018; unweighted data. The sample includes only platform workers who have provided services at least once a month in the last 12 months. *pay per task only includes platform workers who reported the duration of the last task in hours.*

5.3 Summary and Discussion

The second wave of COLLEEM gathers information on specific task by asking frequent (at least monthly) platform workers which task took most of their time, how long it usually took to complete such task, how much they earn and which platform they used to carry out the task they are referring to.

About 40% of platform workers provide more than one type of task and even if, in 2018, the proportion of platform workers providing services on location has remarkably increased, the sample still seems to be biased in favour of professional and non-professional platform workers.

Preliminary estimates based on a restricted and consistent sample show that the majority of platform workers get paid by task and not time worked, that is we are not able to quantify the amount of unpaid work platform workers should undertake in order to get paid work.

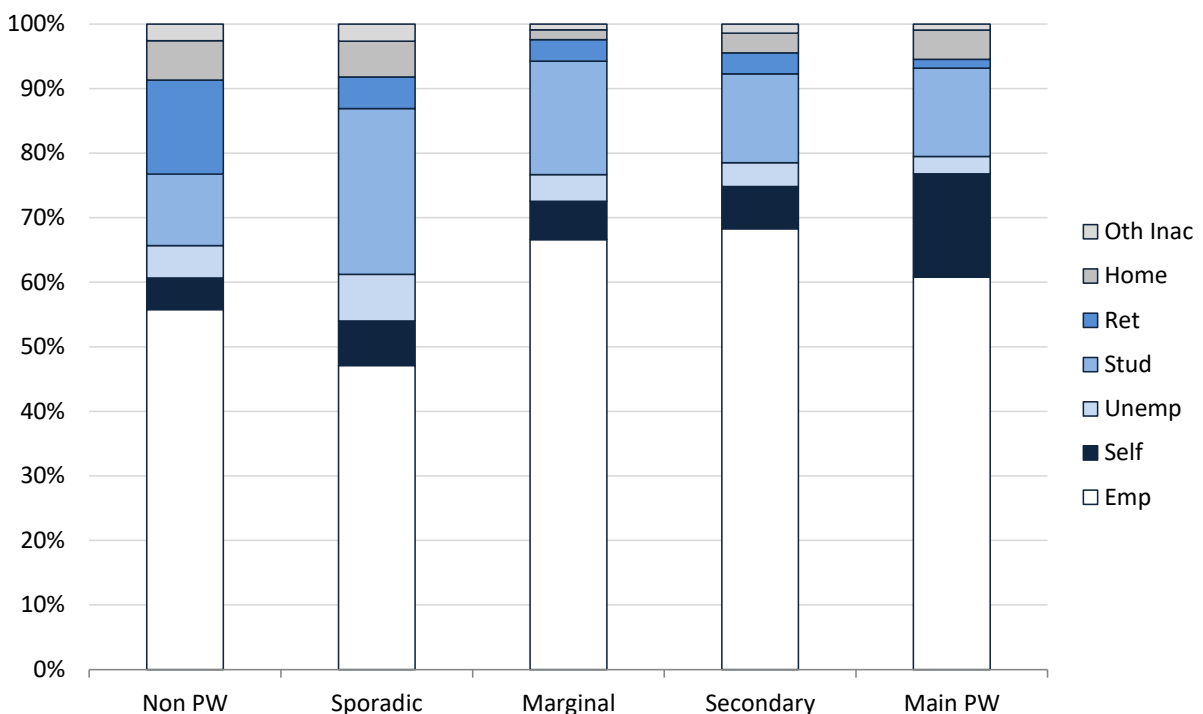
Independently from the type of service provided, platform workers spend on average 30 minutes to carry out a single task. When the duration of the task is expressed either in hours (7 hours on average) or days (11 days on average), it is less clear if they are referring to a single larger task (i.e. a project) or to the time spent logged onto the app. Payment per hour ranges between approximately €7 for microtasking and €23 for software development.

6 Work and employment conditions in digital labour platforms

The sporadic, marginal and often even *hidden* nature of platform work makes it very difficult to assess its work and employment conditions. But in many ways, this is a crucial issue for policy. We know that typically platform work is not protected by employment regulation - certainly not at the same level as regular work - and anecdotal or journalistic evidence suggest that platform workers may be disadvantaged in terms of work and employment conditions compared to similar workers in the regular (non-platform) economy. It is this sort of concerns that underlie much of the debate about platform workers and the need for specific policy in this area. What can COLLEEM tell us in this respect?

In the first wave of COLLEEM (Pesole et al. 2018), the questions about working conditions referred to all the work carried out via platforms by the respondent. This led to problematic results, because platform workers often carry out work of different types and through different platforms, and thus respondents may have had trouble understanding what the questions referred to, resulting in answers characterised by unexpectedly low variability, and poor quality information. In the second wave of COLLEEM, the questions on working conditions were explicitly linked to the main type of platform work carried out by the respondent. As we shall see in this section, this resulted in answers which are more consistent and vary more by type of task performed, but they remain somewhat problematic. The degree of variability in answers is still lower than expected, and the results suggest some bias in the sample towards online professional types of platform work, which tend to have better conditions than those of on-location personal services such as delivery or transport.

Figure 16: Self-defined economic status of different categories of platform workers, COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data

In any case, the first important point for the assessment of the employment and working conditions of platform workers is to identify their economic status, which is remarkably elusive and which will be analysed in detail in section 7. In COLLEEM II, the respondents were asked to report their economic status before identifying them as platform workers or not, and their responses by category of platform work are shown in Figure 16. Except in the case of *sporadic*, all types of platform workers have higher rates of employment than the general population according to their self-defined status (which also reflects the fact that platform workers tend to be younger than the non-platform worker population). But it is important to note that what increases most significantly for platform workers is the prevalence of self-employment (which goes from less than 5% in the non-platform working population to more than 16%), with only a marginal increase in the share of dependent employment. All the other economic categories decline with platform work, with the exception of "student", which increases in particular for sporadic and marginal platform work (suggesting that full-time students often use platform work as a secondary source of income).

It may seem surprising that even for main platform workers (those that claim to work more than 20 hours a week on platforms or earn more than 50% of their income on platforms) the dominant economic status is dependent employment. Although there is a heated debate and even judicial disputes on whether platform workers should be considered employees or self-employed (for a brief overview of the court rulings, see *Box 2*), in principle the dominant status of platform workers nowadays is independent contractor, a sub-category or self-employment. However, the COLLEEM survey also asked whether on top of the main reported economic status, respondents have some secondary self-employed activity: and as can be seen Figure 17, whereas for non-platform workers this share is as low as 10%, for main platform workers it goes above 60%. Even though the category of main platform workers is by definition composed by people for which platform work takes up more than 20 hours a week or generates more than half of their personal income, the COLLEEM results suggest that most of them also have regular employment.

Figure 17: Self-employment as secondary activity by economic status and categories of platform workers, COLLEEM II (2018)

	Non PW	Sporadic	Marginal	Secondary	Main PW	Total
Emp	10%	32%	42%	50%	61%	15%
Unemp	6%	46%	32%	38%	46%	10%
Stud	2%	17%	15%	21%	18%	5%
Ret	1%	1%	10%	3%	5%	1%
Home	7%	50%	46%	45%	75%	10%
Oth Inac	6%	24%	45%	50%	76%	9%

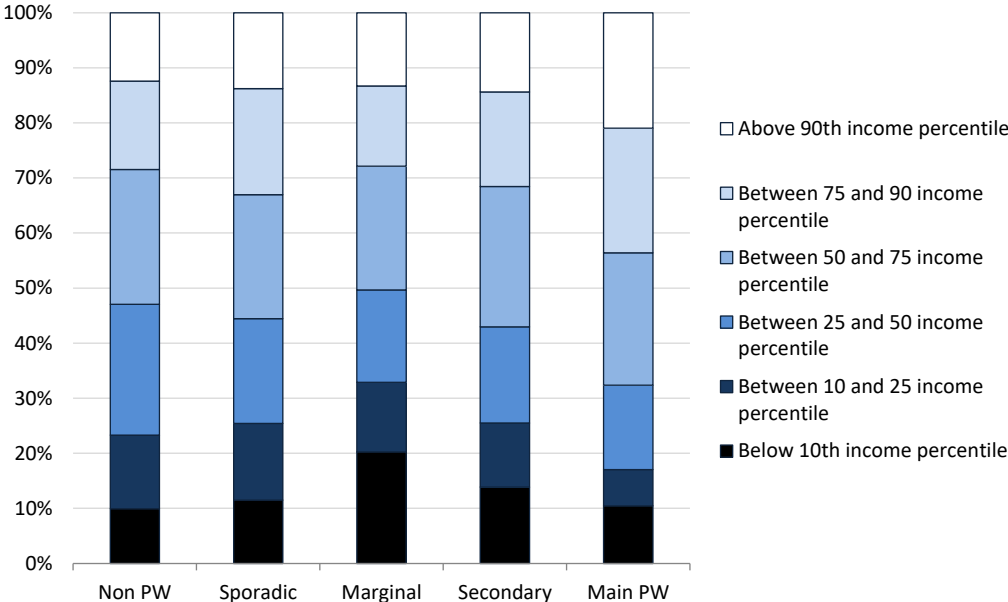
Source: authors' elaborations using COLLEEM 2018 data.

Therefore, according to the COLLEEM survey, most platform workers have (other) regular jobs and use digital labour platforms as a secondary source of income. This finding, which is confirmed by other studies (Huws et al 2017; Eurofound, 2018) is important for the assessment of the employment and working conditions of platform work. On the one hand, platform work can be an additional burden to regular work, and it may reflect the need of some workers to complement their regular source of income even if that means extending their total working time; on the other hand, the fact that platform work is in most cases a secondary activity makes its conditions less consequential for the well-being of the workers, and thus removes some urgency from the debate.

