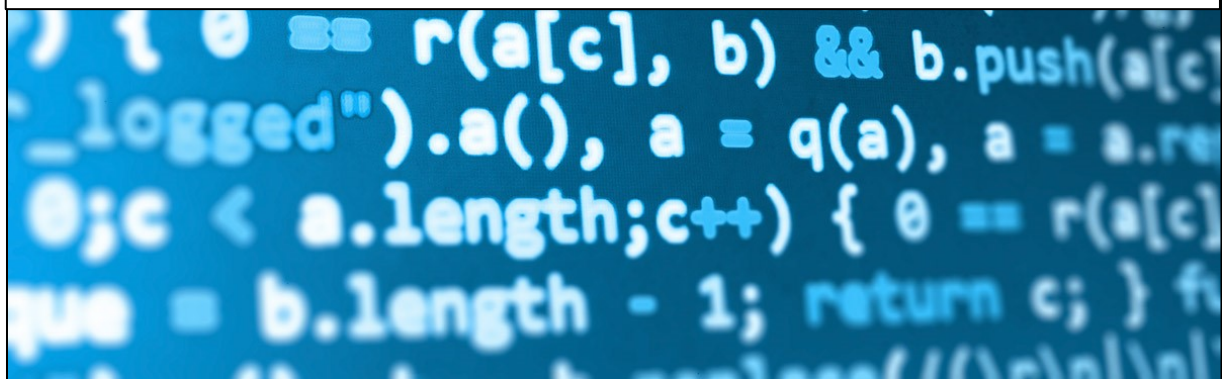


The gig economy – an avenue to women's economic empowerment?



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Abstract

Drawing on administrative data, surveys and experimental studies, this paper explores the question whether the platform economy is an avenue to women's economic empowerment. Low entry barriers and flexibility have enabled the labour market entry of those who can only work from home and other marginalised groups. The gig economy may be more inclusive, but certainly not any fairer than traditional labour markets. Global online markets and digitized reputation create winner-takes-all dynamics which exclude many workers from accessing work irrespective of their qualifications. The three-sided markets are ridden with information and power asymmetries that exacerbate the vulnerabilities of precarious workers. Online labour markets are highly segregated and reproduce divides along gender, class and ethnicity lines. Women are overrepresented in the lowest-paying jobs associated with at times exploitative working conditions. The gig economy fails to provide equal pay for equal work. Online and offline, women face trade-offs over working time, charge less for their work and face significant negative bias in counter-stereotypical occupations.

Methodology

To analyse the gig economy's potential for women's empowerment, this paper combines quantitative data on the scope of female participation across different types of platform work with qualitative evidence on working conditions in those sectors.

To unveil inequalities and discriminatory practices, the paper draws on experimental studies conducted on big data-sets extracted from online platforms.

To understand the causes of labour market inequalities in Europe and interpret the evidence on similar patterns in the platform economy, a thorough literature review, including a combination of primary and secondary sources has proven useful.

Furthermore, the paper seeks to embed the gig economy into the European regulatory context. To see which policy options are available and where legislation is lacking, policy documents, specialised literature, including legal reviews, and strategy papers were used.

Limitations

The platform economy is a relatively new phenomenon, which explains why to this date few independent studies have been carried out. Existing research focuses primarily on the U.S. and selected European countries.

Generally, it is clear that research is severely restricted by the limited access to data. As most activities on platforms are never reported to authorities, the only parties that have full access on key information are platform providers. However, they guard their own data closely; often forcing researchers to make inferences using complementary information.

Due to the lack of administrative evidence, estimates are mostly based on surveys relying on relatively small sample sizes. Live tracking of platforms and users as well as datasets compiled through web crawling provide additional insights into the scale and scope of platform work.

Considering how little is known on workers' involvement in the gig economy in general, gendered data is even more scant and estimates vary significantly between different studies. This is most likely linked to differences in the type of platform, occupation and/or task studied in light of existing occupational segregation. Relatively little is known on the experiences of women in the platform economy, because qualitative studies have largely focussed on the transportation sector, which is overwhelmingly male.

Overall, the absence of gender-disaggregated data at all levels is alarming. Paradoxically, the gender data gap is precisely one of the reasons for the male bias in algorithmic decision-making that is subject of this paper.

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1 Women in the European labour market and the role of flexibility

The past decade has been characterised by a push for more labour market flexibility. The European Union has been a strong proponent of “flexicurity” and encouraged Member States to adopt measures, allowing European businesses to react more flexibly to fluctuations in labour demand (e.g. Europe 2020 and the Stability and Growth Pact).¹ Following the economic crisis, many European countries reformed their labour laws to facilitate hiring and dismissal (e.g. Macron’s *loi travail* 2017 or the Italian *Jobs Act* 2014) in an effort to stimulate growth while keeping unemployment to a minimum. In addition, budget consolidation exerted pressure on existing welfare regimes and encouraged activation policies (Hemerijck 2013). As a consequence, the proportion of the European labour force in standard employment – understood as full-time, permanent employment - has decreased from 62 % to 59 % of total employment over the last decade (DG IPOL 2016b). In recent years, movements from unemployment and inactivity into employment have been predominantly into non-standard employment (DG IPOL 2016b; Figure 1). Today, one in five workers under the age of 40 and one in three under 25 years is employed in temporary contracts (DG IPOL 2016b).

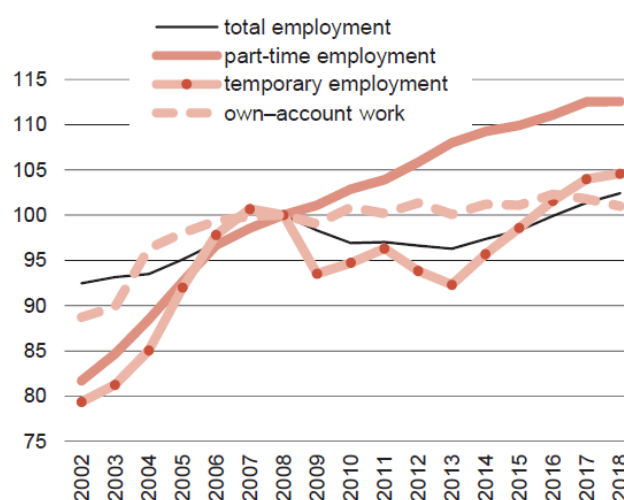


Figure 1 Net job growth by forms of employment in the EU-28 (Eurostat in ETUI 2019, p.26)

Even though employment rates improved overall, gender inequality persists on the labour market. In 2017, the employment rate for men was recorded at 77.9% as compared to 66.4%² for women. This figure masks differences in working hours by country, gender and occupational class (Lyonette 2015).

Parenthood marks a significant change in many women’s career life, ranging from a total withdrawal from the labour force to a shift into non-standard employment. Indeed, women are overrepresented across the band in part-time work and precarious work (DG IPOL 2016b).

In the EU-28, 30.7%³ of working women are working part-time, as opposed to 9.4% of the male working population. The gendered pattern of career interruptions or non-standard employment may be voluntarily chosen, but it can also reflect the barriers women face in balancing paid work and unpaid care and household work for which they remain disproportionately responsible (DG EPRS 2017, p.1). While most men working part-time do so because they cannot find a full-time job (42.5%), women’s primary reason is caring for children and incapacitated adults (28%; DG EPRS 2017, p.2).

While men spend on average more time in paid work than women (39.7 vs. 33.2 hours per week), women spend up to three times as much time in unpaid work (Eurofound 2018c). The gendered division of labour holds when considering only those in employment; taking paid and unpaid work

¹ It is widely believed that the comparatively quick recovery of the U.S. economy from the 2008 financial crisis can be attributed to a much higher degree of labour market flexibility (Monastiriotis et al. 2019).

² up from 54.2% in 2002 (European Commission 2019e, p.9)

³ There are wide variations between Member Countries; the share of part-time working women in total employment ranges from 2.4% in Bulgaria to 75.3% in the Netherlands (DG EPRS 2017).

together, European women total 58 hours working per week, as compared to 53 hours for men (Eurofound 2018c).

Furthermore, the European labour market is highly gender-segregated. Horizontal segregation refers to the under- or overrepresentation of women or men in different occupations, while vertical (hierarchical) segregation denotes the under- or overrepresentation of women or men at the top of a hierarchy of 'desirable' attributes such as income and prestige (EIGE 2018a).

In the European Union, occupations such as craft workers and plant and machine operators are intensely male-dominated, while clerks or service and sale workers are predominantly female. Figure 2 illustrates the most gender-segregated sectors.

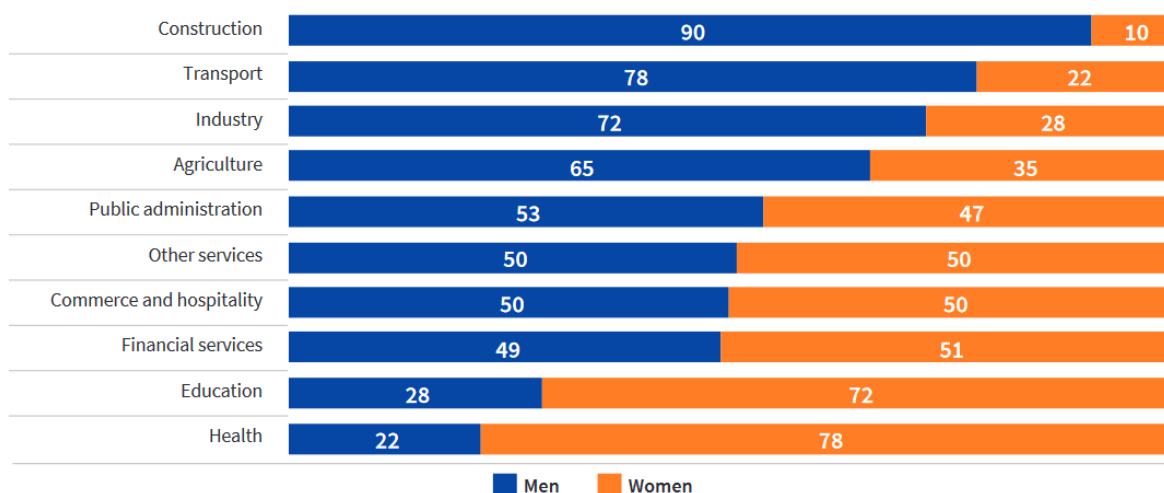


Figure 2 Employed people, by economic sector and gender, EU-28 (%) (EU-LFS 2015 in Eurofound 2018c)

Gender segregation can result in the underutilisation of women's qualifications and experience and lead to the disproportionate concentration of women in the lower-paid parts of the economy, which is a key contributory factor for the gender pay gap (EIGE 2018a).

In the EU, the unadjusted⁴ gender pay gap averages 16.2% and ranges from less than 8% in Belgium, Italy, Luxembourg, Poland, Romania, and Slovenia to more than 20% in Austria, the Czech Republic, Germany, Estonia and United Kingdom (Eurofound 2018c). A high pay gap is characteristic of a labour market that is highly segregated, or in which a significant proportion of women work part time.

The female employment gap reflects cultural gender roles and attitudes. According to the Eurobarometer survey (2017), 44% of Europeans think that the most important role of a women is to take care of her home and family, while 43% think that a man's most important role is to earn money. This notwithstanding, women's employment choices can be constrained by policies at EU, national and organisation level, such as childcare availability and affordability, working hours and work-life balance policies and practices (Lyonette 2015). Women are far more likely to (and expected to) take time away from work after childbirth and lack of childcare facilities may force them out of the labour market permanently. Flexible working arrangements, which allow working carers to work from home or to work fewer hours, are considered key in combatting vertical segregation by facilitating women's permanence in/and return to employment. Denmark, Sweden and the Netherlands have the highest ranking on working time quality in the EU, while the Czech Republic and Slovakia have some of the lowest levels of working time quality in the EU and also are characterised by the most significant declines in employment rates associated with maternity (Piasna and Plagnol 2015). Work-life balance considerations have been shown to drive women's job entry choices. Work-life balance is the third

⁴ The unadjusted gender pay gap is defined as the difference between the average gross hourly earnings of men and women expressed as a percentage of the average gross hourly earnings of men in the economy as a whole (Eurostat 2019).

most important reason women accept a job, topped only by the interest in the nature of the work itself and job security (Eurofound 2018c, p.14).

Equal access to the labour market is a cornerstone of women's economic independence and participation in public life. The European Union and its Member States have committed to integrating those excluded from the labour market (Article 151 TFEU), advancing gender equality in employment (Directive 2006/54/EC) and ensuring equal pay for work of equal value (Article 157 TFEU). Gender equality has been legally-binding primary law since the incorporation of the Charter of Fundamental Rights (CFR) into the Treaties. The EU's strategic engagement (2016-2019) for gender equality set amongst others the following objectives:

- increasing female labour market participation and the equal economic independence of women and men
- reducing the gender pay, earnings and pension gaps and thus fighting poverty among women
- promoting equality between women and men in decision-making

As signatories to the Beijing+20 Platform for Action (BPfA), the EU Member States have committed to the following strategic objectives to promote Women's Economic Empowerment (WEE).


- 
- F.1.** Promote women's economic rights and independence, including access to employment, appropriate working conditions and control over economic resources.
 - F.2.** Facilitate women's equal access to resources, employment, markets and trade.
 - F.3.** Provide business services, training and access to markets, information and technology, particularly to low-income women.
 - F.4.** Strengthen women's economic capacity and commercial networks.
 - F.5.** Eliminate occupational segregation and all forms of employment discrimination.
 - F.6.** Promote the harmonisation of work and family responsibilities for women and men.

Figure 3 Beijing Platform for Action – Women in the Economy, EU indicators (EIGE 2015)

Thus, the challenge for policy makers is not limited to enhancing female participation in the labour market, but extends to ensuring fairness of conditions under which women participate, the quality of work in which they engage and giving women agency to make decisions in their own interest.

Recently, labour market flexibility has received increasing attention in the context of digitalisation and the conversion to an Industry 4.0 (Eurofound 2016). The interplay of economic, societal and technological developments has led to the rise of various forms of non-standard employment, which have been coined the “new forms of work” (Eurofound 2016). These include: the gig economy, casual work, portfolio work, collaborative employment, employee sharing, job sharing, interim management, mobile service delivery and voucher-based work (Risak 2017).

The online markets for labour on-demand referred to as the “gig economy” have been received with particular enthusiasm. Online platforms have successfully positioned themselves as providing a win-win-win opportunity for the European labour market. Businesses can meet their labour needs, platform workers can earn money on flexible schedules and the economy as a whole benefits from higher employment rates and a widened consumer choice. The European Commission (2018) emphasizes

the potential for productivity gains, jobs creation, more inclusive labour markets and a better work-life balance in the digital economy.

Flexible working hours and the possibility to accept work at the worker's convenience are seen as important tools to enable reconciliation of work and family life. Furthermore, platform work is believed to facilitate labour market inclusion of jobseekers facing entry barriers in the traditional labour markets, such as skills mismatches, lack of personal network or discrimination. Thereby, the gig economy may enable the disadvantaged and marginalised to earn additional incomes.

At the same time, there is growing concern that workers are insufficiently protected in the gig economy (OECD 2019b). The recent revision of the European directive on Transparent and Predictable Working Conditions demonstrates the political will to contain the risks of gig workers. This is embedded into a wider debate on how to reorganise social security, rethink labour law and more generally, innovate state interventions to correct the market failures connected to the new forms of work (OECD 2019b). Although non-standard employment arrangements may allow workers to integrate into or return to the labour market more easily, workers also risk being trapped in lower-earning jobs, with implications for lifetime earnings and pensions (Lyonette 2015)

More importantly, perhaps, the platform economy is ridden with information and power asymmetries that can lead to superstar effects, while singling out other workers. The algorithm-powered matching processes on platforms are marked by opacity. Algorithms rely on customer feedback and may therefore institutionalize and spread the biased preferences of individual users onto others. As a result, the gig economy may perpetuate or even exacerbate existing inequalities in the labour market.

In light of this, this paper proposes to critically examine the platform economy's promises of empowerment. Is the gig economy indeed more inclusive? And do platforms actually provide a level playing-field?

Does the gig economy promote women's access to employment, appropriate working conditions and control over economic resources? Does the gig economy mitigate occupational segregation? Do women escape discrimination in the gig economy?

2 Theory: Drivers of gender inequality

This chapter seeks to address the underlying causes of gender inequality in the labour market. It provides the theoretical underpinning to explain differences in the gendered patterns of employment, the kind of choices women and men make and the constraints which guide these choices. Knowledge of the institutional constraints and gender roles that drive human behaviour is critical to understanding how the gig economy may be expected to bring about greater gender equality (Section 5)

2.1 Flexible work arrangements and gendered time use

As shown in Section 1, the female employment gap is linked to women's role as primary caregivers. Thus, working time flexibility is considered key to increasing women's uptake of paid work.

However, existing research on the gendered effects of flexible working time and telework on work intensity demonstrates that flexibility does not necessarily alter the underlying gendered relations, which continue to shape women's and men's use of time (Chung and Van der Lippe 2018, Clawson and Gerstel 2014, Hersch 1991, Lott 2018).

Chung and Lippe (2018, p.11) emphasize that men and women use flexible working time in different ways, leading to different outcomes for their well-being, work-life balance and work intensification. While men are more likely to (or expected to) expand their work spheres, women are more likely to (or expected to) take on even more domestic responsibilities while working flexibly (Clawson and Gerstel 2014). Employee-oriented flexible working time arrangements may benefit women and men in different ways; for men the intensification of work that results from a transition to working time autonomy results in higher earnings (Lott 2015), while flexible working has been reported to benefit women's well-being more than men's (Uglanova and Dettmers 2018).

Previous research based on US longitudinal data (Hundley 2000, in Adams and Berg 2017) finds that self-employed women - most of whom work from home - experience a significant 'housework penalty', exceeding that of organisationally employed women (Hersch 1991).

Furthermore, country, family and class-context matters: Chung and Van der Lippe (2018, p.12) warn that in countries where traditional norms on gender roles are prevalent and where ideal worker culture⁵ exists, flexible working may in fact reinforce a more traditionalised division of labour resulting in reduced gender equality.

Lott (2018) argues that family and domestic responsibilities can be understood as a constraint under which women navigate and negotiate their work spheres. Analysing gendered impacts of flexible working time arrangements on time-use of UK workers, Chung and Van der Horst (2018) find that women without children increase their overtime hours significantly and similar to that of men when gaining schedule control. In contrast, this is not the case for working mothers.

2.2 Occupational segregation

There is not one factor that can single-handedly explain gender segregation in the labour market. Individual motivation, the educational system, working conditions, societal norms and the state of the economy can all play into the educational and career choices of women and men.

Stereotypes are prescriptions of socially appropriate behaviour. Bettio and Verashchagina (2009) document the influence of stereotypes in causing and recreating segregation in education as well as in the labour market. Caring and educating jobs are associated with nurturing traits and inter-personal skills, which are deemed feminine, while science remains a typically male discipline due to stereotypical associations of men with objectivity and rationality (Ulriksen, Madsen and Holmegaard 2015).

⁵ Ideal worker culture is "a worker that has no other obligation outside of work and privileges work above everything else" (Blair-Loy 2009 in Chung and Lippe 2018, p.6)

Expectations regarding “gender-appropriate” careers are found to be stricter for boys than for girls so that cross-gendered pathways are more acceptable for girls than for boys (Van der Vleuten et al. 2016). However, societies with stronger egalitarian gender attitudes can facilitate gender-atypical educational choices amongst boys (EIGE 2018a).