However, the characteristics of the COLLEEM survey, such as the fact that the respondents are contacted and the information is collected entirely online, make it likely that some of the most disadvantaged forms of platform work (such as delivery or other low-skilled in-person services) are underrepresented. These more disadvantaged forms of platform work are often taken up by groups of the population that find it difficult to participate in the regular labour market (such as migrants). But those disadvantaged groups are generally more difficult to capture in surveys, and the COLLEEM survey is no exception in this respect.

As often mentioned elsewhere in the report, the COLLEEM surveys remain exploratory surveys that provide a preliminary and necessarily incomplete picture. In particular, the categories of online provision of services such as clerical, translation or professional services are likely to be well represented, but the categories of on-location service provision are probably underrepresented. Since the former tend to have better working conditions, the overall picture is probably upwards biased to some extent. Figure 18 shows the distribution of platform workers by percentiles of overall income. In the COLLEEM II sample, the category of main platform workers is clearly overrepresented in the highest income percentiles (above 90th and 75th in particular), which seems plausible for the online provision of professional services but not so much for the on-location provision of personal services such as delivery and cleaning. Only for the category of marginal platform workers (those that do platform work with some regularity, but without involving a significant amount of income or working hours) can we observe an overrepresentation in the lowest income percentiles. A possible explanation would be that the additional income generated by the work over platforms could put the category of main platform workers in the upper percentiles, but that seems highly implausible (the additional income may move some workers up the income distribution, but not sufficiently to double the percentage in the top decile). Most likely, the overrepresentation of main platform workers at the top of the income distribution reflects an overrepresentation of the kind of professionals which are more likely to use professional platform service provision as a secondary source of income.

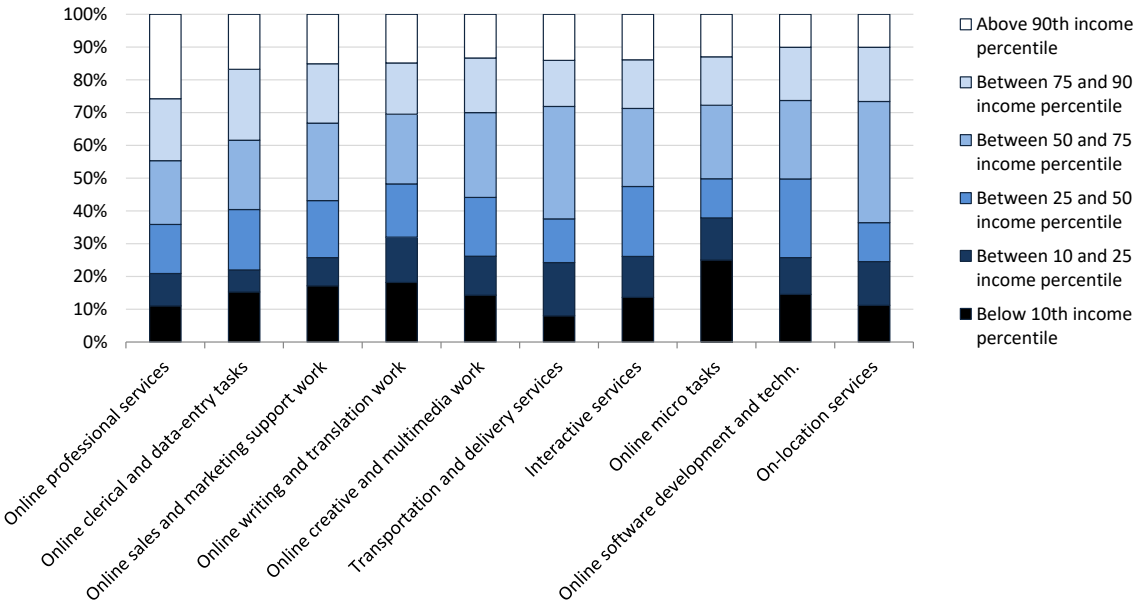
Figure 18: Distribution of platform workers by percentiles of overall personal income (including all sources), COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data.

COLLEEM II allows us to differentiate platform workers by the main type of task performed, which can be used to distinguish the different profiles previously mentioned. It is indeed the case that the most “professional” types of platform work (online professional and clerical services, sales and writing) tend to be overrepresented at the higher income percentiles, whereas transportation, on-location and interactive services (as well as micro-tasks) tend to be overrepresented at the lower percentiles. But as discussed in section 5 of this report, the overall share of platform workers classified within the categories of “transport”, “interactive” or “on-location” services is below 20% in the COLLEEM sample. The lack of reliable alternative estimates of platform work by type of services provided makes it impossible to say with absolute certainty, but anecdotal and qualitative evidence on the growing phenomenon of on-location services via platforms (what is sometimes called “gig work”), as well as simple logic (the difficulties of capturing those profiles in an online survey such as COLLEEM), suggest that the COLLEEM survey may fail to capture adequately the more disadvantaged categories of platform work.

Figure 19: Distribution of platform workers by main task and percentiles of overall personal income (including all sources), COLLEEM II (2018)

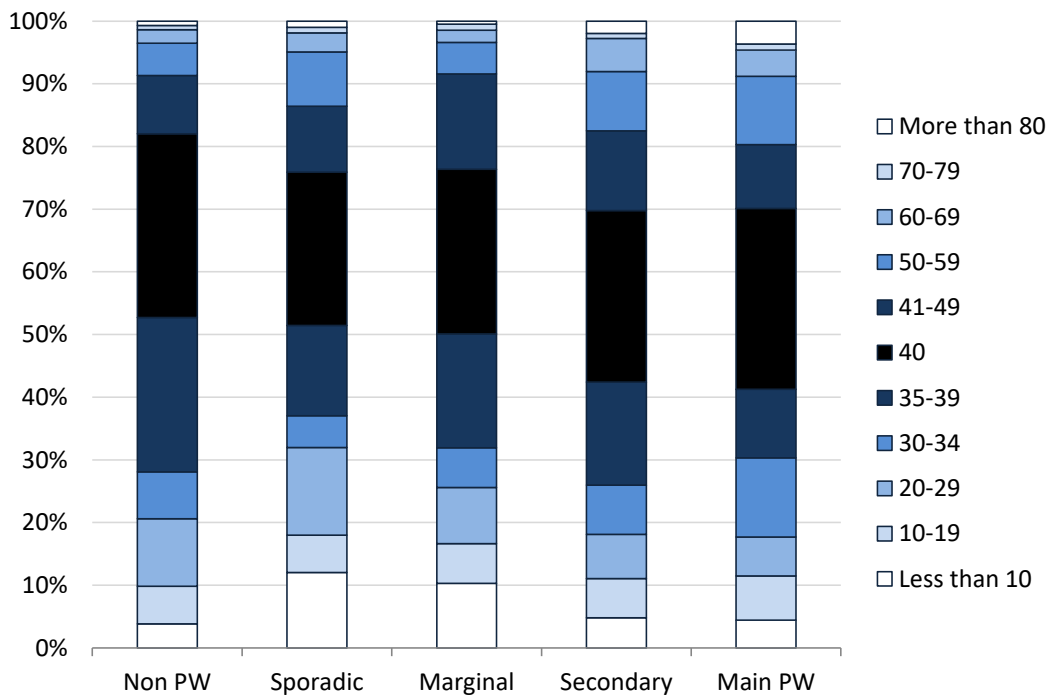


Source: authors’ elaborations using COLLEEM 2018 data.

COLLEEM also included questions on the total working hours of respondents, differentiating hours in regular work and hours providing services via platforms. The total hours of work (in platforms or not) of the different categories of platform worker are shown in figure 5. As could be expected from the fact that platform work is in most cases a secondary activity to regular work, platform workers tend to have longer schedules than regular workers, especially for the most intense categories of platform work.

In fact, Figure 20 does suggest a possible problem in terms of working conditions of platform workers: the incidence of very long work schedules (more than 60 hours a week) is more than double for main platform workers than for regular workers. Equally, in the categories of sporadic and marginal platform workers (where, as previously mentioned, there are many students) the overall incidence of very short schedules (less than 20 hours a week) is also above the average compared to non-platform workers.

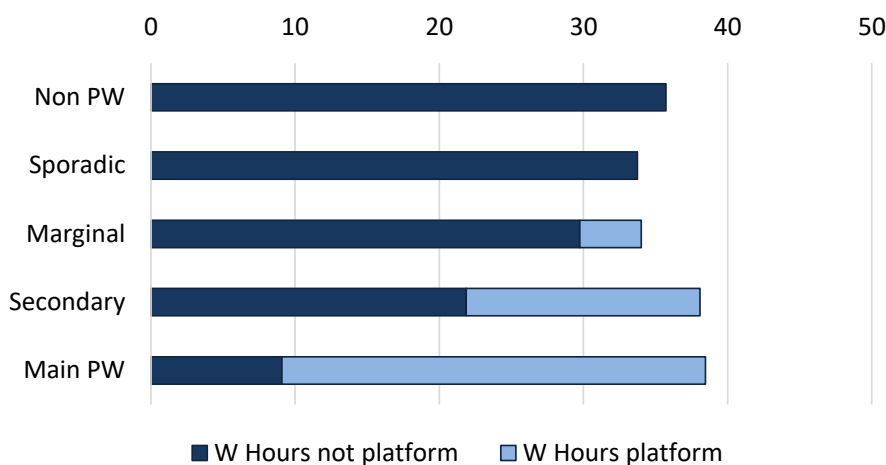
Figure 20: Total working hours (platform and regular work) by categories of platform workers, COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data.

Figure 21 presents an estimation of the total hours of work (inside and outside platforms) of the different categories of platform workers. On average, the hours of work of secondary and main platform workers are higher than those of the non-platform worker group, but the composition is obviously different. Whereas in the marginal category, platform workers spend approximately 4 hours per week in platforms as opposed to 30 hours on average in regular work. The number goes up to 16 per week for secondary platform workers (against 22 hours in regular work) and 29 hours for main platform workers (against approximately 10 hours in regular work). In other words, although platform work tends to add hours to the working time in regular work in all categories, it is also the case that the number of hours in regular work tends to decline with the intensity of platform work.

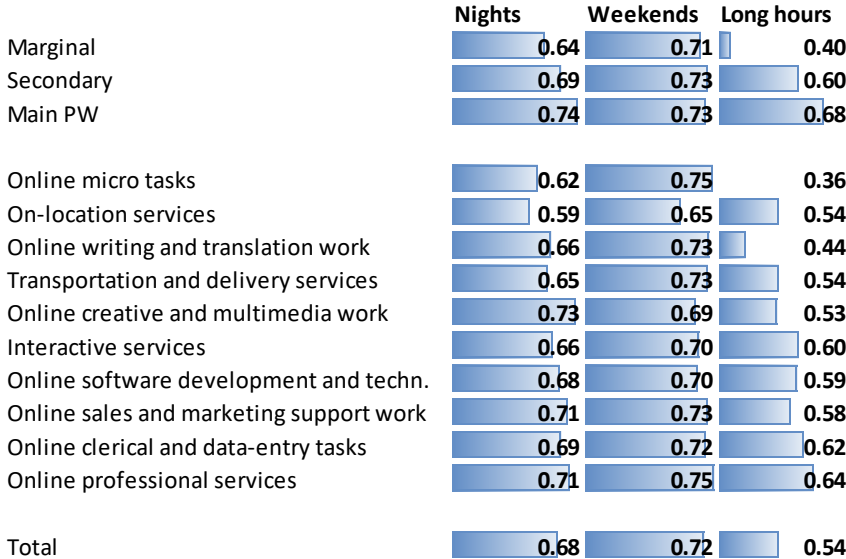
Figure 21: Working hours in regular work and platforms by categories of platform workers, COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data.

Platform workers tend to have not only longer overall work schedules (including regular and platform work), but also more frequently atypical or unsocial working times, as can be seen in Figure 22. This figure refers only to working time in platforms, and it confirms that for main and secondary platform workers, this type of work is often conducive to long schedules; by main type of task performed, it is in online professional and clerical services where the incidence of long hours is highest. But platform work also tends to take place outside the typical (9 to 5) working hours: more than two thirds of all platform workers (with few differences by type of platform work or task performed) provide their services via platforms on weekends, and nearly the same amount provide their services at night (with some more differentiation by type of worker and main task).

Figure 22: Indicators of work in unsocial hours by categories of platform workers and main type of task, COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data.

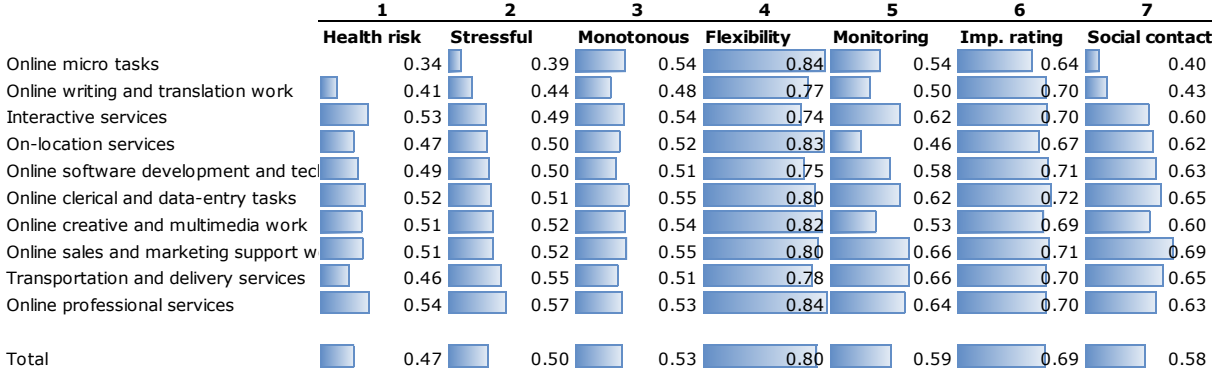
The COLLEEM survey also includes a few simple indicators of working conditions specifically addressed at platform workers (but not to regular workers, so it is not possible to compare). In Figure 23, we can see a succinct presentation of these indicators, which have been rescaled to a 0/1 range and should be understood as a broad assessment of the relative intensity of each specific condition.¹⁵ The first one refers to whether the worker considers that the work performed via platforms puts her health at risk: whereas the overall indicator is low, the differences by type of task are surprising. The values are highest for professional and interactive services, and lowest for online micro tasks, with transportation, delivery and on-location services around medium levels.

As we have repeatedly argued, this may reflect that the sample of on-location and delivery workers in COLLEEM is problematic; but also, it suggests that the respondents mostly refer to psycho-social health risks, which is often the case in the type of professional work that gets higher values in COLLEEM. The second column confirms this interpretation, because the indicator of stress associated with platform work is highest for online professional services and lowest for micro-tasks and translation work.

¹⁵ In particular, respondents have to state how much they agreed or disagreed on a scale from 1 (strongly agree) to 4 (strongly disagree) that: a) this work puts your health or safety at risk (health risk); b) this work is monotonous (monotonous); c) you experience stress in this work (stressful). Respondents were also given a Yes; No; don't know/cannot answer option for the following questions: d) Are you able to choose or change the speed or pace of this work (flexibility); A "don't know/cannot answer option was always included. Another series of questions was asked with a specific mention of the "main platform" that they used to provide services. Respondents were given a Yes; No; don't know/cannot answer option for the following two questions: e) Does the platform constantly monitor your performance while you are working? (monitoring) f) Are you ever in contact with other workers providing services through this platform? (social contact) Whereas they had to choose on a scale from 1 (very important) to 4 (not important at all): g) How important do you think the rating system is for getting work on this platform? (Imp. Ratings).

Indeed, the report carried out by EU-OSHA (2017) argued that platform work can induce stress through continuous evaluation and rating of performance, competitive mechanisms for allocating work, uncertain payment and blurring of work–life boundaries.

Figure 23: Indicators for different working conditions by main task of platform workers, COLLEEM II (2018)



Source: authors' elaborations using COLLEEM 2018 data.

In terms of the nature of platform work, columns 3 and 4 of Figure 23 show that in general platform workers consider their work highly flexible but monotonous, with few differences by main type of task performed. Despite being flexible, most platform workers are under constant monitoring according to their responses in COLLEEM: the indicator ranges from around or below 0.5 for on-location services and translation work to more than 0.66 for transportation and delivery and online sales and marketing support. The importance of the ratings for getting work in the platforms is very high in all types of platform work, with few differences. Finally, there is some variation in the amount of contact with other workers across the different types of platform worker: whereas micro-task and writing/translation tasks are in most cases performed without any contact with other workers, in most other categories (especially online sales, clerical tasks and transportation) there is at least some contact with co-workers in most cases.

In summary, the results from the second COLLEEM survey provide some hints about the conditions of work and employment of platform workers in Europe, but should be taken with caution because of a possible underrepresentation of the most disadvantaged categories of platform workers, and because of the general difficulty of measuring the conditions of work and employment in digital labour platforms in any case. Most platform workers in the COLLEEM survey have regular jobs and only use platforms as a secondary source of income, which implies possible long schedules and additional strain for platform workers but also makes the conditions of their work in platforms less consequential for their welfare. However, the possible underrepresentation of disadvantaged minorities which according to qualitative or anecdotal evidence are increasingly recurring to platform work may conceal a larger proportion of platform work as a main form of employment. Those using more frequently digital labour platforms tend to be overrepresented in the highest income deciles, a result that again may reflect a bias towards professional and high-skilled forms of work in the COLLEEM sample. But what seems clear is that platform work often involves longer schedules, and it is more likely to be done at night and during week-ends, in periods where they may conflict with family and personal life. And whereas platform work is very flexible according to the assessment of the workers themselves, for half the workers it involves a certain degree of stress, it is often perceived as monotonous and it is in most cases subject to constant monitoring by the platform.

7 The labour market status of platform workers

The classification of platform workers' employment status, the demarcation of the market in which a platform operates, and the nature of the services provided are some of the complex challenges that the digital platforms economy poses to the legal system. The 2016 European Commission Communication on the Collaborative Economy highlights how digital labour platforms create "new employment opportunities, generating revenues beyond traditional linear employment relationships, and it enables people to work according to flexible arrangements." (EC Communication 2016, page 11). However, the Communication recognises that digital labour platforms may also create uncertainty as to applicable rights and the level of social protection. According to some authors, for instance, Berins Collier et al. (2017) digital labour platforms are not actually disrupting employment trends, but rather they represent a continuation and acceleration of long-standing trends towards contingent or "non-standard" work, such as temp-agency workers, direct-hire temps, day labourers, contract workers, and independent contractors. The policy challenge is to find a balance between protecting platform workers from exploitation and fostering the innovative potential of the platform economy, by limiting the imposition of onerous regulation.

When discussing the employment status of platform workers, we are faced with some big questions: are digital labour platforms merely intermediaries who connect service users (clients) with service providers (workers) or should they be treated as employers? What are the platform's legal and fiscal responsibilities when it comes to the people who provide services (as well as the service users)? Who should be in charge of paying taxes and social security?

The problem is that there is no straightforward legal definition of what it means to be employed or self-employed; the classification depends on circumstances (Eurofound, 2009; Verhulp, 2017). The European Commission provides some criteria to decide whether people who provide some types of services on digital platforms are to be considered workers, as opposed to mere users of the platform,¹⁶ but does not settle the dispute of employee vs. self-employed.