Besides driving educational choices, stereotypes can also influence women’s and men’s permanence in employment. Women are typically expected to work fewer hours to reconcile work and family life or even to drop out of the labour market after childbirth (Piasna and Plagnol 2015), while men often face significant resistance when they try to do the same for deviating from the ‘norm’ (EIGE 2018a).

Stereotypes are formed before children even enter formal education amongst other through family relations or the impacts of media. Schools shape gender stereotypes by maintaining students’ interest and creating context that is perceived relevant (Jensen and Henriksen 2015). According to Imdorf et al. (2015), educational systems in which steering towards a particular occupation occurs at the upper secondary level favour more gender-typical career choices, because vocational training programmes are typically more gender typed. Gender identity formation is salient for adolescents; hence, they find it harder to challenge gender boundaries through atypical career choices (Smyth and Steinmetz 2015).

Occupational segregation can also be linked to the work environment and working conditions associated with particular occupations, e.g. autonomy, physical working conditions, health and safety risks, working hours, wages or job security.

A Eurofound study (2013) on the basis of the 5th European Working Conditions Survey looks at gender differences in reported job quality and working conditions. “Working time quality”⁶ - defined as a composite indicator of duration, scheduling, discretion, and short-term flexibility over working time⁷ - emerges as important gender difference in job quality. Women’s higher score is largely due to working shorter time and also fewer unsocial hours.

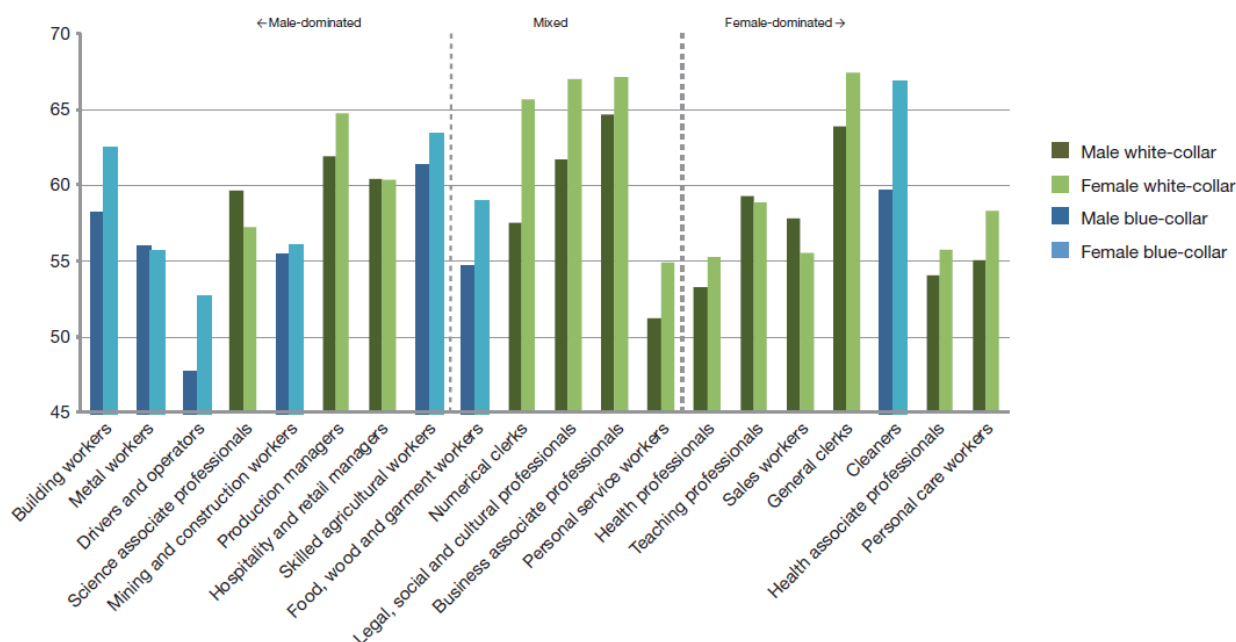


Figure 4 Women report higher working time quality across most occupational groups (Eurofound 2013, p.53)

⁶ “The working time quality indicator takes longer hours as an indicator of poorer job quality, yet short hours may also indicate poor job quality if the outcome is lack of assimilation in the workplace and marginalisation.” (Eurofound 2013, p.62)

⁷ This effect largely persists if the ‘part time’ component is removed from the working time quality measure (Eurofound 2013, p.55)

Based on a EU cross-country comparison, the study authors (Eurofound 2013, p.62) find that *“In those countries where women carry out domestic roles but still participate in employment (often resulting in an increasing gender gap in working time quality), their preferences or restrictions drive them towards jobs with better working time quality, but this also appears to drive down their monthly wages.”*

Occupational sorting also results from the availability of employment. According to Blau, Brummund and Liu (2013), the decline in blue-collar jobs and the rising demand for service jobs facilitates the entry of men into traditionally female jobs. The larger a country's STEM sector is, the higher the probability of women working in STEM occupations (EIGE 2018a). Nevertheless, the simultaneous rise in demand for STEM professionals on the one hand and care/health professionals on the other hand might actually increase gender imbalances; indeed, countries with a large STEM sector have lower shares of men in care jobs, while high employment levels in the care sector are associated with fewer women in STEM (EIGE 2018a).

Stereotypes are particularly problematic when they go beyond impacting the choices made by women. That is the case where recruitment and employment decisions are informed by perceptions of “women's work” (AAUW 2018, Bettio and Verashchagina 2009). “Steering” occurs when employers track women into low-paying jobs with limited prospects for promotions or transfers (AAUW 2018, p.15). Recruitment agencies which systematically advertise different jobs to women and men or employers who base their hiring decisions on gender-related inferred characteristics rather than credentials discriminate against women (Bettio and Verashchagina 2009) on the basis of stereotypes.

EIGE (2018a, p.69) finds that women in men-dominated sectors experience gender discrimination more often. This includes differences in task allocation, fewer opportunities for promotion and lower salaries. The poorest job prospects relative to men are reported by women among scientists, skilled farmers, food, wood and garment workers (Eurofound 2013, p.52). At the same time, men working in women-dominated sectors have more opportunities for promotion, take more senior posts and earn higher salaries compared to women.

Economists commonly distinguish between two forms of discrimination: taste-based and statistical discrimination. According to Becker's (1957) model of taste-based discrimination, employers have an irrational “distaste” for hiring or working with members of the minority group regardless of their productivity and are willing to accept a financial penalty to avoid working with them. In contrast, statistical discrimination (Phelps 1972) suggests that differential treatment of members of a minority group is directly related to imperfect information. Whenever individual-specific information is absent, limited or difficult to interpret, employers draw conclusions on individual productivity based on the expected productivity of the group the individual belongs to. This does not mean that statistical discrimination leads to efficient outcomes. In fact, empirical findings unequivocally show that women applying for stereotypically male jobs possess on average, more domain relevant skills than their male counterparts (Uhlmann and Silberzahn 2014).

Nevertheless, biased practices are likely to persist due to confirmation bias. Bentley, O'Brien and Brock (2014) define confirmation bias as *“a form of mistaken choice and/or mistaken belief that requires repeated challenge and strong immediate feedbacks to change, even though it may be wrong and, perhaps, very wrong”*.

Establishing the existence of discrimination has proven very difficult; amongst other reasons, because productivity is generally not directly observable (Bertrand and Duflo 2016). Labour economists interested in gender differences increasingly rely on experimental economics, where fictitious candidates are identical in all observable characteristics, except for their gender (Galperin et al. 2017, pp.9-10). A growing body of research clearly indicates the existence of implicit biases favouring men (“male preference”) (Moss-Racusin et al. 2012, Reuben, Sapienza and Zingales 2014, Correll, Bernard and Paik 2007).

Reuben et al. (2014) provide evidence of negative stereotyping of women's mathematical skills. When employers have no information about applicants other than their sex, both male and female employers are twice as likely to hire a man as a woman for math-related tasks that women and men perform equally well on average.

Boring (2017) and Mitchell and Martin (2018) find gender bias in student evaluations of teachers. According to Boring (2017), students favour male professors whom they perceive as more knowledgeable and as having stronger leadership skills. In Mitchell and Martin's (2018) study, students describe male professors in much more positive terms than female professors and assign higher ordinal scores in evaluating an identical online course when administered by a male instructor. Managerial performance evaluations of workers indicate that workers who belong to minority groups are subject to a higher level of scrutiny (Stauffer and Buckley 2005). In-group bias or same-gender preferences can positively influence managers' ratings of worker performance (Castilla 2011). Testing the role of gender-stereotypicality of selection criteria and in-group bias of hiring managers, Gorman (2005) observes that a) fewer women are recruited when selection criteria include a greater number of stereotypically masculine characteristics and that b) female hiring managers show same-gender preferences and hire more women than male decision-makers.

2.3 Gender pay gap

Traditionally, the gender pay gap was largely explained with differences in observable characteristics also referred to as "human capital determinants", i.e. gender gaps in education and work experience (Blau and Kahn 2016). Today, this gap has narrowed extensively, as European women have higher educational attainment rates than men, even if they still lag behind in on-the-job human capital due to lower labour market attachment (EIGE 2018a).⁸ According to the OECD (2012), the proportion of the pay gap that cannot be explained by differences in human capital determinants is particularly high at the upper end of the wage distribution, reflecting the strong role of vertical gender segregation in the labour market.

Horizontal segregation emerges as significant driver of the pay gap between women's and men's wages across European countries (Boll et al. 2016). Even though a pay gap exists within nearly every occupation, traditionally male-dominated jobs (construction, chemical products and electric and transport equipment) tend to pay better than female-dominated jobs (education, health and social work) even when the *same level of skill* is required (Boll et al. 2016, Eurofound 2013, Hegewisch and Hartmann 2014).

The STEM professions stand out as occupations with some of the highest earning prospects and rapidly growing demand, where women are markedly underrepresented in most European countries (see Chapter 5.2.2).

The finding by Hegewisch and Hartmann (2014) illustrates how critical understanding of "skill" is in diverse contexts. Researchers typically operationalise "skill" with academic attainment rates. European anti-discrimination law requires "work of equal value" to be compensated equally (EIGE 2019). However, the value attached to different skill-sets and, correspondingly, occupations, is not only a function of labour market needs, but in large parts a social construct (AAUW 2018, Fudge 2013). The persistently low compensation for university-trained nurses despite staggering demand is a common example of how differently society values occupations predominantly performed by women (EIGE 2018a).

Feminist scholars like Fudge (2013, p.7) believe this to be the result of the sexual division of labour by the post-war gender contract according to which women were financially dependent on their husbands and acted as unpaid caregivers, educators and cleaners in the home. As services that women had

⁸ In 2017, 45% of European women aged 30-34 have completed tertiary education, as opposed to 35% of men (Eurostat 2017).

previously performed “for free”⁹ are increasingly outsourced to (some of the most vulnerable¹⁰) labour market participants, we attribute lower monetary value to them.

Another factor, which hurts women’s earnings disproportionately, is the so-called “motherhood penalty” due to their absence from the workforce or to working fewer hours (Bertrand, Goldin and Katz 2010). This penalty extends beyond women’s time outside the workforce when prospective employers discriminate against them due to gendered expectations in their future productivity on the basis of their role as primary caregivers. Correll et al. (2007) and Kricheli-Katz (2012) conducted experimental studies documenting that employers are less likely to hire mothers (even if they never left the workforce) than women without children and offer lower salaries to mothers than to other women. Interestingly, the opposite is true for men. Due to their gendered role as “providers”, men are assumed to increase the commitment to their work after childbirth (Williams et al. 2013 in Uglanova and Dettmers 2018), for which they are offered an anticipated “fatherhood bonus” (Killewald 2013, Budig 2014).

Furthermore, women have lower wage expectations (O’Shea and Bush 2002) and these are likely to lead to lower outcomes (Heckert et al. 2002). Analysing reservation wages of unemployed individuals Caliendo et al. (2017) show that gender differences in reservation wages account for a large share in the subsequent gap in realised wages. Young women have lower wage expectations than men even before entering the labour market. This can jointly drive the pay gap through effects on educational choice and the formation of reservation wages, which have a persistent effect on future wage trajectories (Schweri, Hartog and Wolter 2011).

The classic compensating differential equilibrium (Rosen 1986) stipulates that as women place a higher value on temporal flexibility (due to their role as primary caregiver) they trade off financial gains for non-monetary values such as working time flexibility and sort into occupations accordingly. Schweri et al. (2011) observe a compensation differential for lower wage risk. A recent experiment by Wiswall and Zafar (2016) confronted NYU students with multiple hypothetical job choice scenarios. Their results show that female students are willing to pay six times more in terms of expected wages for higher flexibility in working hours or more secure jobs than males.

Filippin and Ichino’s (2005) study among Bocconi University graduates suggests that women may simply be realistic about their lower earnings prospects; the gender gap in expected wages closely matches the actual wage gap between female and male graduates.

However, scholars are warning of the risk of self-fulfilling prophecies (Bertrand and Duflo 2016). As young women are expecting to be discriminated against in the labour market (Filippin and Ichino 2005), they may opt for the path of least resistance in terms of their career choices or negotiating pay (Bertrand and Duflo 2016).

Gender differences in bargaining behaviour are believed to contribute to the gender pay gap. According to a growing body of research, women do not only avoid negotiations – they also fare worse when they do negotiate (Bowles and Babcock 2013). This is linked to women’s weaker inclination to engage in risk-taking, negotiation, and competitive behaviours (Babcock and Laschever 2003, Niederle and Vesterlund 2007, Croson and Gneezy 2009).

To test whether women avoid wage negotiations, Leibbrandt and List (2012) conducted an online field experiment. They find that women accept lower wages than men in ambiguous contexts, i.e. without mentioning the possibility of negotiating, but that gender differences disappear when the possibility of bargaining is made explicit (Leibbrandt and List 2012, p.12). They find that that gender differences in

⁹ The opportunity cost of time spent outside the labour force and the value of unpaid work are important questions, which exceed the scope of this research.

¹⁰ The international dimension of the care sector is well-known, i.e. the feminisation of migration where an increasing number of women migrate from the Global South to the Global North and from Eastern European countries to Western Europe to work as carers (DG IPOL 2016, Fries-Tersch et al. 2018).

negotiation play a lesser role in environments in which negotiations are impersonal, rather than face-to-face (p.2)

Hernandez-Arenaz and Iriberry (2018) find that women request lower wages when negotiating with male recruiters, while faring equally well as male candidates in negotiations with female recruiters.

Croson and Gneezy (2009) show that men have an advantage in competitive settings. The willingness to engage in competition is widely attributed to gender differences in confidence levels (Risse, Farrell and Fry 2018). As men are more confident of their likelihood to succeed, they are more willing to accept the risks associated with negotiating salaries (Niederle and Vesterlund 2007). Younger men (under 25) in particular are found to have a comparatively high risk tolerance in contexts of uncertainty (Derevensky, Gupta and Ellenbogen 2006).

Further research on the contribution of gender patterns in personality traits to the pay gap finds that women show a higher level of agreeableness, conscientiousness, and extraversion than men (Risse et al. 2018). Nyhus and Pons (2012) find that women's higher level of agreeableness contributes to their lower wages, while Gensowski (2018) detects positive effects of conscientiousness and extraversion to be largely limited to men.

Sandberg (2013) urges women to close the gender gap by requesting higher wages. However, Exley, Niederle and Vesterlund (2016) use a laboratory experiment to examine the effects of 'leaning-in' and find that women positively select into negotiations. In fact, by opting out of negotiations considerably more often than men, women avoid substantial financial losses (Exley et al. 2016, p.14). Bowles, Babcock and Lai (2007) observe that negotiating for pay comes at a significant social cost¹¹ for women, but not for men. These findings suggest that women faced considerable bias when trying to negotiate for better pay.

Gender bias can act not only as a gendered barrier to employment; it may also lead to lower pay for the same work irrespective of the protected group's qualifications. When preconceived notions of women's productivity or bargaining power serve to justify lower pay, this is referred to as statistical discrimination (Phelps 1972). An experiment (Moss-Racusin et al. 2012) testing recruiting practices at six universities finds that (both male and female) faculty members perceive the male candidate as significantly more competent than the (identical) female candidate and set a starting salary for male applicants at almost USD 4.000 above the salary offered to female applicants.

Similarly, the taste-based discrimination (Becker 1957) theory stipulates that employers who recruit women in spite of their 'distaste' for that group will offer them lower pay than they would to comparable male candidates (Bertrand and Duflo 2016).

¹¹ Social cost is defined as evaluators stating they would no longer want to work with a candidate after having seen them negotiate (Bowles et al. 2007)

3 The gig economy: a lucrative business model

The gig economy is defined as

“exchange of labour for money between individuals or companies via digital platforms that actively facilitate matching between providers and customers on a short-term basis”. (BEIS 2018)

This definition excludes agency work, matching services such as LinkedIn and asset-sharing platforms such as Airbnb (Florisson and Mandl 2018, p.21). The terminology surrounding this new form of work organisation is at times blurred¹²; in the sake of clarity, this paper uses the terms “gig economy and “platform economy” to refer exclusively to online labour-mediation intermediaries for commercial purposes.

Key features characterising the gig economy are (Florisson and Mandl 2018, Schor 2018):

- Three parties are involved: the online platform, the worker and the client¹³
- Jobs are broken down into tasks, which are contracted out
- Entry barriers are low for workers on most platforms
- Trust is achieved via social feedback in the form of ratings and reviews
- Providers¹⁴ are typically independent contractors (rather than employees)

The gig economy comprises services which are delivered online (cloud work) or in person (location-based work).

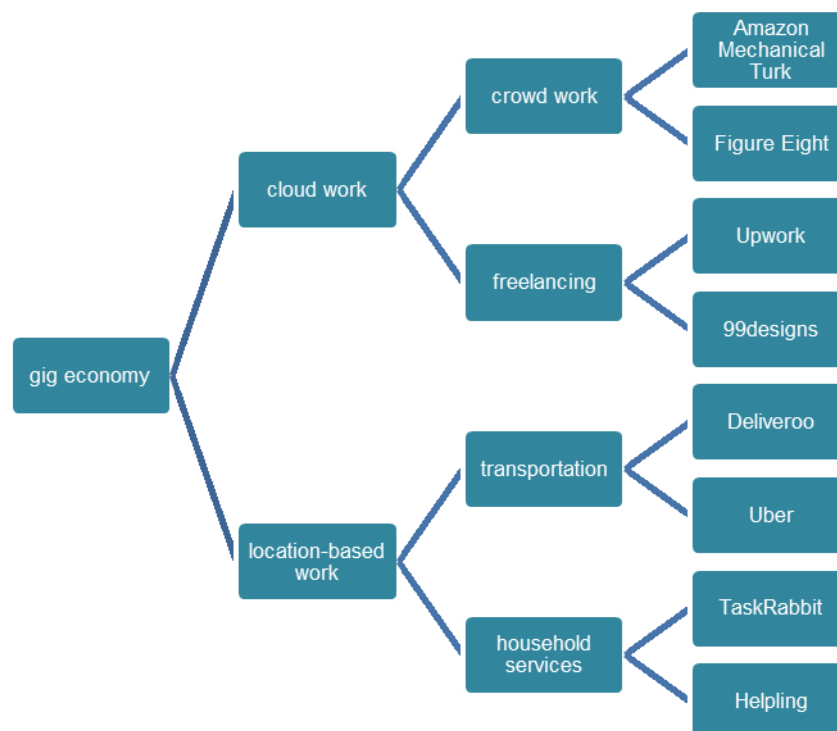


Figure 5 Typology of platform work¹⁵

¹² The objective is to avoid any confusion with the so-called “collaborative” or “sharing economy”, which, in turn, is centred on resource efficiency, sustainability and community-building (Fuentes 2017).

¹³ also referred to as employer

¹⁴ also referred to as worker

¹⁵ based on Schmidt (2017)

The tasks commonly traded via platforms range from very low-skill, standardised tasks (crowd work) and low-skill personal services (location-based work) to medium-skill activities (freelancing) and highly specialised expertise (freelancing), which may otherwise not be locally available.

In **cloud work**, we can broadly distinguish between

- (1) Crowd work, also referred to as “microtasks” or “clickwork”, used to describe crowdsourced clerical and data entry tasks like data labelling, online reviews, “likes”, or audio transcription;
- (2) Online freelancing, including tasks related to administrative assistance, graphic design or software development.

Cloud work is typically contracted by organisations.

In contrast, **location-based work** is delivered locally and in person and ranges from personal transport and food delivery, to household services like babysitting, home repairs and cleaning services (Petropoulos et al. 2019, p.78). Location-based work is associated with the peer-to-peer economy.

While location-based work has received by far the most public attention, Pesole et al. (2018) find that microtasks are the most prevalent type of platform work (making up 43% of gigs traded on platforms), followed by professional freelancing (30%; Petropoulos et al. 2019, p.100).

Some platforms have global reach and a large international workforce, offering their services to clients around the world, while other platforms operate only within city limits. Similarly, there are differences regarding the scope of services traded on a platform; some platforms offer a wide range of services, while others operate within a specific niche. The platform economy thus attracts a variety of service providers with different profiles, motivations and needs.

It is apparent that the gig economy denotes a highly heterogeneous phenomenon. Therefore, any meaningful discussion of the opportunities and risks associated with the gig economy and the ways in which the gig economy may empower workers needs to reflect that diversity.

3.1 Three-sided market

Economists define the structure of platforms as two-sided or multi-sided markets (Hagiu and Wright 2015). This paper follows Schmidt’s (2017) definition according to which the gig economy represents a “three-sided market” in the way that the function of the platform goes beyond merely providing the infrastructure and software that enable transactions between jobseekers and employers.

Platform owners have considerable information advantages vis-à-vis the other two parties through permanent back-end access to a big data overview in the cloud (Schmidt 2017, p.10). Meanwhile, platform structure and algorithms determine how clients and workers find each other, what information is shared when, how platform users communicate, how they make decisions and how they transact money for labour (Newlands et al. 2017). To manage a dispersed labour force, platforms employ various data-driven techniques of remote worker control (Van Doorn 2017). Thus, the typical labour platform is characterised by a systemic information and power asymmetry.

By framing the role of platforms as that of a technology company offering a service to workers and clients, platforms can maintain and expand their operations at virtually no cost because it allows them to shift entrepreneurial risks, legal liabilities, the cost of labour and the means of production to the other two parties (Schmidt 2017, p.10).

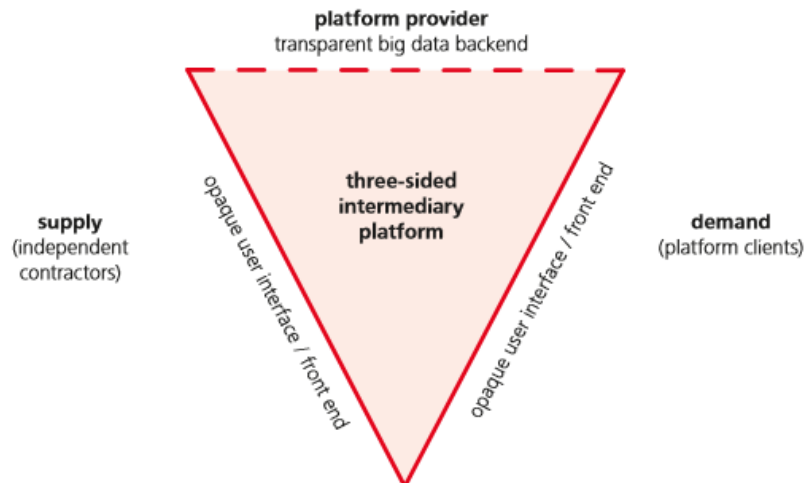


Figure 6 Three-sided platform architecture (Schmidt 2017, p.10)

3.2 Employer-driven flexibility and the commodification of labour

The gig economy is viewed enthusiastically by some for enhancing labour market efficiency. According to Manyika et al. (2016, p.34) *“digitally enabled independent work is intermediated through an online marketplace that improves search capabilities, lowers coordination costs and provides richer signalling through mechanisms such as reviews or ratings”*.

Wood et al. (2019) emphasise the role of reputational systems as effective mechanisms of control in online labour markets, which are marked by non-proximate low-trust labour relations. Many platforms rely on a quality system of reliability scores or ranking whereby workers are evaluated based on cost, timeliness, reliability and quality of delivery (Barnes et al. 2015).

Employers value the opportunity to mobilise human resources quickly and cheaply: *“The gig economy enables companies and consumers to locate appropriate short-term services to meet the demands of specific projects and at a relatively low price”* (International Organisation of Employers 2017).

Platforms promote ‘immediate task gratification’ (Yeung, 2016). In 2010, Lukas Biewald, CEO of the crowd work platform Figure Eight, made a blunt case for flexibility: *“Before the Internet, it would be really difficult to find someone, sit them down for ten minutes and get them to work for you, and then fire them after those ten minutes. But with technology, you can actually find them, pay them the tiny amount of money, and then get rid of them when you don’t need them anymore.”*

Figure 7 illustrates how informal working relationships are “formalised” in the gig economy:

COMPANY DOES NOT PERFORM TASKS AND DOES NOT EMPLOY INDIVIDUALS TO PERFORM TASKS. COMPANY DOES NOT SUPERVISE, DIRECT OR CONTROL A TASKER’S WORK OR THE TASKS IN ANY MANNER, WHICH TASKER HEREBY ACKNOWLEDGES [...]. The TaskRabbit Platform is not an employment service and Company is not an employer of any User. As such, Company is not responsible for and will not be liable for any tax payments or withholding, including but not limited to unemployment insurance, social security, disability insurance or any other applicable federal or state withholdings in connection with your use of Users’ Task services.

Figure 7 TaskRabbit Terms of Service (Shade 2018, p.43)

While platforms argue that “permissionless innovation” is critical to affording previously unknown levels of flexibility to both service providers and clients, it has become apparent that on-demand labour comes at the expense of the increased contingency of workers (Eurofound 2018b, DG IPOL 2017).

The low pay on labour platforms is enabled by hyper-competition. Graham (2017) found that on a global online labour market less than 200,000 workers out of 1.8M registered workers had been successful at obtaining work. By treating platform workers as “independent contractors”, they are “disembedded” from the cultural and legal norms that would limit the commodification of labour (Wood et al. 2019). At the same time, the oversupply of workers diminishes the ability of workers to secure better wages and working conditions.

3.3 Scope

Available analyses on the size of the gig economy vary considerably based on different definitions of the platform economy. Indeed, some refer to the collaborative economy as a whole and include mediation of assets (e.g. house-sharing) in their calculations, while others distinguish between revenues generated on the basis of online- and offline tasks. Nevertheless, there is consensus that the platform economy has generated high revenues and exhibited high growth trajectories.

According to the European Parliament (2017), the revenue generated by collaborative platforms in the EU amounted to €3.6 billion in 2015, which doubled the €1.8 billion generated in 2014. Considering solely transactions for online-mediated labour, these were estimated at €2.7 billion in 2015.

Similarly, a PwC analysis (Hunt and Samman 2019) of five sectors of the platform economy (namely, crowdfunding, asset sharing, transport, household services and on-demand professional services) in the EU values revenue at 3.6 billion in 2015 and forecasts revenue expansion of around 35% yearly between 2015 and 2025, thereby projecting a growth scenario around 10 times faster than the broader economy. By 2025, revenues are forecasted at €80 billion, with many sectors rivalling the size of offline counterparts.

De Groen et al. (2017, p.350) estimated the size of online labour platforms based on total annual gross revenues and numbers of active workers on 173 platforms in the EU. They calculated gross revenue at €4.2 billion in 2016, amounting to 0.03% of EU GDP.

Breaking it down by tasks, Florisson and Mandl (2018) report a total value of transactions of €1,950 million and revenues of €450 million generated through household tasks on platforms in Belgium, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden and the UK in 2015. By contrast, online professional tasks led to a transaction volume of €750 million and platforms’ revenue of €100 million in the same time-period (Vaughan and Daverio 2016).

The platform economy is characterised by winner-takes-all dynamics. While market entry barriers are low for niche markets in localised services; Kuek et al (2015) estimated that in 2013, three platforms, namely Upwork, Freelancer and the Chinese professional task platform Zhubajie/Witmart together held 50% of the global online professional task market. Meanwhile, the microtasking platforms FigureEight and AMT accounted for 80% of a EUR 1.3 billion-market (Kuek et al 2015).

The number of active platform workers varies significantly across different platforms. Longer established and international platforms tend to have much higher numbers of workers (Florisson and Mandl 2018). According to the OECD (2019a), studies measuring platform size in terms of worker involvement produce estimates ranging from 0.5% to 3% of the labour force. In the same vein, Hunt and Samman (2019, p.11) use ILO global workforce data for 2015 and estimates on the number of workers across 39 platforms and find that 1.5% of the global workforce are involved in the gig economy.

In contrast, recent research (Huws et al. 2017) based on online-surveys across Austria, Germany, Italy, the Netherlands, Sweden, Switzerland and the UK purports much higher figures. For this study,

platform workers were identified by their affirmation they 'had ever sold their labour via a platform' in any of the following three categories pertaining to online and offline gig work:

- Carrying out work from their own home for a website such as Upwork, Freelancer, Time etc, Clickworker or PeoplePerHour.
- Carrying out work for different customers somewhere outside their home on a website such as Handy, TaskRabbit or Mybuilder.
- Carrying out work involving driving someone to a location for a fee using an app or website such as Uber or BlaBlacar' (Huws et al, 2017, p. 16)."

Accordingly, between 9% (Germany, United Kingdom) and 22% (Italy) of adults reported to ever have earned money from an online platform. Regarding the frequency of activities and intensity of work, the study finds workers are evenly divided between occasional (monthly) and more frequent (weekly) workers (Florisson and Mandl 2018, p.10).

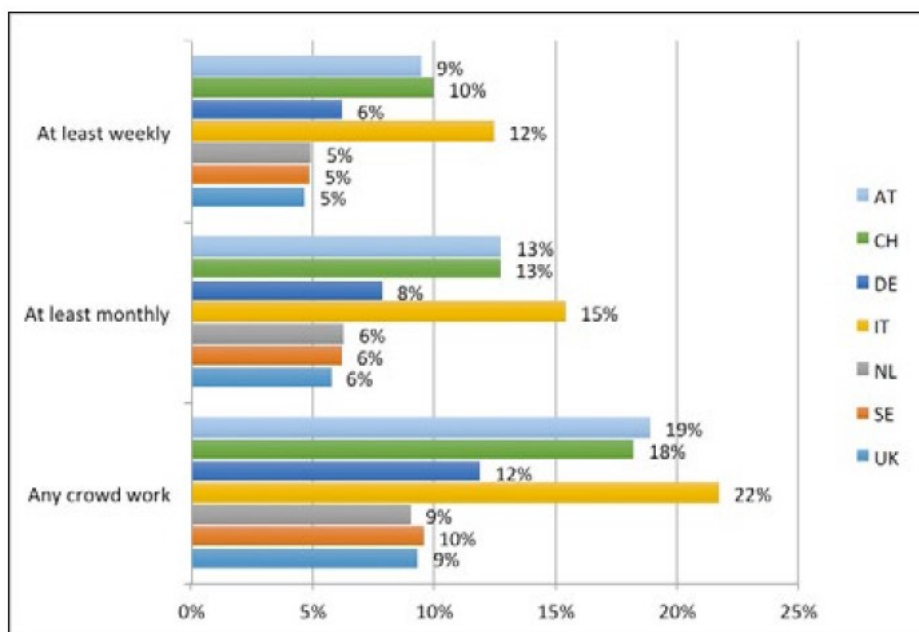


Figure 8 People doing crowd work, by country and frequency (Huws et al. 2017)

Pesole et al. (2018) used a similar approach to survey service provision via platforms in 14 EU countries, by asking respondents whether they had ever earned income by "providing services via online platforms, where you and the client are matched digitally, payment is conducted digitally via the platform and the work is location-independent, web-based" and "providing services via online platforms, where you and the client are matched digitally, and the payment is conducted digitally via the platform, but work is performed on-location". As a result, the share of adult internet users who declared to have previously provided labour services via platforms ranges from nearly 7% in Finland to 16% in Portugal (totalling 2% of the European working-age population).

	%
United Kingdom	12.6%
Spain	15.1%
Germany	11.8%
Netherlands	10.6%
Portugal	15.7%
Italy	13.5%
Lithuania	13.5%
Romania	14.2%
France	8.8%
Croatia	12.1%
Sweden	7.8%
Hungary	8.9%
Slovakia	8.5%
Finland	6.9%
Total	11.9%

Figure 9 Percentage of platform workers in Europe according to the COLLEEM 2017 survey (Pesole et al. 2018)

Farrell et al. (2018) used data from 39 Million JP Morgan checking account holders over a time period of 5 years to determine income derived from activities in the gig economy. They produced an estimation of 0.5% of adults working for platforms in a given month in the US and roughly 1.5% of adults having ever worked for platforms. However, Pesole et al. (2018) note that the JP Morgan study tried to measure only gig work considered their “main job” by the respondents, while a significant amount of work via online platforms may take place as secondary activity.

On the other hand, most research focussing on the European market relies on online-administered surveys and small samples. As Hunt and Samman (2019, p. 9) point out, this makes it both harder to derive significant results and more likely to over-represent gig workers by excluding those workers without digital access. In addition, surveys may produce different results based on the questions used to probe workers’ involvement; i.e., asking workers whether they have ever been involved in gig work at all or whether they have earned money on platforms in a given time frame, such as the preceding year or week.

In conclusion, the platform economy is a growing business, which is dominated by a few very large firms. While Farrell et al. (2018) believe that the gig economy is saturated, most research suggests otherwise. Kässä and Lehdonvirta (2016) estimate that the use of cloud work platforms is growing at an annual rate of 25%. Standing (2015) even suggests that over the next decade every one in three labour transactions will be mediated by online labour platforms

Vaughan and Davario (2016) and Manyika et al. (2016) expect the peer-to-peer service market, i.e. on-demand household services to continue growing rapidly. In fact, scholars forecast revenues from on-demand household services to grow at roughly 50% yearly through 2025 (Hawksworth and Vaughn 2014). These estimates are substantiated by research from the UK (Huws et al. 2019) – the only country for which longitudinal data is available – where the number of regular gig workers has doubled in the course of three years (from 4.7% in 2016 to 9.6% in 2019).

4 Empowering women or scaling inequalities?

The gig economy promises a more inclusive labour market. Ease of access, low entry barriers and working time flexibility are expected to facilitate the labour market entry of women and other marginalised groups. Meanwhile, technology-enabled management and better information offer a merit-based matching process. Jobseekers can choose to conceal aspects of their identity online, which may help them escape discriminatory bias. Hence, the gig economy also promises a more egalitarian labour market.

4.1 Flexibility

The gig economy promises to increase women's participation in the labour market by allowing for a better reconciliation of work- and family life. The promise of flexibility and the chance to work from home shall enable women to engage in paid work alongside gendered familial responsibilities.

"Freedom is helping (literally) drive another wave of women's empowerment: the opportunity to fit work around life, rather than the other way around. For women around the world, Uber offers something unique: work on demand, whenever you want it. Drivers can make money on their own terms and set their own schedules" (Uber Newsroom 2016).

"The Uber app is liberating for 'the single mom who can turn off the app to pick up her kids from school, and then turn it back on once they've been dropped off at soccer practice" (Uber Newsroom 2015).

"TaskRabbit has enabled me to have the flexibility to work around the schedule of being a full-time mom" (TaskRabbit/Shade 2018).

A report by the OECD (2017, p.1) suggests that platform work may narrow the female employment gap, because *"work is split up into self-contained tasks and can be allocated to multiple workers without requiring each one of them to work long and inflexible hours"*. The authors emphasize that the gender pay gap in the U.S. is lower in sectors with a higher prevalence of telework (Goldin 2014)¹⁶. Moreover, the report states that working from home can benefit women especially, given that OECD countries with the highest shares of women working from home also have the highest maternal employment rates, whereas no such relationship emerges for men (OECD 2017)¹⁷.

Manyika et al. (2016, p.43) find that 48% of European women and around 42% of US women who are own-account workers¹⁸ are also caregivers.

The freelancing platform Upwork (formerly Elance) states that *"the majority of women working for labour platforms find it easier to be hired for a job online while working for multiple clients than to compete for a full-time job in a traditional fashion"* (Elance 2013).

Indeed, independent surveys with platform workers Florisson and Mandl 2018, Eurofound 2018a) confirm that many platform workers consider autonomy and flexibility in their work as a significant motivation for their platform activities. Nevertheless, motivations for engaging in gig work differ across the wide range of services and skill-levels associated with different forms of work and factual work autonomy. Low entry barriers and the chance to earn additional income are important motivations in location-based work, while participation in creative projects is seen as a means build or extent the

¹⁶ Employees are likely to be offered contracts allowing for flexible working arrangements such as telework in the interest of maintaining the working relationship or strengthening the attachment to the organisation (Goldin 2014). In the gig economy, such a relationship does not exist; hence, the use of standard employment as proxy is at the very least questionable.

¹⁷ The share of mothers working from home is defined as mothers stating to have worked from home at least once during the previous year (2014/15). The positive correlation observed by the authors is similar (albeit much weaker) to the relationship between maternal employment rates and the share of young children in early childhood education and care (OECD Family Database: <http://www.oecd.org/els/family/database.htm>).

¹⁸ The definition of own-account/independent work comprises any form of income-generating activity, including supplementary earnings (Manyika et al. 2016, p.31)

client base of freelancers (Eurofound 2018a). Location-based gig workers value working time flexibility, allowing them to combine gig work with other activities; while cloud workers appreciate flexibility in “work organisation” (including the use of empty time; Eurofound 2018a).

It is noteworthy that platforms direct the message of empowerment through flexibility not only to women in involuntary unemployment. Upwork’s (Elance 2013) publication of an internal survey emphasises that 32% of women who had left their “traditional jobs” to work as online freelancers did so because they needed more flexibility and 28% said they needed more time as a caregiver for a family member at home.

Platforms also promise to close the female employment gap more indirectly thanks to convenient, locally-available services. Advertising for location-based platforms is frequently targeted at female users, following a narrative of “work-family reconciliation”.¹⁹ By outsourcing unpaid work at low cost to on-demand workers, women can free their schedules from undesirable tasks and increase their commitment to paid work, so the promise (Shade 2018).

I hired a TaskRabbit to go get oatmeal for my daughter so I’d have it when I get back on Saturday. As a mom you’re so panicked and starved for time, you just need help. There’s just no other way sometimes (Busque, CEO TaskRabbit, in Winick 2014).

According to Huws et al. (2017), household services (e.g. cleaning, household maintenance) represent the most frequently purchased service on platforms; accordingly 36% of the surveyed sample in the UK, 30% in the Netherlands, 29% in Italy, 26% in Sweden, 21% in Switzerland, 20% in Austria and 15% in Germany have procured household services via online platforms.

In conclusion, platforms offer to fulfil women’s greater need for flexibility. However, in doing so, they may (inadvertently) perpetuate the gendered division of labour.

4.2 Low entry barriers

Ease of access and low entry barriers are key features of platform work expected to facilitate the labour market entry of underrepresented groups.

“CrowdFlower [now Figure Eight], and others in the crowdsourcing industry, are bringing opportunities to people who never would have had them before” (Bielefeld, CEO Figure Eight, in Marvit 2014).