To complicate matters even further is the fact that employment legislation varies substantially across countries. A report on self-employed workers carried out by Eurofound in 2009 summarises the key differences between employees and self-employed across countries: for instance, in Sweden, the distinction rests on Swedish tax law; in Spain, it is down to social security law; in Germany the legal framework has been modified in 1999 so that the demarcation of employment vs. self-employment is fairly open and based on a case-by-case approach, similarly to the UK or Ireland, where there is no statutory definition of dependent employment, or self-employment. The UK also distinguishes between a core category of employees and the more peripheral "worker" category among those who are classified as employed (as opposed to self-employed). While both categories enjoy access to basic rights, such as a minimum wage, only employees are covered by statutory sick pay, paternity and paternity pay, unfair dismissal protection and redundancy payments (Adams et al, 2018). The employment legislation in some countries also includes an intermediate category between employee and self-employed, for instance, the *lavoratore parasubordinato* (quasi-subordinate worker) in Italy, or the *Trabajador Autonomo Economicamente Dependiente* (Economically dependent autonomous worker) in Spain.

¹⁶ First of all, it depends on the nature of work, in that the provider of the underlying service must pursue an activity of economic value that is effective and genuine; secondly, the presence of a remuneration, to distinguish it from volunteer work; finally, the existence of a subordination link: the service provider must act under the direction of the collaborative platform, the latter determining the choice of the activity, remuneration and working conditions.

Generally, employees work under a contract of employment, whereas self-employed people operate under a contract for services (Verhulp, 2017). To a large extent, what distinguishes employees from self-employed is not the type of work they do, but the way in which tasks are accomplished and structured (Cherry and Aloisi, 2017).

In particular, employees differ from the self-employed because they have limited autonomy, since the employer organizes, directs and controls the activity of the worker. For example, the employer has the prerogative to choose what the employee must do, decides the place and time of work, authorises absences and holidays and pays a regular salary. Furthermore, the employer monitors the employee's activity and sanctions any shortcomings. To compensate this lack of autonomy, employees enjoy legal protection and a series of rights and benefits. In particular, the employee cannot receive a salary which is lower than the statutory minimum wage, or that prescribed by collective agreements. An employee cannot work beyond the maximum number of hours allowed by law, and cannot be easily dismissed. In addition to this, a substantial part of the employee's social security contributions are paid by the employer.

By contrast, self-employed workers have in principle the autonomy to carry out the work as they see fit: the place, time and way in which the work is performed are decided by the worker; the sole obligation of the self-employed is to achieve the result agreed with the client. Generally, self-employed workers do not benefit from the same protection and rights as employees, and are responsible for paying their taxes and social security contributions. The key characteristics distinguishing employees from self-employed can be found in Table 8. By combining the type of information provided in Table 8 with information on the type and nature of tasks coordinated by digital labour platforms, it should be possible to classify platform workers as employee or self-employed. However, it has been argued that these traditional elements may be ill suited to capture the features of platform work and should be adapted or even eliminated as criteria to determine the status of platform workers. After a review of the legal literature, Todolí-Signes (2017) argues for the need of a new special labour legislation specifically suited for platform workers; similarly, Prassl and Risak (2017) propose a shift of the focus from the employee vs. self-employed angle to the idea of questioning which party, if any, could be identified as employers in a multilateral contract relationship, like the ones of digital labour platforms.

In their terms and conditions, digital labour platforms typically refer to platform workers as independent contractors, a sub-category of the self-employed. The platform itself would thus not be an employer, but simply an intermediary between a client who needs a certain task to be executed and a worker who executes that task.

The key elements described in Table 8 suggest that platform workers share several characteristics with the self-employed: they are not paid a wage or salary; they do not have an implicit or explicit contract for a continuing work relationship; and they do not have a predictable work schedule or predictable earnings when working. However, these are arguably not the elements we should be looking at when trying to classify the workers, but rather we should take a close look at what workers do: their tasks. One of the main characteristics of self-employment is that the worker acts autonomously and has a high level of discretion regarding how the task is performed. This is hardly the case for platform workers who carry out micro-tasks, as well as some transportation and on-location tasks. For instance, the much touted freedom that taxi drivers or food riders have to choose their hours or reject requests has been often rebutted as purely formal, given that hours are often assigned on the basis of a, sometimes opaque rating system, and the rejection of several tasks can lead to deactivation. Many scholars are therefore arguing for a reconsideration of platform workers' employment status.

When analysing the labour market status of platform workers, De Stefano (2016) mentions "disguised employment relationships," or sham self-employment and illustrates how some platform workers share similar characteristics with casual work (an extreme form of non-standard work). Along the same lines, Aloisi (2016) questions whether "workers in the gig-economy [should] continue to be classified as independent

contractors”, in “web-based work environments devoid of the worker protections of even the most precarious working-class jobs”. Giorgiantonio and Rizzica (2018) claim that on-location platform workers (such as Foodora riders) who provide services as a main job and are economically dependent on it should be classified as employees.

Table 8: Key differences between employee and self-employed

	Employee	Self-employed
Type of contract	Explicit (written or oral) or implicit employment contracts that give them a basic remuneration that is not directly dependent upon the revenue of the unit for which they work.	Self-employed (including employers) work on their own account or with partners, and the remuneration is directly dependent upon the profits derived from the goods and services produced
Method of payment	Regular wage by the day, week or month	Invoice the client for the work done
Mutuality of obligation	The employer is obliged to offer work, and the employee is obliged to do as the employer requests	Free to accept or turn down work; the client/engager is under no obligation to offer any work, or further work
Control over how work is done	Work is supervised	Self-employed has discretion over how the work is done, as long as standards are met
Risk of loss	Employees are not exposed to financial risk	Self-employed are exposed to financial risk
Place of work	Employees work at the place required by the employer	Self-employed decide the place, although some jobs might have to be carried out 'on site'
Time of work	Employees have set times and work agreed hours	Self-employed are (mostly) free to decide when they do the work
Type of work	Employees can be moved by their employer from job to job as needed	Self-employed only do the particular job which they agreed to do, until further agreement
Ownership of main assets	Employees do not own the main asset	Self-employed generally own the main asset/business and are exposed to financial risk; own the tools of the trade;
Opportunity to profit	May only profit under a bonus or incentive scheme. However, may benefit from tips, or payments from third parties.	Can profit if work is performed efficiently, or from re-charging and making a profit on materials.
Number of jobs	The worker has one job at a time, or a small number of regular jobs	Self-employed work for a lot of people and juggles their requests
Worker's role	Employees have a recognised role at the place where he or she works	Self-employed are not a permanent part of the client's business
Who does the work?	Employees do the work themselves	Self-employed may send someone else to do the work for them, or arrange for a job to be done and supervise others.

Source: authors' elaboration of data from Low Income tax reform Group, ILO (ICSE-93 and Eurofound 2009. Information to compile the table is drawn from the following sources: Low Income tax reform Group (<https://www.litrq.org.uk/tax-guides/self-employment/am-i-employed-self-employed-both-or-neither#toc-i-work-in-the-gig-economy-what-is-my-position->); the official UK government website (<https://www.gov.uk/employment-status/selfemployed-contractor>); and Eurofound (<https://www.eurofound.europa.eu/observatories/eurwork/industrial-relations-dictionary/self-employed-person>)

The proliferation of individual lawsuits and grassroots organisations asking for a more accurate classification of platform work supports the claim that not all platform workers should be classified as self-employed (See Box 2 for a brief overview).

Box 2: A quick overview of recent court rulings on digital labour platforms

The first documented lawsuit against a digital labour platform dates back to 2013 and took place in the US: Otey vs. Crowdfunder. In that case, the court identified violations of the Fair Labor Standards Act (FLSA) and ruled in favour of a minimum wage for Crowdfunder workers who performed microtasks via Amazon Mechanical Turk.

For what concerns Europe, Eurofound provides a list of lawsuits against digital labour platforms in its repository on the platform economy¹⁷. The documented lawsuits took place in the UK, France, Italy and the Netherlands. They all involved transportation or on-location digital labour platforms – Uber, Deliveroo, Foodora, and Citysprint.

The lack of a unified legal framework has often led to contradictory court rulings. For instance, in the lawsuit of Aaslam Y. & Farrar J. against Uber, the UK employment tribunal ruled in favour of the plaintiffs by agreeing that they were not self-employed, but "workers" within the definition in s.230(3)(b) of the Employment Rights Act 1996, and were thus entitled to the minimum wage and holiday pay. However, the civil action lawsuit brought against Uber in Pennsylvania was ruled in favour of the defendant on the basis that the plaintiffs had not met their burden to show that they were employees of the platform.

In France, a ruling of the Conseil des Prud'hommes de Paris in December 2016 has qualified the relation between a private-hire driver (VTC, *voiture de transport avec chauffeur*) and a transportation digital labour platform (Le Cab) as an employment contract, in light of the exclusivity clause preventing the driver from using other platforms or serving a customer on his own. In addition, the French social security institution has demanded contributions by Uber, therefore qualifying its "partner-drivers" as employees and not self-employed (De Stefano and Aloisi, 2018).

In the UK grassroots organisations, such the "Independent Workers Union of Great Britain", have started promoting lawsuits to overturn the improper classification of platform workers and achieving remarkable victories, such as the right to a minimum wage and holiday pay. However, they did not manage to win the right to collective bargaining for on-location platform works who delivered food, as the High Court ruled in favour of the food delivery service app Deliveroo.

In Italy, six platform workers providing on-location services (food delivery) through the platform Foodora filed an employment claim before the Turin Employment Tribunal at the end of 2017 asking that their contracts be reclassified as employment contracts, and therefore their dismissal ruled as unfair. On 11 April 2018 the tribunal ruled in favour of Foodora claiming that "riders" were completely free to accept or refuse any meal delivery requests from the platform, and therefore fit within the category of freelance, not subordinate employment. By contrast, on January 2019, an Amsterdam court ruled against Deliveroo declaring that its couriers were in fact employees and not self-employed.