Zyskowski et al. (2015) provide evidence indicating that the gig economy may indeed be more inclusive. According to their research, people with a variety of disabilities currently participate in cloud work. The authors indicate that cloud work offers opportunities for people with disabilities relative to the normative office environment, such as flexibility, and the lack of a need to rely on public transit (Zyskowski 2015).

The International Labour Organization (2019) finds that cloud work can help workers escape local labour market constraints, as anyone with internet access and in possession of a connected device may in principle participate in online labour markets irrespective of their location. This may encourage women’s greater entry into paid work by allowing them to bypass cultural or socio-economic constraints (OECD 2018). Indeed, Berg et al. (2016) find that residents from economically depressed areas are highly represented amongst crowd workers.

Furthermore, the OECD (2018, p.24) credits the platform economy with the capacity to “offer leapfrog opportunities to women” by accessing online markets with global reach. The report (OECD 2018, p.24)

¹⁹ These messages risk perpetuating gender stereotypes and follow a tradition of classism in domestic services (Wajcman 2015). Service users are more likely to be college graduates, have higher incomes, be under the age of 45 and live in urban areas (Smith 2016)

states that participation in the gig economy, both locally and globally gives women *“the chance to emerge from the shadow economy in which they might have been working”*.

4.3 A level playing field

Platforms promise to empower women and other marginalised groups by offering more egalitarian labour markets. Technology is deemed to be free of human biases. Algorithmic management and detailed monitoring enable an objective comparison of workers' productivity. In addition, workers may choose to conceal aspects of their identity online to avoid bias. As a result, hiring processes should be characterised by greater objectivity than in traditional labour markets. A merits-based system should equally mitigate occupational segregation and contribute to closing the gender pay gap.

“We operate in a truly egalitarian fashion, where anyone who wants to can do microtasks, no matter their gender, nationality, or socio-economic status, and can do so in a way that is entirely of their choosing and unique to them” (Bielefeld, CEO Figure Eight, in Marvit 2014).

“At TaskRabbit, the importance of diversity and inclusion has been a part of our DNA since day one, with a workforce that’s 58% female, 11% African American, 5% Latino, 11% Asian, and 11% LGBTQ” (TaskRabbit 2016).

Hyperwallet (2017) conducted a survey among 2,000 U.S. women participating in asset- or labour-sharing platforms. Their study shows that 33% of women work online under a pseudonym, or have a user name that does not reveal their gender, in an attempt to avoid being discriminated against. Of those women, 72% state to work under a gender-neutral name to maintain anonymity, 14% do so to increase the interest in their offer and 14% maintain anonymity explicitly to avoid sexism or hostility on platforms.

86 % of respondents believe that gig work offers the opportunity to make equal pay to their male counterparts (while only 41% believe this to be the case in traditional work; Hyperwallet 2017, p.11). Women expect to find much more egalitarian conditions in the gig economy, which might reflect in higher reservation wages and higher earnings.

Some platforms have set standardised rates, providing a more level playing field to market participants. Yet, many freelancing platforms encourage providers to compete by price. Barzilay and Ben-David (2017, p.398) suggest that women may still find it easier to negotiate for equal pay on platforms, because negotiations are taking place online, rather than in person and in horizontal, rather than hierarchical relationships.

There are three ways in which the gig economy may **increase existing labour market inequalities; precarisation, superstar effects and algorithmic bias**. Platforms may contribute to the dualisation of labour markets if on-demand labour replaces standard employment. Global online markets and digitized reputation can create winner-takes-all dynamics on online platforms. Algorithms may (inadvertently) reproduce human bias.

4.4 Precarisation

Schmidt (2017, p.10) emphasises that platforms are immaterial software products and as such they can potentially scale exponentially with very low marginal costs. At the same time, platforms operate for the most parts outside regulatory scrutiny (see Section 3.1). Those who are excluded from the scope of labour law are more often than others exposed to social exclusion and employment and income security (Standing 2011).

Women are already overrepresented in atypical, precarious and informal employment (Section 1). The gig economy may further increase existing inequalities as low-earners sort into low-paying jobs on platforms (Smith 2016). In addition, the rise of the platform economy is depriving a growing number of individuals of their social rights (DG IPOL 2017). Platforms limit the incentives for companies to train and retain employees (Standing 2011, Hunt and Samman 2019). Temporary work can reduce social mobility, as precarious jobs become ‘traps’ as opposed to ‘bridges’ into secure work (Codagnone et al. 2016).

As work is increasingly split up into tasks, it is more easily contracted out. *“One consequence of work fragmentation is the growing risk of deepening gender-related workforce segmentation, because of differences in women’s position, relative to men, in the occupational structure, the family and welfare policy, all of which render them more vulnerable to market pressures”* (Piasna and Drahokoupil 2017).

In conclusion, the gig economy may exacerbate labour market segmentation through the precarisation of gig workers and substitution of regular employment.

4.5 Superstar effects

The gig economy drastically reduces the search cost for labour in highly competitive markets (Fishman et al. 2014). A larger labour pool is associated with more heterogeneity in terms of skills, experience, and motivation (Codagnone et al 2016, p.28). Employers can choose to contract either the best workers (in absolute terms) or those who provide the best value for money in a global, rather than a local context. This can lead to “superstar” effects, i.e. the concentration of work assignments and earnings around a limited number of workers (Codagnone et al. 2016, p.28)

Horton (2014) finds superstar effects on Upwork, as employers inefficiently pursue oversubscribed workers. Amazon Mechanical Turk (AMT) is a heavy-tailed market, where the top 0.1% of clients request 30% of dollar-weighted tasks (and the top 1% account for more than 50% of dollar activity), while 10% of workers perform 75% of available gigs (Ipeirotis 2010). Admittedly, a long tail might be expected in labour markets with low entry barriers and it is unknown to what extent workers registered with a platform are actively seeking work (Rietveld and Eggers 2017, Ipeirotis 2010).

Nevertheless, the strong superstar effects are likely to be caused by platform recommender systems and matching algorithms. Employers appear to cope with information asymmetries and overwhelming choice (Rietveld and Eggers 2017) by relying heavily on recommendations and referrals (Codagnone 2016, p.44).

Platform users receive digital reputation scores on the basis of social feedback by other users. Users with high reputation²⁰ scores enjoy higher visibility on platforms through rankings or referrals (Sangeet 2016). Better visibility allows workers to attract more work and resources, enabling them once more to increase their reputation scores. Conversely, users with poor or no feedback have lower visibility and

²⁰ Digital reputation enables trust by mitigating the risk of negative experiences.

are less likely to be booked because they represent a riskier choice in comparison to high-valued users. These feedback loops compound over time, skewing work opportunities and earnings in favour of a limited number of platform workers (Sangeet 2016).

Agrawal, Lacetera and Lyons (2013b) find that a low amount of verified work experience is associated with a disproportionate increase in winning subsequent job offers. Horton (2015) conducted an experiment, showing that algorithmically recommending workers for the purposes of recruitment can increase hiring substantially (Horton 2016). Employers with technical vacancies that received recommendations had a 20% higher fill rate than those without recommendations (Horton 2016).

Pallais (2014) demonstrates that ratings play an important role in driving income inequality. The researcher hired 952 contractors on Upwork to complete a 10-hour data entry task. Upon completion he provided all of them (treated group) with a 5*-rating. The 2,815 gig workers who applied but were not selected were used as control group. Considering only workers with no prior experience, Pallais (2014) found that the income of the treated group was three times greater than that of the control group during the two months following the initial experiment.

Platforms can increase inequality among workers by favouring early users over those who come on later. Furthermore, online labour markets can exacerbate wage inequality by skewing work in favour of the most skilled and experienced.

In light of the feedback loops associated with reputational systems it is critical to understand to what extent algorithms are reacting to clicks, interaction and rankings and may thereby reproduce human bias in social feedback.

4.6 Algorithmic bias

In principle, *“artificial intelligence can reduce humans’ subjective interpretation of data because machine learning algorithms learn to consider only the variables that improve their predictive accuracy, based on the training data used”* (Silberg and Manyika 2019). This explains the widespread belief that algorithms are free of bias and ensure objective decision-making on platforms.

However, Mittelstadt et al. (2016, p.1) remind us that technology is not autonomous, because operational parameters are specified by programmers and *“configured by users with desired outcomes in mind that privilege some values and interests over others”*. In addition, an algorithm can only be as good as the data it works with, which means that the data model the algorithm analyses to take decisions can be biased (Kullmann 2018, p.9)

Bias in the data or the way big data is used may therefore *“result in disproportionately adverse outcomes concentrated within historically disadvantaged groups in ways that look a lot like discrimination”* (Barocas and Selbst 2016, p.673)

According to Kim (2017), an algorithm may discriminate individuals in various ways:

- The algorithm may intentionally discriminate
- An individual’s record errors may unfairly deprive them of work or equal pay
- A statistically biased data model may systemically disfavour a particular group because of the way it was programmed
- An algorithm may systematically discriminate against members of a particular group, even if the data model itself is not biased.

An example where statistical discrimination might occur is where a matching algorithm has learned to associate certain masculine characteristics with male-typed professions (or vice-versa) and correspondingly privileges male workers in returns to client queries. Even in the absence of explicit information on a user’s gender, algorithms may use other characteristics to infer gender and skew opportunities towards privileged users.

The blind application of machine learning runs the risk of amplifying biases present in data. Silberg and Manyika (2019) report that a technology company discontinued development of a hiring algorithm based on analysing previous decisions after discovering that the algorithm penalised applicants from women's colleges. Bolukbasi et al. (2016) showed how the widespread machine learning practice of "word embedding"²¹ exacerbates human prejudice. After training the algorithm on Google News Articles, the word embeddings exhibited strong gender stereotypes, such as labelling women as homemakers and men as software developers (Bolukbasi et al. 2016). As a consequence, translation software has translated female doctors into male doctors, and image-labelling software has labelled men as women if they were standing next to an oven (Perez 2019)

Buolamwini and Gebru (2018) found that facial recognition technologies misclassified women, and especially women of colour (with error rates of up to 34.7%) considerably more often than white males. An inspection of the training datasets revealed that they were overwhelmingly composed of white subjects (Buolamwini and Gebru 2018).

The data gap in the development of algorithms has been attributed to the lack of diversity in the industry. There are significantly fewer women involved in software development: *"Of approximately 100,000 software developers using Stack Overflow, only 4% are female; of GitHub's 5,500 surveyed users only 2% are female; and on HackerRank, the gender gap in software development is approximately 16% with only 25,000 respondents being female"* (OECD 2018, p.96).

At the same time, women are notoriously underrepresented in digital innovation businesses and funding of software development. The Silicon Valley, where most of the technology originates, is almost exclusively white and male (Perez 2019). Female entrepreneurs represent less than one third of start-up founders (OECD 2018, p.98); only 11% of start-ups applying for venture capital are female-owned and these businesses are significantly less likely to receive funding (Breschi, Lassébie and Menon 2018). Even if female-owned start-ups are funded, they receive on average 23% less funding than male-led start-ups (OECD 2018, p.98).²²

In conclusion, it is possible that platforms reproduce or enhance human bias. However, both the training data used to develop the algorithms and the algorithms themselves are proprietary information (Kullmann 2018). This makes it extremely difficult for outsiders to prove the existence of bias. In light of the information asymmetries on platforms, users have no way of knowing whether they are unfairly bypassed for jobs or paid less due to algorithmic bias. In addition, platforms may themselves be confronted with issues related to "explainability", i.e. the difficulty when using neural networks of explaining how a particular prediction or decision was reached and which features in the data or data model led to the result (Silberg and Manyika 2019).

²¹ Word embedding is a framework used to represent text data as vectors, which has been used in many machine learning and natural language processing tasks (Bolukbasi et al. 2016).

²² 93% of venture capitalists are men (Perez 2019) and this reflects in the ideas that receive funding. By comparison, VC firms with a female partner are more than twice as likely to fund companies with a woman on the management team and three times more likely to invest in female CEOs (OECD 2018, p.99)

5 Gender analysis of the gig economy

This paper presents empirical evidence on the participation of women in the platform economy and critically reflects on the promises for women's empowerment.

5.1 Employment

To see whether the gig economy lives up to the promise of gender inclusiveness, this chapter presents an overview of the available data on female participation in the platform economy. As mentioned before, the evidence is all but consistent; to this date, few studies have been carried out and research focuses primarily on the U.S. and selected European countries.

From an empowerment perspective, it would be relevant to know women's employment status prior to and during their engagement in the platform economy to explore to what extent the gig economy enables the participation of those who would otherwise be excluded from the labour market. Determining the impact of job creation for previously inactive or unemployed women would require longitudinal studies, which do not yet exist.

While missing the gendered dimension, DG IPOL's (2017, p.57) survey of European platform workers finds that a significant proportion of respondents had been unemployed in the previous 5 years (Figure 10). These rates are much higher than in the offline economy, indicating a) that the gig economy is indeed comparatively more inclusive and b) that platform workers are likely to be relatively more dependent on social transfers (see Section 5.5.3).

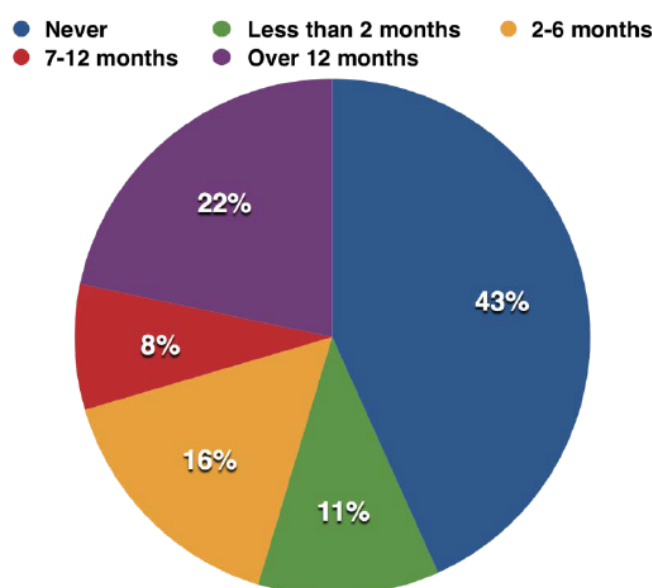


Figure 10 Self-reported unemployment of platform workers in the previous 5 years, by duration (DG IPOL 2017, p.57)

The platform economy's job creation potential for the wider economy (Graham et al. 2017) remains a highly contentious issue. While platforms like FigureEight (2014) are advertising to "*bring opportunities to people who never would have had them before*", some economists are sceptical towards the platform economy's potential to create new jobs. According to Albrieu (2019), platforms are not creating new jobs, but merely changing the way exchanges are organised. Thus far, it has not been possible to establish clear interlinkages between the amount of own-account workers and the growth of the gig economy. Based on Farrell et al. (2018), Smit (2019) observes that as the U.S. economy moves towards full employment, fewer workers move into the platform economy. In contrast, such interactions cannot be observed in markets with high unemployment. In addition, Dewan (2019) notes

that in countries with high shares of own-account workers, the emergence of the gig economy has not had a noticeable effect with regards to the employment status of the labour force.

Despite different sample sizes, methodology and markets covered, the research on participation in the gig economy overwhelmingly shows that

Participation of women is lower than men's and those women who are active on platforms participate less frequently and exit earlier than their male counterparts.

Hunt and Samman (2019) provide evidence from nine different studies on the range of women's participation across countries and platform type. The female participation rate varies from 31% to 55% of all platform workers.

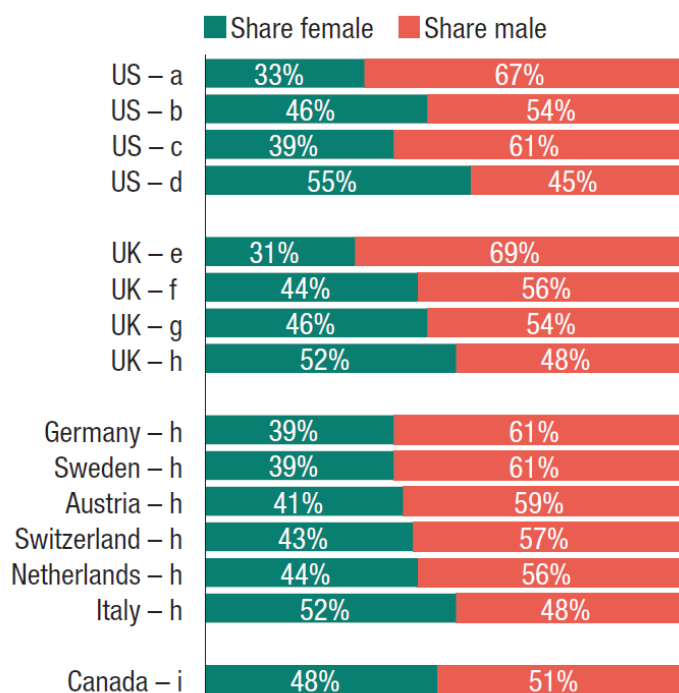


Figure 11 Share of women reported to work in the gig economy (Hunt and Samman 2019, p.12)²³

The figures for Europe (h) shown above reflect the findings of Huws et al. (2017). The research reveals relatively modest employment gaps in overall participation of women. Looking at those workers who have ever gained an income from gig work, women form a majority in Italy (52%) and the UK (52%), with more men than women participating in other countries.

Focussing on those who participate at least weekly in platform work produces a relatively similar gender split (Figure 12):

²³ a. Farrell and Greig (2016) on receipt of income from a labour platform over a three-year period (confidence intervals are negligible)
b. U.S. Bureau of Labor Statistics (2018)
c. Burston-Marsteller et al. (2016) on 'ever involvement' on an asset or labour platform
d. Smith (2016) on use of an asset or labour platform in the previous year
e. Balaram et al. (2017) on 'current gig workers' who carry out gig work on an asset or labour platform at least once a year
f. CIPD (2017) on use of an asset or labour platform within the previous year
g. Lepanjuuri et al. (2018) on work on a labour platform within the previous year
h. Huws et al. (2017) on 'ever involvement' on an asset or labour platform
i. Block and Hennessy (2017)

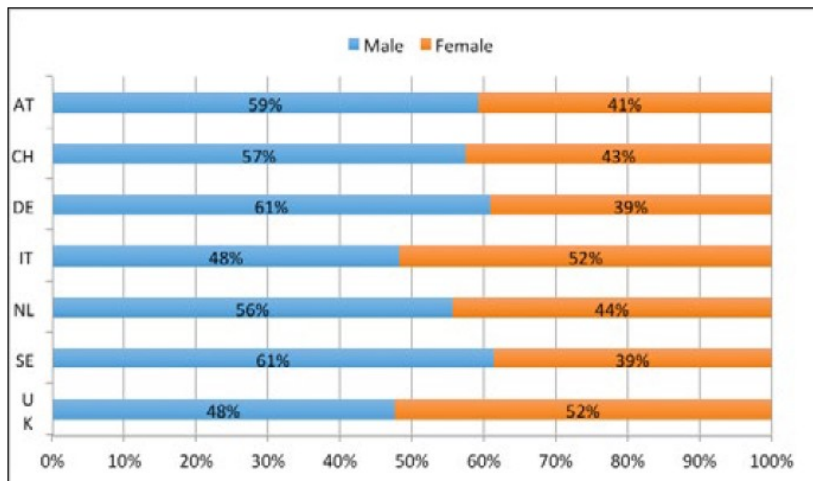


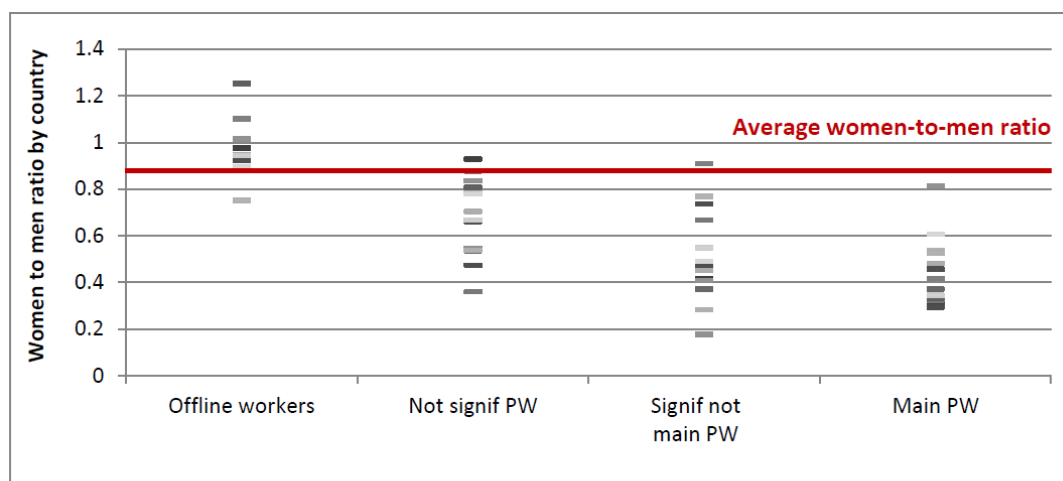
Figure 12 Weekly crowd work, by gender (Huws et al. 2017, p.27)

Based on observed similarities between countries, Huws et al. (2017, p.) conclude that structural patterns linked to different institutional contexts are not decisive for gender participation.

The cross-country comparison by Pesole et al. (2018, p.22) on the other hand reveals that a) women to men ratios are well below one in most categories of workers across all 14 EU countries and that b) representation of women varies greatly by country. By finding significantly lower overall participation of women, they concur with the overwhelming majority of existing research on the global gig economy (Figure 11).

5.1.1 Work intensity and retention

The women to men ratio for platform workers who consider platform work their 'main job' is 0.29 in Croatia, but almost one to one in Slovakia (Pesole et al. 2018, p.22). Geographical dispersion is even more significant when considering women to men ratio for workers who engage in gig work to supplement their incomes by spending at least 10 hours weekly on platforms. Here, ratios range from 0.18 (one women for every six men) in Finland to 0.91 in Portugal (Pesole et al. 2018, p.22).



Source: authors' elaborations using COLLEEM data. Data weighted using population weights.

Figure 13 Women to men ratios in platform work across 14 EU countries (Pesole et al. 2018, p.23)²⁴

²⁴ **Main PW / Platform work as main or very significant job:** respondents that earn 50% or more of their income via platforms and/or work via platforms more than 20 hours a week.

Signif PW, but not main / Platform work as significant, but not main work: respondents who earn at least 25% of their income via platforms (but less than 50%) and/or work via platforms at least 10 hours per week.

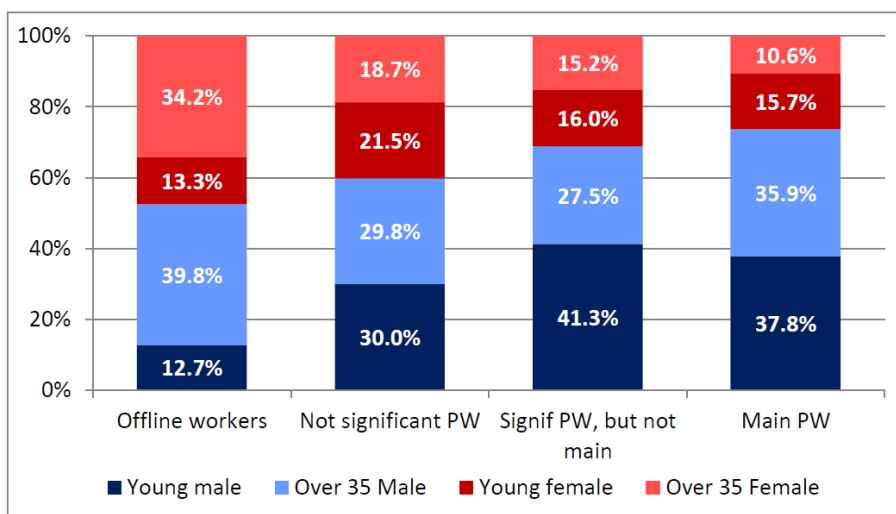
The vast majority of existing research indicates much higher work intensity of male platform workers in comparison to female workers. Women represent 47.5% of offline workers, 40.2% of ‘non-significant’ platform workers, 31.2% of the ‘significant but not main’ platform workers and only 26.3% of the ‘main and very significant’ platform workers (Pesole et al 2018, p.22).

Florisson and Mandl (2018, p.23) confirm this link between gender and whether platform activities constitute the workers’ main source of income or supplementary earnings (Ipeirotis 2019). Similarly, Kuek et al (2015, p.31) note that the majority of workers are male in those countries where gig work constitutes the primary source of income. By the same token, the share of female workers is much higher in countries where platform work is considered mainly as supplementary income. Finally, Manyika et al. (2016)’s study on gig workers in the US and EU-15 confirms that women are likelier than men to be supplemental earners.

The platform economy is characterised by high staff turnover. Farrell and Greig (2016) find that half of online platform participants quit within 12 months. The same study shows that women are far more likely than men to exit platforms early (62% compared to 54%) and that gender is a better predictor of early exit than age. These findings are supported by Balaram et al. (2017), who find that 38% of UK women who had been involved in the gig economy had exited this work, compared to 25% of men.

5.1.2 Age and education

Pesole et al. (2018, p.6) conclude: *“the typical European platform worker is a young male, educated to a degree level”*.



Source: authors’ elaborations using COLLEEM data. Data weighted using population weights.

Figure 14 Platform workers are mostly (young) males (Pesole et al. 2018, p.23)

Huws et al. (2017) confirm the age distribution of gig workers (Figure 15).

Not significant platform work (PW): respondents who have performed platform work, but who neither earn at least 25% of their income via platform, nor work at least 10 hours (Pesole et al. 2018, 21)

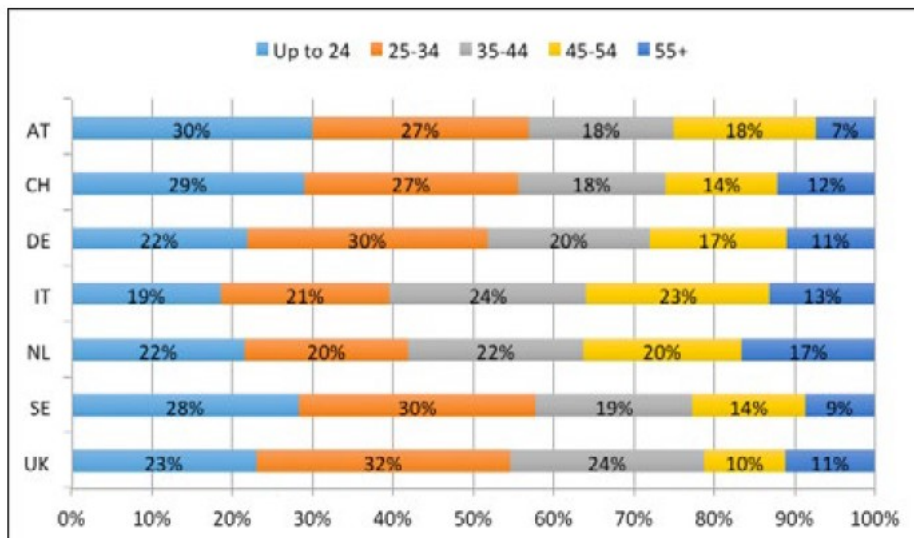


Figure 15 Age of weekly crowd workers, by country (Huws et al. 2017, p.31)

This age distribution holds across different types of online-mediated labour. De Groen and Maselli (2016, p.9) web-crawled activities of workers on the Belgium local service provider platform Listminut and found that 69% were younger than 30.

The propensity of young respondents to participate in crowd work is perhaps least surprising, given that they are more likely to be tech-savvy (Figure 19) and exploit available digital technologies and that they have less work experience; with the gig economy offering access to employment in spite (Pesole et al 2018, Florisson and Mandl 2018).

However, the fact that platform workers are younger than offline workers does not necessarily mean that they are free from family commitments. In fact, Pesole et al. (2018, p. 26), discover that there is a significant proportion of workers with family responsibilities (including dependent children) for whom platform work is a significant source of income.

While there is no systematic review of workers' job-specific skills and qualifications, researchers found that platform workers in Europe (Pesole et al. 2018) and the U.S. (Schor 2018) are disproportionately well-educated, with majorities of university-educated workers on most platforms.

5.2 Gendered employment barriers

This chapter intends to explain women's comparatively limited participation in the platform economy. It will be addressed where the promises of a more inclusive online labour market are falling short, and the notion of "new" access barriers arising from a virtual labour market will be introduced.

5.2.1 Work-family conflict

The gig economy promises to increase women's take-up of work by providing flexibility and control over working hours. The gendered motives for participation in gig work show that women value flexibility (Hall and Krueger 2015, MBO Partners 2018). In addition, by providing the opportunity to work from home, the gig economy can lift barriers to employment in the traditional economy (Zykowski et al. 2015, Adams and Berg 2017).

Nevertheless, it appears that women work fewer hours than men and drop out earlier. A possible cause may be that the gig economy's flexibility bonus does not resolve the work-family conflict for women.

As demonstrated by research on the impacts of flexible working time (Chung and Lippe 2018, Clawson and Gerstel 2014, Hersch 1991, Lott 2018), women and men use flexible working time differently.

Instead of “enhancing” reconciliation of work-and family life, working time flexibility may simply increase the share of unpaid work women are expected to manage.

To test the impact of unpaid work as a constraint on female platform workers, we would need to understand time-use of workers while they are active on platforms versus when they are not. Unfortunately, no such research currently exists. Evidence on gendered differences in platform workers’ motivations nonetheless lends credibility to the notion of unpaid labour as a gendered employment barrier.

According to an ILO survey (2018) across five crowdworking platforms, one out of five female gig workers have young children (0-5 years old). 13% of women compared to 5% of men stated a need to work from home due to caring responsibilities (p.16).

Adams and Berg’s (2017) study on AMT-American workers confirms that female microtaskers are more likely to be part of larger families and to care for family members in parallel to their work. At the time of the study, 47% of female AMT workers had children under 18, compared to 24% of men (Adams and Berg 2017, p.7). Presumably related, women were more likely to report that working outside their homes would be difficult for them (35% vs 24%; Figure 16).

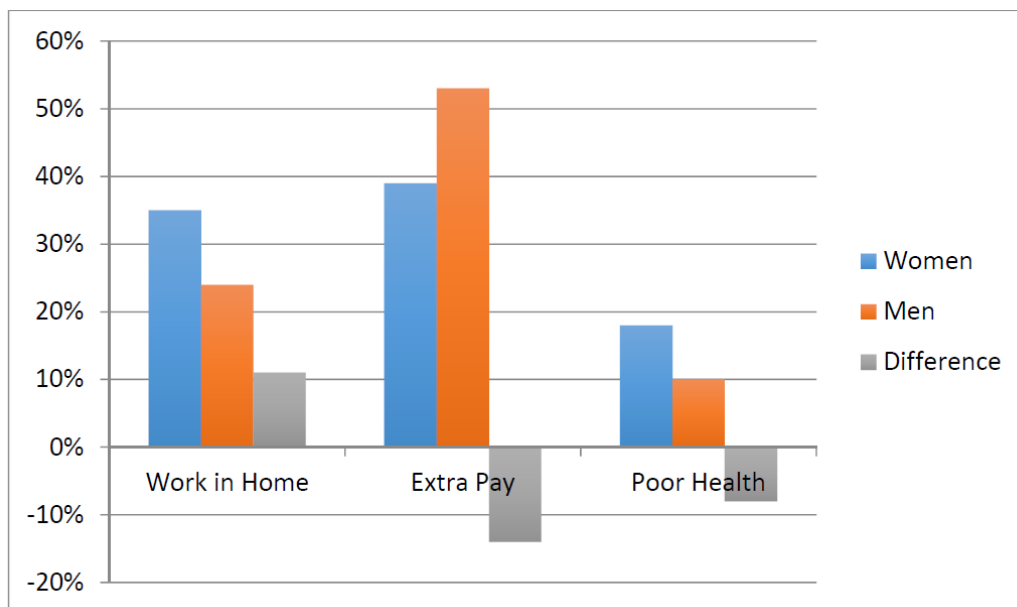


Figure 16 Women are 11 per cent more likely to report a need to work from home (Adams and Berg 2017, p.9)

On the microtasking platform CrowdFlower, 6.4% of women explained their involvement in crowd work with the need to work from home, compared with 2.8% of men. Many cited care responsibilities as a reason for performing platform work (Berg 2016, p.7).

Hall and Krueger’s (2015) research shows that gender differences in worker motivations also apply to physical gig work. They find that women are more likely (42%) than men (29%) to say that their main reason for driving with Uber is that they can only work part-time or flexible schedules due to a “family, education or health reason”.

In a survey of own-account workers (including those using digital platforms), MBO Partners (2018) find that while men are more likely to be motivated by being their own boss, earning their own money and feeling more secure, female independent workers are driven by the need for flexibility (76% vs 58% of men) and control over their own schedules (71% vs 64%).

In contrast to their presence on labour-sharing platforms, women represent the majority on asset-sharing platforms such as Etsy (89%), a large sales platform for self-made goods, as well as on Airbnb (67%; MBO 2015 in OECD 2017). The much higher participation of women on these platforms may be explained by two factors; the possibility to work from home and full work autonomy. On asset-sharing platforms women do not have to comply with external deadlines or work at specific times of the day. They sell goods and manage bookings when it suits their schedules. They can abstain from a sale or reject a booking without having to fear a lasting effect on ratings and future earnings.

Indeed, it is likely that women's limited participation on platforms is not merely caused by supply-side factors. On labour-sharing platforms, worker-driven flexibility is limited by demand-side expectations and hyper-competition on platforms. In other words, "instant task gratification" means that (well-paid) tasks become available as soon as paying customers request them and do not wait for anyone.

- Total pay for 20 hours is \$5 (not per hour). You will need to be online during UK office hours;
- I need the articles within 24 hours after you are hired. You will be paid \$10 once all 10 articles are APPROVED. Failure to comply means termination of contract with 1 star feedback.

Figure 17 Examples of job postings on Upwork illustrate low pay and power asymmetries on platforms (Beerepoot and Lambregts 2015)

Martin et al. (2016) find that hyper-competition and low pay can force cloud workers to work long and unsocial hours or wake up in the middle of the night to bid on projects or register for tasks when they are posted in a different time zone. ILO (Berg et al. 2018) reports that women spend 20 hours per week on Amazon Mechanical Turk (five hours less than the sample as a whole); to manage paid work alongside caring responsibilities, many of them work during evenings and at night.

The need to adapt to clients' schedules was also mentioned by high-skilled online freelancers. Similarly, in the creative industries, workers are under pressure to submit a bid as soon as work becomes available.²⁵ The perception to be required to be available at all times was also noted by on-demand workers in locally-delivered services (ILO 2016, DG IPOL 2017). Thus, platform work risks blurring the boundary between private and professional life (Martin et al. 2016). Moreover, worker's ability to schedule paid work in line with their preferences may be severely limited in practice.

Finally, the most detrimental characteristic of working time quality in the gig economy is the lack of predictability. Unforeseeable working time undermines the ability of women with caring responsibilities to manage external caring arrangements and make themselves available at short notice and/or at atypical hours. To exploit working opportunities in the platform economy, working carers would require informal and/or formal support structures, which are equally flexible and can be mobilised at short notice. As long as these services are not widely available and/or affordable, working carers will – irrespective of their preferences or expectations bestowed upon them – continue to spend fewer hours in paid work.

5.2.2 Digital skills

It makes sense to look at gender differences in digital skills separately when exploring possible barriers to gig work, as even on-demand work carried out in someone's home, which – unlike cloud work – is not intrinsically linked to ICT, requires basic digital skills and internet user competence (BEIS 2018). A quantitative analysis on participation in the sharing economy demonstrates that non-participation in online platforms is related to lower internet skills (Andreotti et al. 2017, Figure 18)

²⁵ According to Liang et al. (2018), women submit their bids later and suffer income losses due to this. (Section 5.8.1.2 Wage bargaining)

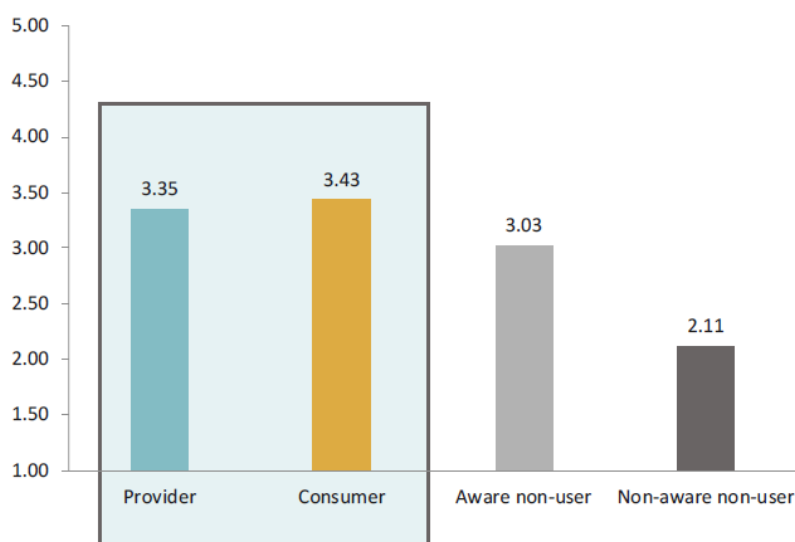


Figure 8: Sharing participation by Internet skills (Means, scale 1-5)

Figure 18 Participation in the sharing economy by internet skills (means, scale 1-5; Andreotti et al. 2017, p.13)

It is only logical that what is true for asset-sharing platforms will also apply to labour-mediation platforms. Job-seekers have to be aware of the gig economy, locate and navigate the apps or websites and create appealing profiles to offer their services. They have to understand how to interact with clients and how to organise payment and possess basic troubleshooting skills to handle device malfunctioning.

A recent study (Quirós et al. 2019) sheds light on the relationship between gender, age and digital skills (Figure 19).