Between June 2018 and July 2019 several Spanish high courts have decreed that Glovo and Deliveroo riders are employees.

While some court rulings have been published, none is yet final and may still be appealed.

¹⁷ https://www.eurofound.europa.eu/data/platform-economy/records?combine&field_pleco_platforms_tid=All&field_pleco_platform_sectors_tid=All&field_pleco_countries_tid=All&field_pleco_work_typologies_tid=All&field_pleco_keywords_tid%5B0%5D=24563&field_pleco_record_types_tid=24615&field_pleco_organisations_tid=All&field_pleco_languages_tid=All&field_pleco_methodologies_tid=All&field_pleco_availability_tid=All .

Harris and Krueger (2015) propose to create an intermediary, third category of workers: the Independent Worker, specifically suited for (microtasking) platform workers; Cherry and Aloisi (2017) propose the 'dependent contractor' already existing in Canadian Law proposed and also mentioned in the review on modern employment practices carried out for the British Government by Taylor et al. (2017).

However, it should be noted that the creation of a new worker category may not be sufficient to solve issues related to workers protection and can lead to arbitrage and further exploitation (as in the case of Italy with the quasi-subordinate workers). Indeed, employment law scholars, such as Adams, Freedman and Prassl (2018) argue against the creation of a new category of workers and for an extension of basic floor rights to all working individuals regardless of their status. Similarly, the position adopted by the European Parliament's is that fair working conditions and adequate legal and social protection should be ensured for all workers in the platform economy, regardless of their status.

7.1 Platform workers' self-reported economic status in the COLLEEM survey

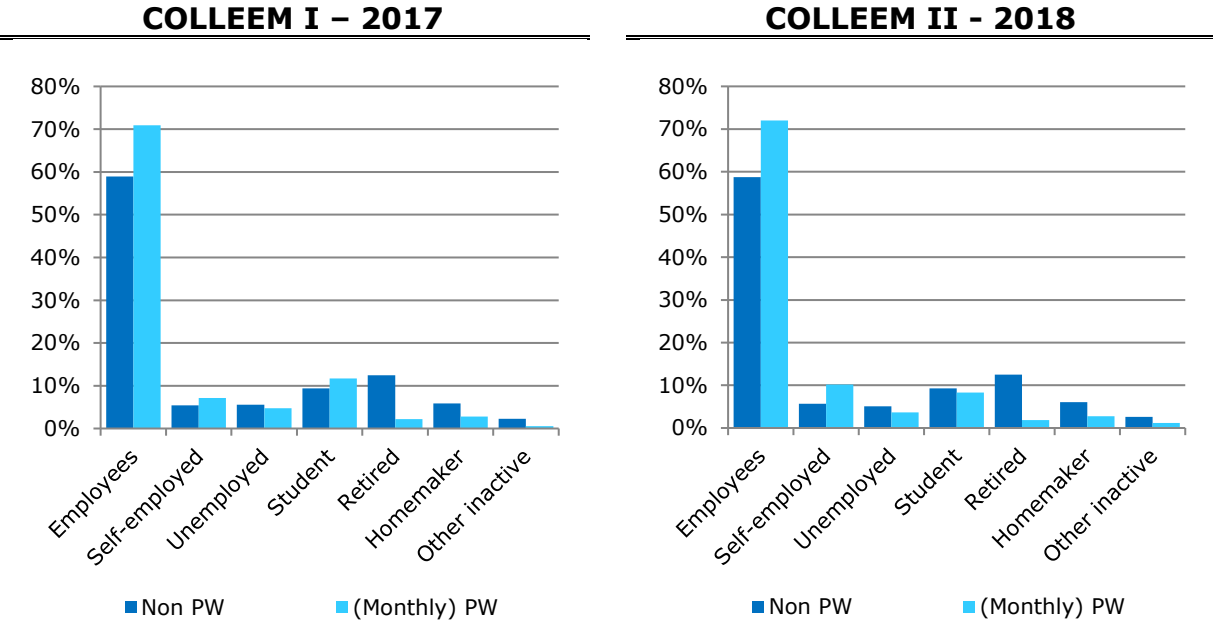
Aside from conceptual definitions of how platform workers' employment status should be defined, it is useful to take a look at how the workers perceive themselves. The COLLEEM survey asked respondents to define their main employment status, from their own perspective.¹⁸ Figure 24 compares the self-reported economic status of all respondents with platform workers, in 2017 and 2018.

The self-reported economic status for the "non platform workers" is practically the same in 2017 and 2018, with nearly 60% claiming to be an employee, roughly 5/6% self-employed or unemployed, 9% students, 12/13% and 6% homemakers; similarly, the self-reported economic status among platform workers does not appear to vary substantially between the two years, with the exception of two categories: the proportion of those primarily self-employed, which rises from 7% in 2017 to 10% in 2018, and the proportion of students which drops from 12% in 2017 to 8% in 2018.

We investigate further this change in the proportion of self-employed in the next section, but exploiting another piece of information provided in the COLLEEM survey, whether if respondents carry out some activity as self-employed beside their main activity.

¹⁸ It should be mentioned that some replies were contradictory; for instance 240 people identified as students and then claimed that their "current employment situation" was as full-time employees. Similarly, 154 people identified as retired and then claimed that their "current employment situation" was as "full-time employee". These people are flagged as explained in the appendix.

Figure 24: Self-reported economic status of platform and non-platform workers



Source: authors' elaborations using COLLEEM 2017 and 2018; weighted data. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

7.2 Self-employment as a side activity for platform workers

For many workers, the provision of services via digital labour platforms is a secondary activity, often considered as self-employment on the side.

The COLLEEM survey asks those respondents who do not claim to be primarily self-employed if they carry out a side activity as self-employed besides their main occupation. We can therefore take advantage of this question to reclassify the employment status of platform workers in the following four categories, as previously defined in Urzi Brancati et al (2019):

- **Employee:** referring to those who claim to be employees as main occupation and have no additional activity as self-employed;
- **Self-employed:** referring to those who claim to be self-employed as main occupation;
- **Side gig as self-employed:** referring to those who claim to be employees, unemployed, retirees, students, or homemakers as main activity, but also self-employed as additional activity;
- **Not employed:** referring to those who claim to be unemployed, retirees, students, and homemakers, and have no additional activity as self-employed;

It should be noted that the definition is slightly different from last year's report (Pesole et al., 2017), since the category "side gig as self-employed" includes all workers who have a side gig as self-employed, whereas last year the report differentiated between employees and the rest.

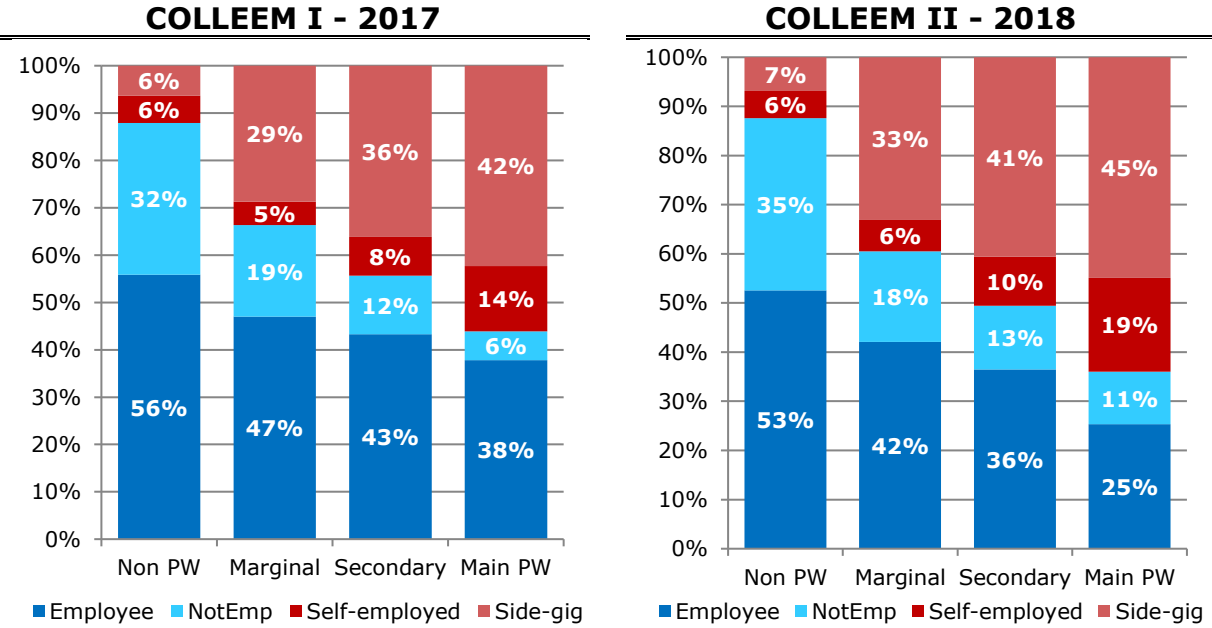
Figure 25 shows the employment status of frequent platform workers¹⁹ in 2017 and 2018 and compares it with the rest of the sample (which includes also those who may have provided services via platforms at some point in their lives, but do not do it frequently enough to fit the definition).

¹⁹ Frequent platform workers are those workers who provide services at least monthly in the past 12 months.

The self-reported employment status has not changed dramatically between 2017 and 2018, especially among the non-platform workers, the majority of whom identifies as employees. By contrast the self-employed, (either as primary activity or as a side gig) increase with the intensity of platform work. In addition, the proportion platform workers who claim to be self-employed is substantially higher in 2018.