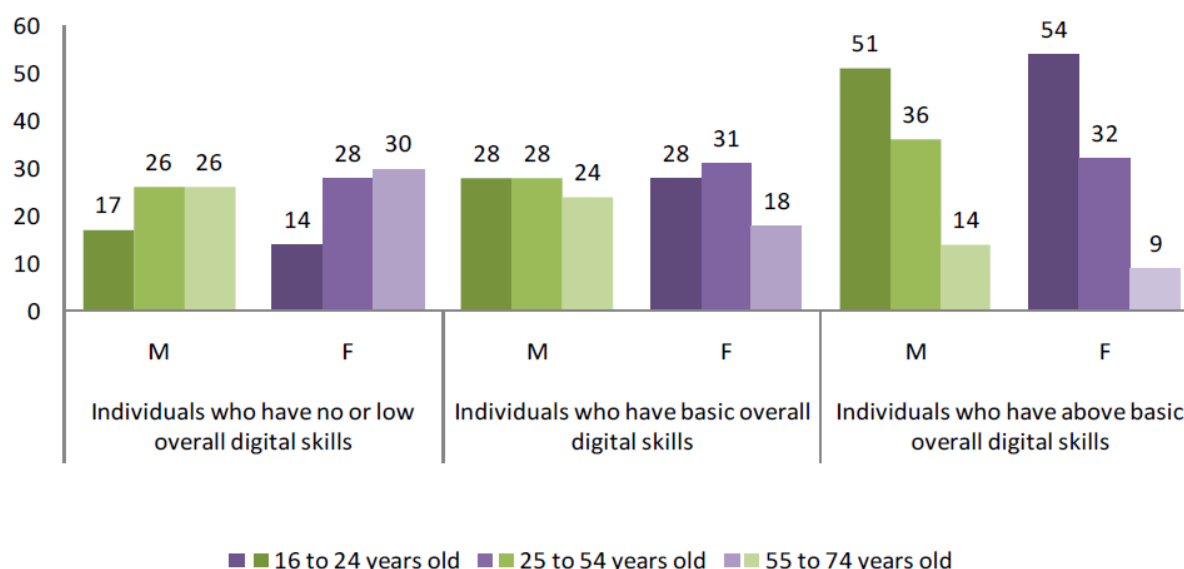


Figure 19 Level of digital skills by gender and age in EU-28, 2016 (eurostat 2017 in Quirós et al. 2019, p.54)

The data reveal that there is no significant gender gap between European women and men who have no or low digital skills. However, Quirós et al. (2019) identify a gender gap among females over 55 years old²⁶, which closes among the younger internet users. At the same time, ITU (2018, p.39) finds

²⁶ Research by Van Deursen and Hesper (2015) shows that – rather than age itself – factors such as social isolation, health, lower education and other issues make this group more likely to be offline and have lower digital skills.

that having a young, digitally native population is not a predictor of high skill levels, while overall educational levels and rurality of a country are more important (see Section 5.2.3 Location and connectivity).

The gender skills gap is much more apparent (12.9%) when skills levels above basic are considered (Quirós et al 2019). Regarding ICT specialist expertise, 5.7% of male workers in the EU are ICT specialists, compared to only 1.4% of female workers (Figure 20)

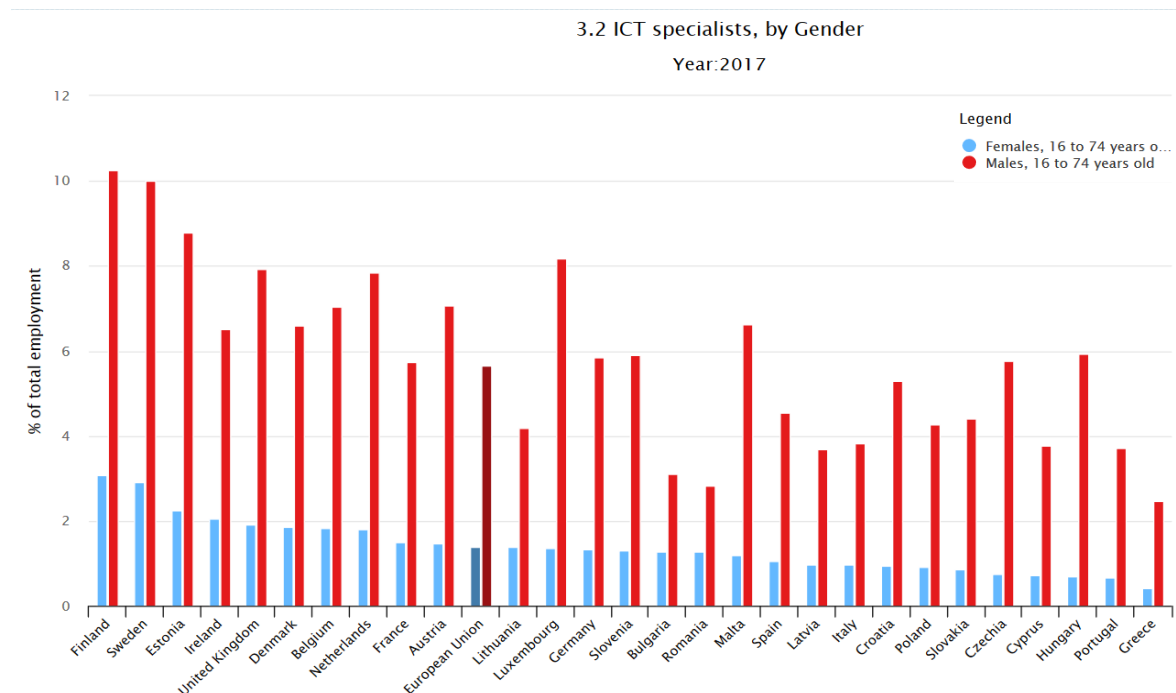


Figure 20 The majority of ICT specialists are men (European Commission 2019)

This seems to be due to the coincidence of two factors: a low share of female ICT/STEM graduates and a higher dropout of female ICT professionals.

Science, technology, engineering and mathematics (STEM) are the most gender-segregated subjects in the education system. Women's share in ICT graduates is 17%. Between 2004 and 2015, the share of women among ICT and engineering graduates declined in 20 EU Member States (EIGE 2018b). Gender stereotypes play an important role in driving subject choices. Despite starting out at similar skill levels, boys and girls show different levels of confidence in their skills. 73% of boys aged 15-16 as opposed to 63% of girls in the same age bracket report feeling comfortable using digital devices that they are less familiar with (EIGE 2018b). Only in four EU countries (BG, EE, MT, RO) do teenage girls express any interest in working as an ICT professional (1-3% of girls) at the age of 30. In contrast, 3-15% of teenage boys across the EU aspire to become ICT professionals (EIGE 2018b).

Meanwhile, the "leaky pipeline" in ICT/STEM careers is an increasingly well-documented phenomenon (DG IPOL 2018). It is used to describe the progressive loss of female ICT professionals at earlier points in their career cycles. Only one third of female STEM university graduates work in STEM occupations, compared to one in two men. Among vocational training graduates, this gap is even greater, with only 10 % of women but 41 % of men working in STEM occupations (EIGE 2018a). One of the barriers to getting women to apply for ICT jobs are male-dominated workplaces (EIGE 2018b).²⁷ While digital jobs generally offer more favourable conditions for work-life balance, female tech

²⁷ According to a survey of 3,933 tech professionals, 62% of women found their ideas were ignored until repeated by men. Furthermore, more than a third of women report that their appearance has been inappropriately commented on and 11% have been told they got their job because of their gender (DICE 2016).

professionals report difficulties in returning from career breaks (Mavriplis et al. 2010). Women work considerably more often than men under female supervision and in offices with roughly equal numbers of women and men (EIGE 2018b). These gender divisions across ICT workplaces indicate that a women's ability to enter and stay in the pipeline depends on the critical mass of women who are already there.

Given that the gender digital skills gap is least pronounced among young internet users (Figure 19) who form the majority of platform workers (Figure 15), it is unlikely to represent a significant gendered access barrier to gig work. That being said, the data reveals that a considerable number of Europeans will find it hard to engage in platforms irrespective of gender.

In contrast, the gender skills gap for advanced digital skills is likely to affect access, occupational sorting and earning prospects in online freelancing, as ICT expertise is one of the most requested skills on these platforms (Florisson and Mandl 2018, BEIS 2018). Female workers are thus likely to be excluded from the gig economy's highest paying jobs (Eurofound 2015, Aleksynska et al. 2018).

5.2.3 Location and connectivity

One of the promises of platform work is that it allows workers to escape local labour market constraints. This certainly deserves further attention given that existing studies on the gig economy are almost exclusively based on online-administered surveys, which may exclude an important number of jobseekers in economically depressed and rural areas.

Regrettably, there is no recent gender-disaggregated data on connectivity. However, the available household-level data suggest that Europe's most vulnerable populations may face significant access barriers to employment in the gig economy. The data indicate that jobseekers' location matters.

Despite the often-cited potential of the gig economy to facilitate labour market inclusion of rural workers, the gig economy has been found to constitute a largely urban phenomenon (Graham 2019, Albrieu 2019, Eurofound 2018a).

The business model of location-based gig work is intrinsically linked to high and continuous supply, as services are offered on-demand at the convenience of users. Customer value is derived from the immediate availability and low cost of services driven by hyper-competition (Graham 2019). It is thus unlikely for platforms whose profit model is built on the exploitation of network externalities to develop in areas with low population density.

Regarding cloud work, ILO research (2017) on the global distribution of the workforce on English-language micro-task platforms finds a sizeable presence of workers in North and Latin America, Central and Eastern Europe, the Russian Federation, as well as South Asia (particularly in India) and parts of Africa. This concurs with Berg et al. (2016) who identify important concentrations of crowd workers from economically depressed areas²⁸ among those active on US-based online platforms. An OECD study (2017) finds that platform workers on the global freelancing platform Upwork are mainly located in low-income countries, while employers (clients) are mostly based in high-income countries (Figure 21)

²⁸ Inequalities between and within countries related to employment, education, gender and geography are replicated in digital skills distributions and connectivity (ITU 2018). In emerging and developing economies, gendered differences are much more pronounced than in Europe. In India – one of the biggest online labour markets – only 38% of women own mobile phones, compared with 71% of men (Barboni et al 2018).

Top 10 employer and provider countries on Upwork, 2014



Notes: Upwork is one of the leading global freelancing platforms. Top 10 employer (provider) countries are denoted by their flags and two-digit international codes. Circular arrows denote flows where employer and provider countries coincide.

Figure 21 Digital service workers and clients' location on Upwork 2014 (OECD 2017)

Nevertheless, there is no evidence to this date to support the claim that the gig economy facilitates the inclusion of rural jobseekers into the labour market.

In fact, the persisting urban-rural divide regarding internet connectivity, access to connected devices and digital skills makes rural jobseekers much less likely to dispose of the minimum infrastructure and skills required to participate in crowd work. In addition, an East-West divide (Figure 23) is apparent from data on internet access and digital skills in Europe.

Overall, access to basic ICT infrastructure is widely available in Europe: 85.4% of households have access to the internet at home, 86.5% of individuals in the EU are frequent Internet users and there are 83.9 mobile broadband subscriptions per 100 people (Quirós et al. 2019, p.51). On average, the gender differences in internet usage are negligible (ITU 2019).

Competing for tasks or projects (contest work) within a growing global labour force means that reliability and speed of the internet connection available at home can result in a competitive edge, or vice-versa, lack thereof may exclude gig workers from employment opportunities.

In 11 EU Member States fast broadband (NGA) is available to at least 90 % of homes. In contrast, less than two thirds of homes have access to such networks in France, Lithuania, Greece and Poland. Figure 22 shows that despite continuous expansion of NGA throughout the EU, rural households are underserved in comparison to urban households. (European Commission 2019f)

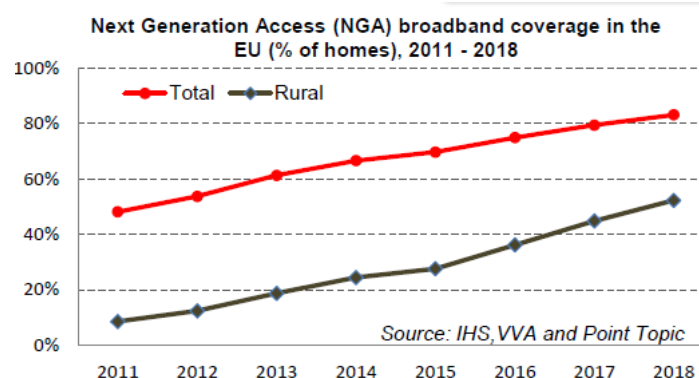


Figure 22 Urban-rural divide in access to fast internet at home in the EU-28 (DESI 2019, p.7)

Lack of digital skills and cost-related barriers are the main reasons given by households for not having internet access at home (European Commission 2019f). In Croatia and Hungary, over 57% mention cost as the principal barrier to access, compared to only 8% of Danish households (European Commission 2019f).

A few studies (Davaki 2018) have shown that Internet access is likely to be less present in women-headed households due to lower income, digital skills or interest.

Furthermore, only about 31 % of people with low education levels or no education have at least basic digital skills.²⁹ This figure is significantly lower among those living in rural areas (49 %) than for their urban counterparts (63 %, DESI 2019). Figure 23 depicts the digital skills divide across Member States.

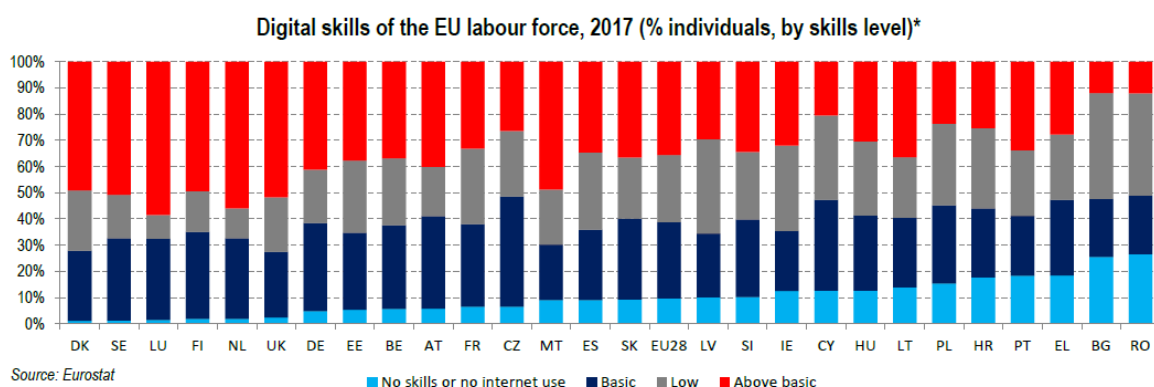


Figure 23 Digital skills levels are less developed amongst the Eastern European labour force (DESI 2019)

The evidence presented above demonstrates that female jobseekers are relatively likely to face significant access barriers to employment in the gig economy in terms of connectivity and digital skills if they a) live in rural areas b) live in Eastern Europe³⁰ c) live in low-income households.

5.3 Employability

An important concern with regards to the platform economy's potential to empower women relates to employability. Employability translates to work-readiness and as such it is a key objective of initial education, such as vocational training. At the same time, the EU has recognised the importance of lifelong learning to ensure employability of Europeans across all stages of life (European Commission 2019b). The European Centre for the Development of Vocational Training (Cedefop 2019a) defines employability as *"a combination of factors (such as job-specific skills and soft skills) which enable individuals to progress towards or enter into employment, stay in employment and progress during their careers."*

In addition to basic literacy, maths and IT skills, Cedefop (2019b) considers time-management, problem solving, communication skills and understanding of the requirements and culture of a professional working environment as skills essential to employability. Next to these skills, individuals need a set of behaviours and attitudes. These include being flexible, adaptable, pro-active, positive and motivated (Cedefop 2019b).

²⁹ The European definition of basic digital skills refers to skills in the following four dimensions: information, communication, problem solving and software for content creation. *"People possessing, at a minimum, the skills required to perform activities such as using e-mail, editing tools, and installing new devices"* (European Commission 2019)."

³⁰ with the exception of Estonia

Skills, attitudes and knowledge about the labour market are all individual factors important for employability. According to Green et al. (2013), there are yet other factors with the potential to influence someone's employability, namely

- Individual circumstance, e.g. access to economic and social resources, caring responsibilities³¹
- Employer or organisational practices
- Labour market intermediaries, e.g. training providers
- Local contextual factors and macro level factors, e.g. availability of employment opportunities, welfare regime and regulatory context).

Therefore, it has to be asked, whether women can benefit from gig work by learning transferable skills and behaviours. How do platforms enable learning of gig workers? To what extent do platform workers maintain existing skills or learn new skills? And finally, can involvement in the gig economy allow women to transition into regular employment?

To date, there has not been any research into gender differences regarding employability effects of platform work. Nevertheless, a number of qualitative surveys shed light on the training activities available to workers and the learning effects of gig work.

The research shows that opportunities to develop new skills depend largely on the activities traded within a given type of platform (Florisson and Mandl 2018). In addition, it is clear that HR measures for a decentralised workforce are organised differently than in a traditional business context.

Younger (2018) finds that online freelancing platforms can compete for top talents by investing in gig workers' employability. Accordingly, the best practices in platform-administered professional development include (Younger 2018):

- Providing updates and training on changing industry requirements (e.g. machine learning, blockchain)
- Offering continued education on critical soft skills
- Making available career coaching and mentoring support
- Assisting workers to assess their skills and provide feedback on how to improve
- Bringing workers together (virtually and in person) to network and learn new tools and techniques
- Helping workers profile themselves to attract good assignments

Unfortunately, these platforms appear to be the exception rather than the norm. Overall, platform workers rarely have access to training, mentoring or coaching and must generally organise professional development on their own (Eurofound 2015, p.115). Where they do undergo training, participation is not always voluntary and time spent on training is typically not compensated (Barnes, Green and De Hoyos 2015). According to Graham (2019), platform operators are discouraged to invest in gig workers' professional development by concerns that this could create the perception of an "employment relationship" between the platforms and gig workers.

Nevertheless, platform work provides opportunities for skills development through self-directed learning and learning-by-doing (Kuek et al 2015, Schmidt 2017). Independent of whether work experience on platforms is formally recognised, workers may practice and develop skills that serve them outside the platform (Graham et al. 2017). Activities on platforms can serve to counteract skills depreciation during periods of unemployment. Moreover, the skills requirements for platform work may be lower, allowing individuals outside conventional career paths opportunities to access activities through which they develop new skills (Florisson and Mandl 2018).

³¹ As demonstrated earlier, these can act as gendered constraints to desired attributes such as flexibility and adaptability.

Barnes et al. (2015, p. 23) conducted a small qualitative study with UK-based cloud workers and found that these workers had developed new skills, which were in some cases unrelated to their previous labour market experience. The workers stated to have used platforms to broaden their skills and expertise or for changing career. In addition, they improved adaptability, flexibility and time management skills in an effort to prove their reliability while managing their workload. The researchers find evidence of workers developing their networking skills and enhancing their professional networks (Barnes et al. 2015, p.27)

Petriglieri, Ashford and Wrzesniewski (2018) interviewed 65 US-based platform workers across a wide range of occupations. According to their research, workers are motivated to engage in continued learning by their lack of job security and pressure to perform. The authors (Petriglieri et al. 2018) find that in order to thrive in the gig economy, workers require high levels of discipline, concentration and self-management skills.

Kittur et al. (2013) find that “task identity and task significance” enable workers to find meaning in their work. According to Teodoro et al. (2014), platform workers on creative platforms perceive their work as intrinsically rewarding. Creative platform workers moreover emphasise the importance of creating a personal connection with their clients and coming across as friendly, service-oriented, conscientious and innovative (Schmidt 2017).

In contrast, Valenduc and Vendramin (2016) warn that the lack of face-to-face interaction (in online work) and the absence of teamwork undermine the capacity of platform workers to build a professional identity and limit opportunities to develop professional networks. Similarly, Blohm et al. (2016) find that due to the isolated nature of platform work, gig workers have little opportunities to develop social skills (such as team work or tolerance) or communication skills.

Eurofound surveys (2018b) among location-based gig workers suggest that there is a mismatch between the workers' qualifications and the gigs they take on. As many gig workers are university-educated (Pesole et al. 2018), low-skilled gig work is unlikely to help maintain existing skills.

In a survey (Omerza 2016, p. 124 in Florisson and Mandl 2018, p.73) among drivers on the Slovenian platform GoOpti, 60% of the respondents reported to be satisfied with the opportunities for education and training, but only 37% were satisfied with their career opportunities (compared to 33% who were dissatisfied).

Microtasks may potentially lead to deskilling (Blohm et al. 2016). Tasks are broken down to menial clickwork, which offer very limited skills variety by their very nature. The fact that taskers do not know the final purpose (significance) of their work makes it difficult for them to derive meaning and remain motivated (Kässi and Lehdonvirta 2016, Graham et al. 2017).

One benefit of platform work is that gig workers gain familiarity with a digital working environment and develop their digital skills, regardless of the job content of their activities. This is a noteworthy upskilling opportunity for women's job prospects in the wider economy as well, as it is estimated that 90% of jobs in Europe will require above basic overall digital skills in the near future (European Commission 2016).

In conclusion, participation in gig work can help women develop a number of transferable skills; some of which may be learned due to the need to persist in the competitive online labour market.

However, when it comes to job-specific skills, the benefits of platform work for employability are uncertain. Microtasks are standardised by definition. A large amount of this work consists in data labelling. Paradoxically, crowdworkers are contracted to prepare the learning data needed for the development of disruptive technologies, which are likely to help automatize many of the jobs currently traded via platforms (Irani 2015).

According to the World Economic Forum (2018, p.9), some of the tasks with the highest risk of automatization include accounting and auditing, administrative, clerical and data entry tasks, which are

all sectors where women represent the majority of the (online) workforce. This suggests that female cloudworkers are practicing job-specific skills, which may soon be redundant.

At the same time, advances in the development of autonomous vehicles entail significant changes in skills requirements in location-based work. The global ridesharing leader Uber is already building a fleet of self-driving cars, suggesting that the future of drivers and delivery workers in the gig economy is all but certain (Conger 2019, Wing Kosner 2015).

In 2006, the OECD warned that atypical employment can work as a “trap”, or even a “revolving door” instead of a stepping stone. An accurate assessment of the potential of gig work to facilitate upwards mobility at a later state of individual careers would require fine-grained analysis following the labour market trajectories of individuals.

Nevertheless, platform work can be likened to other forms of atypical work such as marginal part-time employment (“mini-jobs”) and temporary agency work. Research on transitions of marginally employed workers to regular employment is available for Germany (Wippermann 2012, Caliendo, Kühn and Uhlenborff 2012, Lehmer and Ziegler 2010).

Wippermann (2012) investigated whether mini-jobs helped women in Germany move into standard employment. He called the transitory characters of these precarious jobs into question, as the mini-jobbers remained in such jobs on average for 79 months. According to Brülle (2013), limited upwards mobility cannot be explained solely by women’s adaptive preferences, given that mini-jobbers moved considerably less frequently into standard employment relationships even after controlling for working time preferences and socio-demographic factors.

Caliendo et al. (2012) on the other hand find that taking up a mini-job increases the probability of transition to regular employment for a very specific group, namely for the long-term unemployed, given that the mini-job is in the same sector as their previous job (Caliendo et al. 2012). Similarly, Schmelzer, Gundert and Hohendanner (2015) emphasise the role of individual qualifications and experience to move from marginal into regular employment.

Regarding temporary agency workers, Baumgarten et al. (2011) and Burkert, Carloff and Lepper (2014) find no evidence of upwards mobility. Lehmer and Ziegler (2010), on the other hand, find that the probability of being employed in a job outside a temporary work agency is 20 percentage points higher for the long-term unemployed who worked temporarily, than for their statistical twins who remained unemployed.

These findings suggest that job-specific skills and previous experience of platform workers matter for their mobility beyond platforms. This means that women will find it easier to use gig work as a stepping stone to regular employment if platform work is not their first professional experience and if they carry out gigs that closely match their skills. Conversely, it is doubtful whether the gig economy can promote employability of first-time earners.

5.4 Occupational sorting

In the gig economy, workers are promised to be treated fairly and objectively in a gender-neutral space where their suitability for a given task is determined solely on the basis of their skills and experience. Thanks to automatized matching processes, platform workers may escape customer bias in hiring processes. By taking advantage of the anonymity platforms offer, women may be able to shield themselves from discrimination. As a consequence, platforms may enable women to permeate into stereotypically male occupations more easily in the platform economy.

The gig economy may help mitigate occupational segregation; to see if this is indeed the case, this chapter looks at occupational sorting on online labour platforms. In addition, evidence suggesting that skills are not the sole determinants in hiring practices online will be discussed.

As addressed in previous chapters, precise figures on participation rates vary across existing studies due to differences in methodology and research interests. Huws et al. (2017) note that it is difficult to

map patterns of segregation reliably, because of the high propensity of platform workers to engage in multiple types of work and to be active on multiple platforms simultaneously. Nevertheless, the evidence overwhelmingly points to a high degree of occupational segregation, which largely reflects that of the overall economy (Hunt and Samman 2019).

Occupational segregation largely mirrors that of the offline economy.

There are a disproportionate number of women in the gig economy in the administrative, care and domestic help sectors, while men appear to dominate ICT-related services and the transport and delivery sectors (Hall and Krueger 2015, Barzilay and Ben-David 2017).

Research by Kuek et al. (2015) on gendered participation in cloud work suggests that gender gaps are more significant for low-skilled tasks than for high-skilled gig work. Their study found that on the global freelancing platform Upwork (formerly Elance), 58% of freelancers were male and 42% female. In contrast, the microtask platform FigureEight (formerly CrowdFlower) had a gender profile of 73% male and 27% female (Kuek et al 2015, p.31). Similarly, a study by DG IPOL (2017) reports a majority of male clickworkers of 61% across four microtasking platforms.

Barzilay and Ben-David's (2017) research provides insights into occupational sorting on an unnamed global freelancing platform. On the basis of data on 4,600 workers extracted from the platform's API, they find that women are overrepresented in occupational categories such as administrative support, customer service, legal, translation and writing, while men dominate in areas such as engineering and architecture, IT and networking, and data science and analysis (Barzilay and Ben-David 2017, p.408)

Occupational sorting in location-based gig work also follows traditional gender lines. On the cleaning service platform Hassle in the UK, 86.5% of workers are women. As Hunt and Samman (2019, p.13) point out, this reflects entirely gendered employment patterns in the offline economy, given that 86% of cleaning and domestic service workers in the UK labour force are female (ONS 2018 in Hunt and Samman 2019).

Meanwhile, men dominate those forms of location-based services which are not taking place inside the household, namely transport and delivery services. According to Balaram et al.'s (2017) findings for the UK, 94% of workers on the food delivery platform Deliveroo and 95% of drivers working for Uber are male.

In fact, Farrell et al. (2018) claim that the gender composition of the gig economy is skewed towards men primarily because of their strong presence in transportation (of people and goods), which makes up the lion share of location-based work in the U.S. (Rugaber 2018). Estimates by the Fabo et al. (2017, p.9) indicate that this is true for most of Europe too.

Interestingly, it is precisely the driving business which sparked the hope that platforms enable transition of women into male-dominated work. A study released by Uber in 2018 claims that 27.3% of their U.S. drivers are female (Cook et al 2018, p.9). Competing services like SideCars and Lyft report even higher shares of female drivers, 40% and 30% respectively (Huet 2015), compared to only 8% of taxi drivers and chauffeurs in the offline economy.

If these figures are correct³², this implies that the gig economy indeed offers a higher degree of permeability.

5.4.1 Individual factors

As systematic gender-disaggregated data on individual qualifications of platform workers is lacking, it is impossible to determine in what way occupational sorting in the platform economy as a whole

³² While between-country variations might apply, the significant differences between the outcomes purported for the U.S. and the results of the independent and survey-based research by Balaram et al. (2017) for the UK are difficult to ignore.

reflects gender differences in skills and work experience outside platforms. What we do know is that women and men on platforms have higher educational attainment levels than in the wider economy in spite of the low-skill nature of a big part of gig work (Pesole et al. 2018). But again, this does not necessarily imply the existence of job-relevant skills (e.g. a university degree is no useful predictor for handiwork qualities).

Regarding the effect of women's preferences on occupational sorting, the effect of gendered roles in the household on women's job entry decisions is discussed in Section 5.2.1. Women who are motivated to offer their labour on online platforms by the need to work from home will naturally not be interested in location-based services.

Flory et al. (2015) find that gender differences in preferences for uncertainty and competition jointly drive gender differences in job-entry choices. Regarding women's relative tendency to avoid uncertainty (Flory et al. 2015), incomplete or unprecise task descriptions may discourage female jobseekers (Barzilay and Ben-David 2017, p.402), as clients who are dissatisfied with the delivered work can penalise workers via ratings or by withholding payment (ILO 2016, DG IPOL 2017).

Liang et al. (2018) investigate gender differences in job application strategies of cloud workers. They find that women are less inclined to apply for monitored jobs than males and are willing to pay a significant financial penalty for the avoidance of monitoring. Given the increasing prevalence of technology-enabled monitoring practices in the platform economy, avoidance of monitoring might not only direct women towards specific tasks, it could also dissuade women from platform work altogether.

Finally, a study by Cook et al. (2018) illustrates the importance of safety concerns in driving occupational choices of female gig workers.

5.4.2 Steering and discriminatory practices in and around platforms

There is evidence suggesting that occupational segregation on platforms may also be caused by steering practices.

Datta et al. (2015) developed a tool called AdFisher that explores how user behaviours, Google's ads, and Ad Settings interact. They find that simulated males receive job ads for high-paying jobs more frequently than simulated females with the same profile. For 1,000 fictitious users (50% women, 50% men), men are shown high-paying job offers 1,800 times, while women are shown these ads 300 times.

A review by ProPublica (Angwin and Paris 2016) reveals that targeted advertising on Facebook has been used to discriminate against female jobseekers. Accordingly, 15 employers, including Uber, have advertised jobs on Facebook exclusively to one sex, with many ads playing into gender-specific stereotypes.

Uber has equally been under fire for the way the company has advertised its services to clients. Uber in France ran a short-lived promotional campaign making female models available as drivers offering free rides for a maximum of 20 minutes. A blog post announcing the campaign promised to pair customers with "*hot chicks*" and featured slogans such as "*Who said women don't know how to drive?*" (Kosoff 2014).

Platforms may contribute to occupational segregation more directly via the services provided to platform participants. Florisson and Mandl (2018) note that platforms provide more or less extensive pre-screening services. The freelancing platform Upwork, for instance, sends workers recommendations for tasks recently posted that appear to match their profile and offers clients different subscription plans including varying levels of pre-screened recommendations and active help with recruitment (Florisson and Mandl 2018, p.51).

Amazon Mechanical Turk was criticised for discriminating against workers on the basis of geographical location, when the company suspended registration for new workers during a period of several months only to reopen it again to US-based workers only (Turkrequesters 2013).

Moreover, a number of intermediaries have developed in the platform economy's ecosystem with the purpose of reducing frictions in the matching process. These companies assist corporate recruitment by pre-selecting workers on platforms (Codagnone et al. 2016).

Independently of whether pre-screening is carried out by platforms themselves or through intermediaries, the processes are marked by opacity and it is entirely unclear which criteria are used to pre-select candidates.

This is true for the matching processes on platforms as a whole. As the algorithms used to organise transactions are business secrets, it is virtually impossible to prove discriminatory steering practices. Few researchers have obtained access to the data required to derive any meaningful conclusions on hiring practices in online markets. First evidence of algorithmic bias (Hannák et al. 2017) in the gig economy is discussed in detail in Section 5.8.1.3.

Nevertheless, it is clear that platforms facilitate discriminatory practices to the extent in which algorithms allow or reward discriminatory behaviours. Massanari (2015) explains that technological agents (algorithms, scripts and policies) can shape user interactions and are in turn shaped by human activity. A typical example of a technological agent is a platform's moderation policy. In the context of online labour markets, a proactive policy could include, for example, flagging job offers, which explicitly preclude members of minority groups from applying.³³

A study by Terrell et al. (2017) compares acceptance rates of contributions by men and women in an open-source software community. They find that women's contributions are accepted more often than men's in an anonymous setting. This changes, however, as soon as a woman's gender is identifiable, in which case their contributions are rejected more often (Terrell et al. 2017). The study is revealing in various regards: on the one hand, it demonstrates that women are not necessarily evaluated objectively in online work, which corresponds with previous findings on student evaluations in academia (Mitchell and Martin 2018). On the other hand, the study illustrates that platforms have the capacity to protect minority groups through design choices.

5.4.3 Clients' discriminatory hiring practices

In principle, the need for cognitive heuristics in hiring practices should be lower, as platforms provide measures of comparability such as ratings, reviews, and self-declared credentials. According to Uhlmann and Silberzahn (2014, p.103), platforms give employers access to extensive and algorithmically organised information, which should enable the typical employer to act as perfect *Homo oeconomicus* and hire rationally on the basis of skills, merit and value for money.

However, Chan and Wang (2018, p.3) emphasize that employers evaluate applicants with the help of textual tools without conducting face-to-face interviews, which means that communication of subtle worker information like attitudes and personality is highly restricted (2018, p.3).

More importantly perhaps, employers in international online markets have access to a virtually unlimited pool of labour and are potentially met with an overwhelming supply of candidates to choose from. The desire to reduce the amount of information processing required to evaluate numerous

³³ As noted by Beerepoot and Lambregts (2015), explicit geographical discrimination (e.g. "Filipinos only") is extremely common in job postings on international platforms. In contrast, it is unknown whether this is the case for gender too.

candidates objectively along multiple criteria can lead individuals to resort to heuristics such as cultural stereotypes (Galperin 2018, Uhlmann and Silberzahn 2014)

Researchers looking for bias in hiring practices find suitable laboratories for experiments in online labour markets because they can control for productivity and human capital determinants of workers. Instead of testing identical resumes in artificial recruitment processes, they can study real-life hiring outcomes in original datasets. By matching pairs of female and male platform workers with their closest possible match in all observable characteristics except gender, it is possible to achieve reliable measures of bias (Dubey et al. 2017, Chan and Wang 2018, Uhlmann and Silberzahn 2014).

Chan and Wang (2018) find a female hiring bias on an unnamed online freelancing platform. This is the result from a marked preference for women in stereotypically female occupations (administrative support), while men do not enjoy higher hiring likelihoods in stereotypically male occupations (web development).

In line with previous research on same-gender preference (Gorman 2005), the researchers find that female employers are much more susceptible to the female hiring bias compared to male employers (Chan and Wang 2018, p.18). Finally, the study informs that gender cues appear to be less relevant for experienced employers, given that hiring bias diminishes as employers gain hiring experience on the platform.

A study by Uhlmann and Silberzahn (2014) in an unnamed freelancing platform finds that female workers are comparatively less likely to be hired for stereotypically male jobs (programming) and more likely to be hired for stereotypically female jobs (customer service). In the less likely cases where women are hired in male-typed occupations, they are more often paid by the hour rather than offered fixed contracts for the entire duration of a project, suggesting uncertainty about their abilities on behalf of employers (Uhlmann and Silberzahn 2014, p.104). The assumption of a discriminatory risk penalty for counter-stereotypical hiring is furthermore substantiated by the fact that the reverse is true for women in feminine-typed jobs, who are more likely to be offered fixed contracts, and men in feminine-typed jobs, who are more likely to be paid by the hour.

It can be expected that these behaviours could lead to confirmation bias (Bentley et al. 2014). Discriminatory practices by employers in online labour markets are likely to reproduce themselves, because employers who select workers based on gender stereotypes and are satisfied with the outcome will never try counter-stereotypical hiring and are thus repeatedly confirming their own biases (Uhlmann and Silberzahn 2014)³⁴

Crucially, individual bias can be passed on to others through social feedback. Gender bias could cause employers to subject outputs submitted by workers engaged in counter-stereotypical jobs to additional scrutiny (Stauffer and Buckley 2005), resulting in worse evaluations. Similarly, workers may fail to meet the relatively higher quality standards that biased clients would expect in return for positive ratings (Phelps 1972). At any rate, it is likely that if employers are biased, it will reflect in the way they evaluate workers (Hannák et al. 2017). However, ratings and reviews are important cues for the hiring decisions of other platform participants. Where social feedback feeds into matching algorithms, a single negative review by a biased client can have long-term consequences for a worker's chance to access employment on the platform in the future (Pallais 2014).

The platform economy promises to shield minorities from discrimination on the basis of anonymity. Online, jobseekers have much more freedom how they choose to present themselves and they may omit information on their minority status (Cherry 2010, p.15). However, gender and race can often be inferred from names or profile pictures even in those job markets, where clients and gig workers never meet.³⁵

³⁴ As shown in Section 2.2, female gig workers applying to male-typed jobs on online platforms possess, on average, more domain-relevant skills (Uhlmann and Silberzahn 2014).

³⁵ This is true for all the studies on online freelancing markets presented in this paper.

It is argued that the role of bias in hiring decisions is potentially bigger in the peer-to-peer economy. Inviting a stranger into one's home arguably requires a different level of trust than hiring a cloud worker. Schoenbaum (2016) agrees that the context of intimacy in which locally-delivered services are situated enhances the importance of "identity" of both the worker and the client. Thus, intimacy of transactions heightens the salience of gender in hiring choices. To transmit "identity", profiles of gig workers on domestic work platforms often feature pictures and other demographic information (Hunt 2017), which in turn enables households to hire domestic workers based on characteristics other than their qualifications for the task, such as age, gender or ethnicity.

As of today, most research into bias on platforms for location-based services has focused on discrimination towards users, rather than providers. Nevertheless, the findings are relevant as they indicate the salience of identity in transactions on online platforms. In a study on user interactions on the asset-sharing platform Airbnb Edelman, Luca and Svirsky (2017) find hosts to be 16% more likely to refuse to rent to guests with African-American sounding names. Similarly, a field experiment on the ride-sharing platforms Uber and Lyft found that female customers were more likely than male passengers to be cheated (taken on unnecessary detours) and that passengers with African-American names were twice as likely as White passengers to be cancelled on after having been algorithmically matched with a driver (Ge et al. 2016).

5.5 Income and working conditions

To understand whether the gig economy can actually empower women, it is essential to look not only at participation rates, but also at job quality. Does the gig economy offer decent working conditions for women? Can gig work help women escape precarious living conditions? What are the earning prospects of female platform workers? To what extent do female workers in the offline shadow economy move into the gig economy?

These are truly fundamental questions, which cannot be reliably answered at present. In addition, it is obvious that platforms are highly heterogeneous with regards to income levels, working conditions and the degree of formalisation under which workers operate (Vandaele 2018, Graham 2019). Therefore, it would be difficult to derive any meaningful generalisation from the existing body of research.

However, representative examples of the pay on various platforms provide an understanding of the earning potential associated with different types of work.

The chapter indicates what is known about job quality on platforms and highlights particular risks for female workers.

A critical consequence of small sample sizes in existing surveys is that it is difficult to produce reliable intersectional analysis to determine the participation level of different groups of women in the gig economy (Hunt and Samman 2019, p. 13) and how this relates to job quality.

What we do know from the COLLEEM Survey (Pesole et al. 2018) is that there is a polarisation in the income distribution of European platform workers, particularly for those who rely most on platforms. Workers in the lowest income decile are overrepresented among the digital labour force (26% as opposed to the 10% benchmark expected if all groups were equally likely to participate in gig work; Petropoulos et al. 2019, p.96).

Meanwhile, the ethnic composition of the U.S. online workforce roughly reflects that of the overall workforce (Edelman Intelligence 2016), but ethnicity and class are decisive for occupational sorting and thus, job quality. The U.S. Bureau of Labour (2017) holds that workers of colour are more likely to be in those independent arrangements that are paid lower and offer less flexibility. Similarly, Smith (2016) finds that workers who are more financially reliant on gig work are overrepresented in location-

based tasks like cleaning, personal transport and laundry services and are typically from low-income households, less educated and more likely to be from ethnic minorities.

As we have learned that the gig economy appears to reproduce the labour market segmentation of the traditional economy (Van Doorn 2017),

The platform economy perpetuates existing vulnerabilities.