Among main platform workers, those identifying as employees drop sharply between 2017 and 2018 (from 38% to 25%) whereas those who consider themselves self-employed either as primary activity or as a side gig grow in share from approximately 56% to 64%.

Figure 25: labour market status of platform workers, by year and categories of platform work (2017 and 2018)



Source: authors' elaborations using COLLEEM 2017 and 2018; weighted data. The sample of platform workers includes only those who have provided services at least once a month in the last 12 months.

7.3 Summary and Discussion

Resolving the issue of platform workers' employment status is one of the most pressing from a policy standpoint. Our results suggest that platform workers generally see their work via platforms as a form of self-employment, even though a large minority of them still perceive themselves as employees.

Rather than relying on a straightforward legal definition of what it means to be employed or self-employed, the classification depends on circumstances. In the case of platform workers it's particularly difficult because they appear to share several characteristics of both the employees and the self-employed. A possible solution would be to advocate the creation of a third category, such as the "dependent contractor", which would be entitled to some of the basic benefits of employees; another possibility would be to extend basic rights to all workers, regardless of their employment status.

8 Conclusions and policy implications

In 2019 as we write this report, digital labour platforms can still be thought of as a relatively new phenomenon that may radically transform the world of work. The number of studies on digital labour platforms has proliferated in recent years, so that researchers, policy makers and the general public have substantially improved their knowledge of the topic; and yet, a consensus has not been reached on even the most basic aspects of this new phenomenon, and many questions remain unanswered.

The first object of contention among researchers is the size of the digital labour platform economy; as the review carried out by Pesole et al (2019) shows, estimates of the prevalence of platform work vary widely according to the definition used and the data gathering methodology adopted in each study. Furthermore, even studies with similar methodologies, such as Huws et al (2017) and Pesole et al (2018), do not necessarily reach similar numbers. The findings in this report suggest that a significant minority of people (approximately 11%) in the 16 countries under study have provided services via digital labour platforms at least monthly in the 12 months preceding the start of the survey (September 2018); however, only a much smaller proportion, about 1.4% can be said to have earned significant income or put in substantial hours in platform work. This estimate is somewhat smaller than what was attained for the previous edition of the COLLEEM survey in 2017, and we contend that the difference reflects an improvement in measurement. In addition, estimates drawn from the longitudinal sub-sample of COLLEEM imply very high dropout rates, suggesting that the phenomenon is fluid and a large number of people simply try out platform work and should not be included in the main statistics. On a more positive note, we are confident that the measure of platform work as a form of employment as described in this report is more apt to gauge the extent of the phenomenon, as it offers information on regularity, time allocated and income generated from platform work, and is therefore more complete than the measures relying on simple participation at a given time used by other studies.

Secondly, this report provided an update on the socio-demographic profiles of platform workers; in this case, our findings are both in line with what emerged from the previous COLLEEM study, and with studies carried out by other researchers (for example the one by the ILO, Berg et al.), in that we found platform workers to be younger, males, and highly educated. Even though in principle the flexibility offered by digital labour platforms could encourage participation among groups with a traditionally lower attachment to the labour market, such as women, older workers or the low skilled, our findings suggest that this may not be the case in practice. A new question in the second wave of COLLEEM ascertained the respondent's country of origin, and we found a substantial over-representation of foreign-born among platform workers. While this could be seen as indication of inclusivity, in that migrants are more likely to be excluded from traditional labour markets, it may also suggest that work on digital labour platform offers less attractive pay and working conditions, and is therefore taken up by those who lack better options.

A crucial issue related to digital labour platforms is the extent to which they change the nature of work by an unbundling of tasks; to investigate this topic, we need detailed information of what type of tasks platform workers actually carry out. Both waves of the COLLEEM survey include questions on tasks, but only the second one links information on hours worked and working conditions specifically to the last or main task, as opposed to pay which still refers to the main platform. In the COLLEEM sample, only a relative minority of platform workers carry out on locations tasks, whereas the greatest proportion carry out professional and non professional online tasks, such as translation and microtasks. However, when we tried to look more in detail at how long respondents took to complete a task or how much they earned doing it, we encountered some problems. First of all, many answers suggested that respondents interpret the concept of "task" differently. Secondly, when asked to name their main platform for carrying out their main task, many respondents gave inconsistent or wrong names. By selecting a sub-sample of consistent answers, we could estimate average earnings per hour and

average number of minutes spent in completing a task. However, this was just a first approximation and more research and better quality data are needed to corroborate the findings.

The section on platform workers' employment status reveals that there is still a fair amount of confusion as to whether platform workers should be classified as employees, self-employed, or somewhere in between. The main insight which can be drawn from this section is that we need more objective indicators to infer the correct employment status that should be applied, on average, to different categories of platform workers according to the type of task they do or the platform they use. To this end, the next survey might include questions on the level of control, autonomy and dependence that digital labour platforms exert on the workers, and allow us to create some profiling to help policy makers go beyond the case-by-case basis.

Finally, COLLEEM provides some hints about the conditions of work and employment of platform workers in Europe. First of all, respondents using more frequently digital labour platforms tend to be overrepresented in the highest income deciles, a result that we found rather surprising and believe it may reflect a bias towards professional and high-skilled forms of work in the COLLEEM sample. Indeed, because respondents are contacted online and the information is collected entirely online, it is likely that some of the most disadvantaged forms of platform work (such as delivery or other low-skilled in-person services) are underrepresented. Our findings confirm that most platform workers also have regular jobs and use platforms as a secondary source of income. While this implies some disadvantage caused by possible long schedules and additional strain, it also makes the conditions of their work via platforms less consequential in terms of welfare. Finally, even though platform work is very flexible according to the assessment of the workers themselves, for half the workers it involves a certain degree of stress, it is often perceived as monotonous, and it is in most cases subject to constant monitoring by the platform.

One last concluding thought has to be dedicated to what we perceive to be the greatest limitation of the COLLEEM survey. As we have often repeated throughout the report, COLLEEM is a good attempt at capturing an elusive phenomenon such as platform work, which is generally difficult to measure and define; however, our findings should be taken with caution. First of all, there are concerns about sampling bias, in that COLLEEM may over-represent not only high frequency internet users, but also potentially professional (and thus more privileged) platform workers; secondly, the reliability of the answers and quality of information obtained is hampered by the use of commercial online panels for selecting and contacting respondents. While the current methodology of COLLEEM has provided an extremely useful approximation to the contours of an emerging and elusive phenomenon, which has certainly contributed to our knowledge and to the policy debate on digital labour platforms in Europe, future editions of the survey will need to use a different methodological approach to go beyond this initial approximation.

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Annexes

Annex 1. Approach and Methods

COLLEEM online panel survey

The JRC, in partnership with the Directorate General for Employment, Social Affairs and Inclusion (DG-EMPL), commissioned an online panel survey on digital labour platforms (COLLEEM) in 2017, as well as a follow-up survey in 2018. The aim of the COLLEEM survey is to assess and quantify the prevalence of platform work in Europe, the profile of platform workers, the type of work (or tasks) they carry out, their sources of income and remuneration, and their working conditions.

The first pilot wave was completed in 2017 and gathered a total of 32,389 responses from 14 Member States. The COLLEEM 2018 survey gathered a total of 38,022 responses from internet users aged between 16 and 74 years old in 16 EU Member States: Germany, France, Italy, Spain, Finland, the Netherlands, Sweden, Hungary, Slovakia, Romania, Croatia, Lithuania, Ireland, Czech Republic, Portugal and the United Kingdom. In addition to it, COLLEEM 2018 includes a booster sample of 856 respondents who were identified as platform workers in 2017 and were re-invited to participate in the survey. The booster sample can only be used for longitudinal analyses, but has to be excluded from cross-sectional estimates.

COLLEEM is a self-administered online panel survey - an opt-in panel which is by definition a non-probability sample. While suited to meet the general aims of the project, these types of surveys are related to a possible number of errors, such as biased population, unreliable responses, no knowledge of who is answering and under what conditions, and no possibility to clarify the questions or specific terms used without an interviewer. In addition, self-administered online panel surveys may lack representativeness, both in terms of coverage, for instance by under-representing low frequency internet users, and because of non response.

One potential source of error is inherent in the nature of the phenomenon under study: platform work is a rather new, complex and fluid topic. For instance, respondents who do telework may erroneously think that it qualifies as platform work. The key screener question ascertaining whether respondents provide services via digital labour platforms is long and complex, and lengthy formulations lead to respondent fatigue and are more difficult to comprehend properly. However, the current formulation was necessary to provide a precise definition of what we consider platform work.

The first survey presented a series of issues that were addressed in the new wave. In general, measurement error has been mitigated using various techniques that aimed to guide respondents throughout the questionnaire. These included intentional specific question order and wording, piping of previous responses to clarify reference points in the following questions²⁰, as well as the extensive use of instructional texts. In addition, tests for suspicious answers were introduced and respondents who failed more than three tests were dropped from the sample. Some of the issues in terms of representativeness were addressed both during the fielding phase and through post-stratification weights, as reported in more detail in the next section.

From COLLEEM pilot survey to COLLEEM II

Even though the first wave of COLLEEM was a full survey with a large number of respondents, we considered it as a big pilot or exploratory survey, because of the methodological challenges involved in the definition and measurement of an emerging phenomenon such as platform work.

The second wave of COLLEEM included additional features, such as a longitudinal component, more detailed questions and two additional countries. The longitudinal

²⁰ Question & Answer Piping allows you to insert, or "pipe," answer text from a previous question into a question on a later page in the survey.

component is essential in order to capture dynamics, such as transitions in and out of platform work.

One important difference between COLLEEM I and COLLEEM II is that in the second wave questions on platform work are asked only to respondents who provide services at least once a month in the past 12 months, whereas in the previous year some were asked to all those who had provided services even just once in the past 12 months. This means that the definition for the different categories of platform work had to be adjusted accordingly. It also means that a straightforward comparison with last year's report (Pesole *et al*, 2018) is not always feasible.

To revise and improve the questionnaire for the second wave, we organised an expert workshop and discussed the main methodological issues:

- Sampling frame
- Non-response rate
- Creation of a longitudinal (sub-sample of) the dataset
- New questionnaire

On the sampling frame, we discussed the possible sources of bias, the risk of over-representation and self-selection, and in particular the need to deal with the potential correlation between completing the survey and the probability of being a platform worker. On the non-response rate, it was agreed that further information on the socio-demographic of non-respondents should also be collected in order to correct for the potential bias. On the creation of a longitudinal dataset, the two main issues concerned the potential large attrition rates and the limitation in comparability deriving from changes in the original questions. A general consensus for a split panel, in order to control for this heterogeneity, was achieved.

As per the new questionnaire, the experts suggested several improvements in terms of the wording of some questions, adding more specific time-frame references and include additional aspects that were not considered in the first wave (i.e. migrant status, regional dimension). The questions on working conditions were reduced in number and simplified with respect to the previous wave. A new battery of questions referring specifically to the "main platform" through which respondents provide services was inserted.

The final questionnaire featured 31 questions (all of them compulsory for respondents who are filtered to answer, in order to avoid issues with item non-response), divided into seven brief sections. Three of these sections (comprising 14 questions) collected responses from all participants, while the rest of the survey focused on respondents who provide services via digital labour platforms.

Finally, a general agreement was expressed on the list of tasks already used in the pilot questionnaire and the need to link the set of questions on motivation and working conditions to a specific task when platform workers perform more than one.

Sampling design: Mode of the survey, quotas and weights

For its second wave, COLLEEM aimed to gather a minimum of 2,300 responses per country, for a total of approximately 36,800 observations. The survey was administered using SurveyGizmo and disseminated to respondents of an online panel survey aggregator CINT (www.cint.com).²¹ CINT is a privately owned software company headquartered in Stockholm; survey respondents do not have an account with CINT but with one of their panel partners, for instance Marketagent²², DataDiggers²³, Swagbucks²⁴,

²¹ CINT has access to 50 million members of the public through opt-in access panels in over 80 countries; however, this does not mean that we could target all of the 50 million respondents, since we were limited by the country of choice and the correct socio-demographics.

²² <https://marketagent.com/> .

²³ <https://www.datadiggers-mr.com/>.

²⁴ <https://www.swagbucks.com/>.

Surveyeah²⁵, and many more. Respondents are paid a small amount of money per survey completed; when a respondent completes a survey of bad quality, CINT may deduct the credit from the survey from his or her account²⁶. For example, credit can be deducted if a respondent is found to be speeding, as it is an indication that the survey was completed in a time that would not have given good quality answers, inconsistent or inaccurate answers; similarly, credit can be deducted if the respondent misses a red herring question²⁷.

Since CINT gathers respondents from many online panels, a first step to reduce measurement error has been to identify those which produced more representative responses, in terms of frequency of internet use and formal education. Furthermore, the panels with the lowest share of fraudulent answers were also selected and targeted during fielding, whenever possible. However, since the number of feasible responses from these priority panels was not sufficient to fill the quotas and achieve the target sample sizes, the survey was opened to take in responses from other panels. This may have lowered the overall quality of responses.

Fielding

With the exception of Ireland and Czech Republic, which were surveyed for the first time in 2018, the sample in each country consists of two components: a main sample (sample A) and a booster sample (sample B). The main sample follows a quota-based "non-probability sampling design" and comprises 38,022 observations. The booster sample comprises only respondents who were identified as platform workers in 2017 and were re-invited to participate in the survey; it consists of 856 observations.

The fielding of the survey followed a two-step process. During the first step, the quota-based fielding was launched and the main sample, or sub-sample A, was collected. By comparing the collected dataset to COLLEEM 2017 it was possible to identify all the people who responded in both waves. In total, we found 2,467 such respondents, including platform workers and not. These respondents are part of what we refer to as the "longitudinal" sub-sample, together with the "booster" sample, or sample B.

In order to create the booster sample, it was necessary to compile a list of platform workers in 2017 and omit all those who ended up by chance in the 2018 sub-sample A; the re-invites were thus sent to 3,404 respondents. Among them, 856 completed the questionnaire and became the booster sample. It should be highlighted that the booster sample can only be used for longitudinal analysis or for in-depth analysis about platform workers, but it is not to be merged with the main sample when calculating prevalence rates or carrying out other estimates.

Quota based non-probability sampling design

As mentioned above, the main sample follows a quota based non-probability sampling design. The basic objective of quota sampling is the selection of a sample that is a replica of the 'population' with respect to which one would wish to generalise. To this end, we set a target number of completed interviews with specific subgroups of the population of interest; more specifically, quotas of respondents were established to guarantee representative estimates according to age groups (16 to 24, 25 to 54 and 55 to 74) and gender (male/ female). The population in each age-gender-country category was calculated using Eurostat's most recent data on population (table demo_pjan) from the Labour Force Survey (LFS). Targets of completed responses in each group were allocated proportionally to the size of this group in the total population of internet users

²⁵ <https://www.surveyeah.com/en/>.

²⁶ Information on CINT can be found on the FAQs section on their website, available at: <https://cint.zendesk.com/hc/en-us>.

²⁷ A red herring question is a quality control measure in a survey by which you place oddball question within a series of regular questions to easily identify those who fully read and engaged in the survey and those who are not.

aged 16-74 in each country; the proportion of internet users by gender-age group was obtained by Eurostat's ICT survey.²⁸

Quotas for the target samples were then compiled by multiplying the population of internet users in the selected age-gender category by the target sample size (2,300 minus re-invited platform workers) and dividing by the total population of internet users aged 16-74 in the selected country:

$$\text{quota for } X \text{ age} - \text{gender category} = \frac{\text{population of internet users in } X \text{ age} - \text{gender category} \times \text{target sample size}(2,300 - \text{reinvited})}{\text{total population of internet users aged } 16 - 74}$$

Post-stratification weights

The sampling design for sub-sample A implies that responses did not directly come from a randomised sample of the population of interest (whole population of internet users). The absence of randomisation in combination with self-selection sampling mechanisms can produce biased results that do not represent the population of interest. To allow for the inference from a sample to an entire population, non-probability sampling surveys tend to rely on post-field adjustments, such as weighting or modelling estimates, and on the assumptions behind these. COLLEEM was weighted using a calibration procedure and includes two final computed weights:

1. Calibration weights ('weights trimmed');
2. Population-scaled weights ('weights population-scaled').

Calibration weights were computed for and should be used whenever estimates are produced for each selected country (e.g. proportion of digital labour workers in each country) as each calibration weight is the value of internet users that a given respondent represents in a selected country. Population-scaled weights were computed for EU-16 and should be used for analyses that involve combining country samples (e.g. to estimate the proportion of platform workers in all 16 selected countries) as each population-scaled weight corresponds to the proportion of internet users that a given response represents in the overall population of internet users of EU-16.

The population-scaled weights, which are essentially cross-national weights, are simply rescaled calibration weights such that they ensure that each country is represented proportionally to the size of its population of internet users²⁹. As sample sizes were similar in all 16 countries regardless of the share of internet users in each country, without population-scaled weights the estimates combining all countries would over-represent the Member States with smaller populations of internet users.

Calibration weights were computed using raking ratio estimation. Raking - otherwise known as iterative proportional fitting, sample-balancing, or raking ratio estimation - is a method for adjusting the sampling weights based on known population characteristics. The actual algorithm involves repeatedly estimating weights across each set of variables in turn until the weights converge and stop changing (Anderson and Fricker, 2015). Essentially, raking forces the survey totals to match the known population totals by assigning a weight to each respondent. By adjusting these weights, the survey sample is forced to resemble the population, therefore making inference to the entire population possible. The most logical and popular survey variables to use with raking are demographics for two reasons. First, population totals for demographics are often

²⁸ Dataset 'isoc_ci_ifp_iu' on the individuals' internet usage in the last 3 months was used (reference period: first quarter of 2017).

²⁹ In other words, the country sum of 'calibration weights' is equal to the sample size in each country (~2,300-2400). Country proportions of 'population-scaled weights' match the proportion of internet users of countries in the overall population of internet users in the 16 selected countries

available, for example, from census data; second, survey responses to these types of variables typically have a low nonresponse rate.³⁰

In the case of COLLEEM, the survey was adjusted by country, and the raking procedure included the following four variables:

- Age and gender (quotas);
- Level of formal education;
- Employment status;
- Frequency of internet use.

Finally, weights were trimmed so as to avoid having extremely high values that can increase the instability of estimates (Johnson, 2008). In COLLEEM II, weights were trimmed with an upper boundary of 6 to keep them within a reasonable range. This is a slightly higher constraint than that used in other surveys³¹, but it was done to take into account the additional adjustments required by panel surveys with non-probability samples. Weights over the boundary were re-distributed equally among the weights of non-trimmed respondents³².

It should be noted that, in spite of all adjustments, the COLLEEM survey may still suffer from some sort of bias which cannot be easily dealt with. For example, given that CINT panelists choose to sign up to a panel to make money from answering surveys, it is possible that we end up with a sample of people that differs from the real population in ways that are not observable, thus cannot be adjusted with weights based on demographics, and that we cannot pre-empt, because our knowledge of the phenomenon is still limited.

For this reason, in spite of all the precautions, drawing inferences from the sample to the population may be problematic.

Quality control: flags and other test variables

An in-depth analysis of the pilot wave of COLLEEM highlighted a few issues with problematic or inconsistent responses. In light of those findings, 13 different tests were introduced in the second wave of COLLEEM. 9 out of 13 variables tests refer to the entire sample, while 4 concern only platform workers.

Overall 3,682 respondents, equivalent to 9.5% of the whole sample, give at least one answer that can be considered inconsistent or fraudulent; 7.8% of the sample fails only one test, while 1.7% of the sample fails 2; as already mentioned, respondents who failed 3 or more tests were removed from the final sample.

While some of these failed tests could be genuine mistakes, others look like indicators of low quality responses. For instance, the variable "log_speeding" identifies respondents who have completed the survey much faster than the rest and are therefore likely to have filled it in without properly reading the questions.³³ The proportion of speeders is 1.4% for the whole COLLEEM sample (see Table 9).

Similarly, the variable "straight_liner" could be seen as fraudulent, since it identifies respondents who have answered "yes" to all kinds of participation in the platform economy (Q13:1-6), and/or "yes" to all types of tasks performed (Q14:1-10).

³⁰ For a more detailed description of the weighting procedure, please refer to the COLLEEM Methodological report.

³¹ See, for example, 'Weight Truncation and Scaling' in the 7th European Social Survey' (http://www.europeansocialsurvey.org/docs/methodology/ESS_post_stratification_weights_documentation.pdf) or the '6th European Working Conditions Survey, Technical Report' (https://www.eurofound.europa.eu/sites/default/files/ef_survey/field_ef_documents/6th_ewcs_-_technical_report.pdf)

³² This was done in an iterative way. I.e. the procedure was repeated if after the reallocation of trimmed weights some previously untrimmed weights surpassed the boundary of 6.

³³ For a detailed description of how speeding was calculated, please refer to the methodological report.

The flag identifying a mismatch between platform name and activity type is also potentially problematic. For instance, 23% of the respondents who claim that their main task (i.e. the “type of work via online platforms [which] takes most of [their] time” is providing “Online clerical and data-entry” services also claim that the online platform have you use they most frequently to do this work is Uber. It is therefore possible that respondents just mention the most salient or well-known platform that comes to their mind because of time constraints. If this is the case, we may have issues when trying to interpret their responses on working conditions and other elements connected to the main task, but also to the main platform.

Table 9: Test variables, description and summary stats

Name of the variable	Description	# of obs	%
<i>All respondents</i>			
log_edu	Education in COLLEEM two or more levels lower than in CINT	198	0.5%
log_ppl_number	Inconsistent number of household members and marital status	179	0.5%
log_single	Marital status mismatch between CINT and COLLEEM Data	226	0.6%
log_dependent	Inconsistent number of household members and dependents	505	1.3%
log_retired	Retired before the age of 40	76	0.2%
log_student_retired_workers	Retirees and students who report being full-time employees	394	1.0%
log_prodigy	Too young to be so educated	124	0.3%
suspicious_platform	Suspicious platform name	284	0.7%
log_speeding	Speeder	526	1.4%
<i>Only Platform workers</i>			
log_hrs	Inconsistent number of platform work hours and total hours worked	120	2.2%
log_activity_name	Mismatch between platform name and activity type	865	16%
log_tasktime	Unrealistic time spent on the last task via online platform	19	0.4%
straight_liner	Replied yes to all options of Q13 “Have you ever gained income from any of the following online sources” or all options of Q14 “More specifically, what type of services have you provided via online platforms”.	823	15%

Source: COLLEEM 2018; unweighted observations.

In addition, a series of two-tailed t-test show that the proportion of fraudulent/inconsistent answers is always higher among platform workers, with the exception of one "log_ppl_number" (Inconsistent number of household members and marital status). However, most of the differences are fairly small, albeit statistically significant. Particularly noteworthy is that the proportion of speeders is 4 times higher among platform workers than the rest of the sample. While it is possible that platform workers are genuinely faster at responding than other people because they are more technologically savvy, we should keep this finding in mind when we analyse the data.

It is also worth mentioning that, if we focus on platform workers, there are not many significant differences in terms of failed tests between respondents who are part of the main sample and those who belong to the booster sample.

Annex 2. Income percentiles

In Euros

	Below first poorest income decile in their country (< 10%)	Between first income decile and first quartile in their country (10 – 25%)	Between first and second income quartiles in their country (25 – 50%)	Between second and third income quartiles in their country (50 – 75%)	Between third quartile and ninth income decile in their country (75 – 90%)	Above ninth income decile in their country (> 90%)
Croatia	Up to 210 €	211 - 324 €	325 - 477 €	478 - 673 €	674 - 890 €	Over 890 €
Czech Republic	Up to 395 €	396 - 507 €	508 - 653 €	654 - 856 €	857 - 1123 €	Over 1123 €
Finland	Up to 1143 €	1144 - 1479 €	1480 - 1971 €	1972 - 2613 €	2614 - 3421 €	Over 3421 €
France	Up to 993 €	994 - 1349 €	1350 - 1809 €	1810 - 2417 €	2418 - 3286 €	Over 3286 €
Germany	Up to 896 €	897 - 1255 €	1256 - 1773 €	1774 - 2430 €	2431 - 3227 €	Over 3227 €
Hungary	Up to 213 €	214 - 290 €	291 - 397 €	398 - 546 €	547 - 722 €	Over 722 €
Ireland	Up to 960 €	961 - 1292 €	1293 - 1867 €	1868 - 2568 €	2569 - 3456 €	Over 3456 €
Italy	Up to 547 €	548 - 892 €	893 - 1354 €	1355 - 1912 €	1913 - 2610 €	Over 2610 €
Lithuania	Up to 196 €	197 - 301 €	302 - 470 €	471 - 722 €	723 - 1075 €	Over 1075 €
Netherlands	Up to 1 070 €	1071 - 1407 €	1408 - 1894 €	1895 - 2527 €	2528 - 3295 €	Over 3295 €
Portugal	Up to 330 €	331 - 499 €	500 - 732 €	733 - 1075 €	1076 - 1565 €	Over 1565 €
Romania	Up to 69 €	70 - 121 €	122 - 204 €	205 - 305 €	306 - 406 €	Over 406 €
Slovakia	Up to 317 €	318 - 439 €	440 - 579 €	580 - 741 €	742 - 936 €	Over 936 €
Spain	Up to 441 €	442 - 734 €	735 - 1140 €	1141 - 1701 €	1702 - 2370 €	Over 2370 €
Sweden	Up to 1 064 €	1065 - 1479 €	1480 - 2097 €	2098 - 2780 €	2781 - 3533 €	Over 3533 €
United Kingdom	Up to 886 €	887 - 1241 €	1242 - 1761 €	1762 - 2513 €	2514 - 3481 €	Over 3481 €

Source: PPMI, based on Eurostat data.

In national Currencies

	Below first poorest income decile in their country (< 10%)	Between first income decile and first quartile in their country (10 – 25%)	Between first and second income quartiles in their country (25 – 50%)	Between second and third income quartiles in their country (50 – 75%)	Between third quartile and ninth income decile in their country (75 – 90%)	Above ninth income decile in their country (> 90%)
Croatia	Do 1.600 Kn	1.601 - 2.500 Kn	2.501 - 3.600 Kn	3.601 - 5.100 Kn	5.101 - 6.800 Kn	Više od 6.800 Kn
Czech Republic	Do 11 000 Kč	11 001 - 14 000 Kč	14 001 - 18 000 Kč	18 001 - 23 000 Kč	23 001 - 31 000 Kč	Více než 31 000 Kč
Finland	Enintään € 1 100	1 101 € - 1 500 €	1 501 € - 2 000 €	2 001 € - 2 600 €	2 601 € - 3 400 €	Yli 3 400 €
France	Jusqu'à 1000 €	De 1 001 à 1 300 €	De 1 301 à 1 800 €	De 1 801 à 2 400 €	De 2 401 à 3 300 €	Plus de 3300 €
Germany	Bis 900 €	901 € - 1.300 €	1.301 € - 1.800 €	1.801 € - 2.400 €	2.401 € - 3.200 €	Über 3.200 €
Hungary	70 000 Ft vagy kevesebb	70 001 - 90 000 Ft	90 001 - 120 000 Ft	120 001 - 170 000 Ft	170 001 - 220 000 Ft	220 000 Ft-nál több
Ireland	Up to € 1000	€ 1001 - € 1 300	€ 1301 - € 1 300	€ 1901 - € 2 600	€ 2601 - € 3 500	Over € 3500
Italy	Fino a € 500	€501 - €900	€901 - €1400	€1401 - €1900	€1901 - €2600	Oltre €2600
Lithuania	Iki 200 €	201 € - 300 €	301 € - 450 €	451 € - 700 €	701 € - 1050 €	Daugiau nei 1050 €
Netherlands	Tot € 1.100	€ 1.101 - € 1.400	€ 1.401 - € 1.900	€ 1.901 - € 2.500	€ 2.501 - € 3.300	Meer dan € 3.300
Portugal	Até € 350	€ 351 - € 500	€ 501 - € 750	€ 751 - € 1050	€ 1051 - €1550	Mais de €1550
Romania	Până la 300 lei	301 - 500 lei	501 - 900 lei	901 - 1.400 lei	1.401 - 1.800 lei	Peste 1.800 lei
Slovakia	Do € 300	€ 301 - € 450	€ 451 - € 600	€ 601 - € 750	€ 751 - € 950	Viac ako €950
Spain	Hasta 400 €	401 € - 700 €	701 € - 1 100 €	1 101 € - 1 700 €	1 701 € - 2400 €	Más de 2400 €
Sweden	Upp till 10 000 kr	10 001 - 14 000 kr	14 001 - 20 000 kr	20 001 - 26 000 kr	26 001 - 33 000 kr	Över 33 000 kr
United Kingdom	Up to £700	£701 - £1000	£1001 - £1400	£1401 - £2100	£2101 - £2900	Over £2900

Source: PPMI, based on Eurostat data.

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