5.5.1 Hourly rates

When asked to prioritise aspects of job quality, the majority of platform workers – irrespective of whether they are located in the Global South or North – respond: “1. Pay 2. Pay 3. Pay” (Dewan 2019, Graham 2019, Smit 2019). According to Graham (2019), perceived job quality is highly related to the skill-level of tasks traded on a particular platform.

Nevertheless, average pay levels across four leading platforms are significantly below minimum wage in European countries, with a gap of 54.1% between platform wages and the national minimum wage in France (Petropoulos et al 2019, p.101).

Hourly rates vary substantially between different types of platforms. At the low end of the pay scale is cloud-based clickwork, followed by low-skilled location-based work (Berg et al. 2016). The highest rates are associated with ICT-related freelancing and contest work.

Payment is typically organised by the platforms, as this is the transaction stage at which platforms tend to withhold commission fees (Florisson and Mandl 2018). Some platforms set the pay rates at fixed prices per tasks or hour (e.g. TaskRabbit, CrowdFlower, AMT, Deliveroo), other platforms suggest minimum rates or employ dynamic pricing, which is algorithmically adjusted to surges in demand and supply (e.g. Uber). On freelancing platforms, it is typically up to platform workers to set their own prices. In creative contest work, winning bids are awarded predefined “prizes” which are set by the – typically corporate – clients who request the work (Florisson and Mandl 2018).

On Amazon Mechanical Turk, microtasks are compensated at a few cents to a few euros to payment in virtual currencies. The average wage of Turkers is around USD 2 an hour (Marvit 2014).

On the microwork translation and survey platform Clickworker, a worker can make between EUR 200-400 per month working a 30h week (Eurofound 2015 in Florisson and Mandl 2018).

In contrast to low-skilled tasks in the cloud, which can be outsourced to the lowest bidder without geographical constraints, remuneration for on-location work is said to benefit from a more limited pool of workers and offer ‘comparatively high’ wages (De Groen and Maselli 2016).

According to a study by Harris and Kruger (2015), American Uber drivers earn substantially more per hour than traditional taxi drivers. However, this finding has been widely criticised. Walsh (2015) estimated that by taking idle time and actual running costs of drivers into account, estimates of net per hour earnings were similar to or below the minimum wage.

After all, these platforms succeed by undercutting market prices of services (Stanier 2019). This has been proven again and again by global platforms shutting down their operations wherever changing legal requirements threatened to drive up wages towards legal minima (Skydsgaard 2017).

According to Berger et al. (2018), the majority of Uber drivers in the U.K. are male immigrants from the lowest income bracket who – despite remaining in the lower income bracket – report higher earnings than in previous jobs. Therefore, it would be necessary to critically examine against what background platform workers evaluate their earnings to understand to what degree gig work enables upward mobility.

When it comes to household services, gross earnings on the Belgium platform ListMinut are estimated at EUR 15.40 per hour on average (De Groen et al. 2016).

Stiftung Warentest (2018) tested cleaning services by nine different platforms active in Germany and found price points between EUR 20 and EUR 37 per hour for platforms which employed their cleaners and considerably lower rates (roughly EUR 11) for those which did not employ them. This means that digitally-mediated cleaners may earn as little as they would if they offered their services informally³⁶ (Enste 2017).

For high-skilled freelancing, the situation is quite different; here it appears that the online market place can be an attractive alternative to work in the offline economy - even where such work opportunities exist - as these gigs may offer the combined benefits of work autonomy and higher pay. According to a study by FitSmallBusiness.com (2018), the most sought-after jobs on freelance platforms like Flexjobs, Guru and Upwork in 2018 required specialist ICT skills. Kanapi (2018) finds that with hourly rates ranging from USD 40-115, gig jobs in the fields of artificial intelligence, blockchain, robotics, ethical hacking or VR can offer average annual incomes of over four times the U.S. median household income (of USD 59,039).

Given that these gigs are delivered online, they offer platform workers the opportunity to earn substantially above market rates (Florisson and Mandl 2018). Investigating wage convergences between different countries represented in global online market places, Beerepoot and Lambregts (2015) discovered that gig workers in the Global North (U.S., U.K.) received the highest absolute wages, while workers in the Global South (India, Philippines) obtained the highest relative wages. The latter thus benefitted from a skills premium.

In Ukraine, Aleksynska et al. (2018) examined gendered earnings from online freelancing gigs with a greater technological content. They found that men earn 2.2 times more than women, a gap considerably higher than in the traditional economy. This earnings gap could largely be explained by strong occupational gender segregation. In other words, Ukrainian men reaped the benefits of above market rates offered by international clients sourcing specialist ICT expertise.

Finally, creative contest work is well-compensated. Researchers at Eurofound (2018a, p.24) find that first prizes range from EUR 3,000-7,000.

Again, context matters to determine whether those are considered attractive rates. Maselli and Fabo (2015) determined that Italian designers who participated in online contests earned 30% less than their traditional labour market counterparts, while Serbian designers earned 200% more.

Research by Niederle and Vesterlund (2007) and Schweri et al. (2011) would suggest that female freelancers are less inclined to participate in contests due to the high wage risk associated with these gigs. After all, only those gig workers whose submissions end up being chosen are compensated for their work. Nevertheless, substantiating this assumption requires further research.

5.5.2 Financial dependence

Along with flexibility, earning supplementary income is the main motivation for European platform workers to become active in the gig economy (Florisson and Mandl 2018, Huws et al. 2017). There are clear indications that motivations are divided along class lines; in a study on the U.S. and EU-15, Manyika et al. (2016, p.43) find that 37% of earners with less than USD 25,000 in household income participate in independent work out of necessity, while this is the case for less than a quarter of earners from households with incomes exceeding USD 75,000.

³⁶ This issue is addressed in further detail in Section 5.6.

According to U.S. data (Sokas 2017, p.2), 30% of respondents describe the income from gig work as 'essential', 57% have annual household incomes of less than USD 30,000, and 52% have only completed compulsory schooling. In addition, these precarious workers are more likely to be non-white, work in temporary jobs and consider themselves employees rather than freelancers. The majority of workers who are financially dependent on gig work report that their platform work is often stressful and routine (Pesole et al. 2018). In addition, Schor (2018) finds, *"Dependent workers experience extreme precarity, have less job satisfaction and autonomy, and are unlikely to persist if viable alternatives appear for them."*

DG IPOL (2017) and BEIS (2018, p. 27) reveal that those for whom platform work is their main income (roughly 25%) or who depend on it to cover their cost of living struggle to get by. These workers are either in precarious full-time employment or in temporary employment or zero-hour contracts, which require them to top up dips in income with gig work. Microtaskers without other paid jobs were found to earn on average between 43 and 62% less than those not reliant on the platform economy, regardless of between country differences (DG IPOL 2017, p.11)

Nearly all workers surveyed by Mandl et al. (Eurofound 2018a) indicated that their platform-based earnings were insufficient to make a decent living.

All existing research indicates that income from gig work is considered a secondary source of income by the majority of the European online labour force (DG IPOL 2017, Florisson and Mandl 2018, Huws et al. 2017). Farrel and Greig (2016, p.24) find that the average monthly platform worker derives an income of EUR 433 in an active month, which represents 33% of the worker's monthly income. According to Schor (2018), the business model of independent contracting can only be sustained by free-riding on conventional employment.

As has been addressed before (Section 5.1.1), female platform workers are likely to spend fewer hours on platforms and use their income to supplement earnings from other sources. Several studies equate the share of platform earnings in personal monthly income to gig workers' financial dependence on platform work (DG IPOL 2017, Florisson and Mandl 2018).

Some conclude that the remaining workers are "casual earners" earning "pin money" and are not reliant on gig work to get by (Manyika et al. 2016).

However, I would argue that this is not a straightforward conclusion at all. Platform workers report simultaneous activities on multiple platforms and across different occupations (Huws et al. 2017), and young female workers are particularly likely to hold multiple jobs (Sussman 2015). This indicates that workers need the income from gig work to make ends meet (Tran and Sokas 2017).

Besides, women's greater reliance on social transfers (Piasna and Drahokoupil 2017) is likely to distort these measures of economic independence.

In addition, limited participation may not be a matter of choice at all. Lenaerts (2019) emphasises that gig workers have other non-remunerated responsibilities (e.g. caretakers, students), which keep them from becoming more active on platforms.

Furthermore, oversupply of workers on platforms does not only affect pay rates, it also significantly decreases the chances of obtaining a gig. Farrell et al. (2018) find that as the transportation sector³⁷ attracted more workers, gig workers' earnings fell by 53% between 2013 and 2017.

Similarly, workers surveyed by DG IPOL (2017) responded that they would accept more tasks if they were available and reported spending long periods on platforms searching for work (see Section 5.2.1). 88% of respondents across five crowdworking platforms would like to do more work (ILO 2018). On average, workers reported spending 20 minutes on unpaid activities for every hour of paid work; searching for gigs, taking unpaid qualifications tests, researching clients to mitigate fraud and writing reviews (ILO 2018, p.4).

Average earnings are for the majority presumably further limited by superstar effects (i.e., 20% of contractors do 80% of the jobs) on many of these digital markets (Codagnone et al. 2016, p.36).

³⁷ referring to transport of people and goods

These are important considerations with regards to social protection of gig workers and women in particular, as they put the so-called ‘pin money’ argument (Berg et al. 2016, pp.18-19) into question; namely, the claim that supplementary earners do not require access to social protection schemes on the basis of their limited participation in gig work, as they already derive those rights from their ‘main jobs’ in the traditional sectors.

The biggest selling point of platforms from a customer perspective, i.e. flexibility, relies on the contingency of platform workers. Lack of predictability and overall lack of job and income security are perceived as the biggest downsides of gig work from the perspective of platform workers (Eurofound 2018a, BEIS 2018). Researchers at DG IPOL (2017, p.11) observe that gig workers’ levels of dissatisfaction with job security are considerably above representative averages across European labour markets.

Due to the power dynamics on platforms and the lack of appeal mechanisms, gig workers have no effective means of fighting wage theft. This has been characterised as a relatively common occurrence in cloud work, where customers get to keep the results of the work even after formally rejecting it, thereby penalising the workers twice – via their performance score/rating and by withholding their payment. 29% of gig workers surveyed by Smith (2016) report having performed work for which they did not receive payment.

The prevalence of unscrupulous clients paying less than promised, delaying pay, communicating aggressively or systematically underestimating the time required for tasks emerges as an issue across various platforms and markets (DG IPOL 2017). According to three years of invoicing data collected by an online management tool for freelancers, women are paid late more often than men (31% vs 24% of the time; Brown 2018).

5.5.3 Social security and insurance

Critical aspects of job quality depend on workers’ employment status (Eurofound 2018a). This concerns primarily access to social security and insurance, but also rights under labour law regarding working time, parental leave or the right to unionise.

The impact of classification of workers’ status on their entitlements to social protection is highly specific to the national context.³⁸ Social protection arrangements of EU countries vary with regards to efficiency, equity and the degree to which social protection is universal and funded out of general revenues (Beveridgean) versus being oriented mainly to workers and their families, and paid for by workers (Bismarckian; Petropoulos et al. 2019, p.141).

Anyhow, the fact that most platform workers are classified as independent contractors partly or fully excludes them from many forms of social protection (Codagnone 2016). For instance, a cross-country study by Matsaganis et al. (2016) finds that 46% of self-employed women in Europe are at risk of not being entitled to maternity benefits, while this is the case for less than 0.1% of permanent, full-time workers.

Codagnone (2016, p.20) warns that even if statutory coverage is available, workers in atypical employment and the self-employed have difficulty exercising their rights to social protection, because the time worked as they change from one status to another is not properly accumulated.

Regardless of whether platform workers are truly independent contractors or purposefully misclassified by platforms (“bogus self-employment”³⁹), the majority of European gig workers has no access to social protection schemes in relation to disability, old age, pregnancy, care or unemployment (DG

³⁸ EU Regulation (EC) 883/2004 on the coordination of social security systems defers to the Member State’s definition of “activity as an employed person” and “activity as a self-employed person” (Petropoulos et al. 2019, p.142).

³⁹ This is believed to be more common in low-skill location-based work, where platforms exercise significant control over workers and work autonomy is often severely limited (Cherry 2016, Harris and Krueger 2015, Van Dorn 2017).

IPOL 2017). In combination with low earnings, the lack of protection leaves platform workers extremely vulnerable.

The rise of informal work associated with the gig economy might undermine fiscal support to social protection and endanger the sustainability of social protection. This is likely to have particularly negative consequences for women due to their greater reliance on social protection across the life course (Piasna and Drahokoupil 2017)

Women are already disproportionately affected by old-age poverty due to their lower pensions. The platform economy offers little hope to change that. If women move from other forms of dependent employment into the gig economy, this may in fact exacerbate the existing gender pension gap.

The absence of protection during pregnancy constitutes an occupational health and safety risk, exposes women to discrimination, undermines their financial independence and may lead to financial hardship. The lack of rights to maternity and parental leave carries the same risks. In addition, the absence of these rights may reinforce traditional gender roles and push women out of the workforce permanently.

The lack of sick pay may force gig workers to continue working when they are ill, simply because they cannot afford to take time off.

While women working part time generally report higher levels of well-being than women in full-time employment, highly mobile workers⁴⁰ such as gig workers in location-based work report less positive outcomes than other employees regarding their work-life balance, health and well-being at work (Eurofound/ILO 2017). Insecure employment and precariousness are associated with psychological morbidity (Virtanen et al. (2005) in Codagnone et al. 2016, p.29). The unpredictable and urgent nature of gig work can confer a lot of stress on workers (EU-OSHA 2017, Huws et al. 2017). In addition, a lack of training and professional working equipment exacerbates physical risks against which platform workers are often not insured (Huws et al. 2017).

Trans and Sokas (2017) emphasise that the safety risks for gig workers are likely worse due to the loss of the “protective effect” of working in a public workplace; amongst other reasons, because platform workers might accept working conditions and risks that would not be tolerated in the regulated labour market. In household services – a type of work where women are overrepresented - platform workers are entirely invisible to the public eye. Tasks performed in the homes of clients carry risks of inter-personal violence and harassment, as well as the risk of accidents, or contact with chemicals, for example in cleaning materials (Florisson and Mandl 2018, p.68).

5.5.4 Violation of privacy

Platform workers are also more vulnerable to violation of privacy (Codagnone et al. 2016). De Stefano (2018) warns that privacy protection is inefficient, when AI systems enable real-time monitoring of workers at virtually no cost. Cloudworkers can be controlled by measuring their productivity in terms of keystrokes or through regular screenshots and activity logs (Agrawal et al. 2013a). More and more workers in location-based platform work are equipped with wearable work devices that register their movements and location and report how fast workers complete tasks and how many breaks they take (Moore et al. 2018).

AI systems can fulfil various functions ranging from matching to price-setting and semi-automated evaluation (Van Doorn 2017). Platform operators justify their monitoring practices with the need to manage a dispersed workforce. Since these tools do not take into account the quality of work delivered, individual productivity (i.e. quantity) may deliver the only grounds to objectively compare performance of workers who complete highly standardised tasks.

⁴⁰ “Mobile” workers are defined as working regularly outside the premises where their activities usually take place (Eurofound/ILO 2017).

Convenience of service arguments are common to justify GPS tracking of workers in location-based services. In addition, real-time coordinates may be collected out of genuine concerns for the safety of both clients and users.

However, mechanisms which substitute direct managerial control do not only imply an intrusion of privacy, they also serve to enhance power asymmetries between platforms and workers (Van Doorn 2017). In addition, the information obtained through intense monitoring can be abused to discriminate against specific groups of platform participants. As previously addressed (Section 5.4), real-time monitoring may inadvertently discourage women from accepting work. In addition, the data generated as a result of close surveillance can be abused to discriminate on protected grounds. Shephard (2016 in DG IPOL 2018, p.26) provides insights into Uber's use of data for discriminatory advertising:

"Uber's data scientists not only correlated rides to/from prostitution-prone areas with the habitual paydays for benefits recipients, but rebranded the so-called "walk of shame" a "ride of glory" after discovering increased demand of their service, based on patterns they associated with one night stands. While Uber published these insights in a (humorous) blog post that was later deleted, they illustrate the potential for sexual, and in this case classed, surveillance in data collected for commercial purposes."

5.5.5 Harassment and violence

Sexual harassment and violence are arguably gendered risks of platform work.⁴¹ Cyber-bullying and cyber-intimidation constitute risks in cloud work. Women, especially young women, are the main targets of cyber violence and hate-speech online (DG IPOL 2018, p.30). Cyber-intimidation and online threats against women often take the form of inter-sectional violence. Online attacks are often targeted at women who are asserting themselves in public space (e.g. politics, journalism) or stereotypically male online spaces (e.g. gaming or coding communities; DG IPOL 2018).

According to Zimmerman (2012), cyber violence can be amplified by anonymity. Anonymity reduces inhibitions and enables online users to distance themselves from their own behaviour. The absence of identification requirements is equated to an absence of rules and accountability, as message ownership can be disguised; evidence deleted, and accounts disconnected (DG IPOL 2018). These forms of violence affect women's sense of safety, their physical and mental health, their dignity and rights. A study by Amnesty International found that of the women who experienced cyberbullying, 41% felt that their physical safety was threatened. In addition, the Pew Research Center (2017, in DG IPOL 2018) finds that cyber violence does not have to be experienced directly to negatively impact women's sense of safety.

Women in location-based platform work are particularly exposed to sexual harassment and physical violence (Eurofound 2018a). McDonald (2012) finds that women in service occupations and precarious employment contracts are more susceptible to sexual harassment. According to a pan-European study by the European Agency for Fundamental Rights (FRA 2014, p.111), 61% of women employed in the services sector have been subjected to sexual harassment at least once in their lifetime. More than 55% of women in the EU-28 have been sexually harassed and of those, 32% state that the perpetrator was a supervisor, colleague or customer (FRA 2014, p.95).

About one in four women who experienced physical violence did not know the perpetrator beforehand (FRA 2014, p.49). 11% of women who have experienced physical and/or sexual violence by a non-partner indicated that the perpetrator was somebody from a work context.⁴² Crucially, the most serious

⁴¹ Women are almost three times as likely as men to be subjected to sexual harassment (ECWS 2015).

⁴² As Lippel (2018) points out correctly, domestic violence can have a negative impact on the victim's ability to get to work, stay at work and perform well at work regardless of where it occurs.

incidents of physical violence and sexual violence by a non-partner are most likely to occur in the victim's home or someone else's house⁴³ (FRA 2014, p.50).

Accordingly, this is an important risk to bear in mind when it comes to household services.

According to the interviews Ravenelle (2019) conducted with women offering household services via platforms, platform operators do little to ensure the safety of workers in light of these risks:

"While workers are screened to varying degrees, clients are not. The terms of service of most peer-to-peer apps ostensibly prevent clients from setting up more than one account, but as long as one has access to multiple email addresses and credit cards, it's very easy to create numerous identities. Worker profiles are often much more complete than those of clients and include a photo and short biography."

Besides information disadvantages, review systems enforce power asymmetry between clients and workers and exacerbate workers' vulnerabilities:

"Sharing economy workers also need to be cognizant of how they come across when a client is hitting on them or otherwise suggesting something inappropriate. They know the person who just made them uncomfortable is about to give them a rating in the app (Ravenelle 2019)."

In conclusion, the promise of empowerment through access to quality jobs is dubious. Low income and job security, exacerbated by additional work-related risks and the absence of social protection may in themselves constitute gendered employment barriers. Women's comparatively low work intensity and propensity to sort into the lowest-paying jobs casts doubts on the promise of financial independence. In addition, the apparent replication of labour market segmentation in the traditional economy exerts additional pressures on Europe's most vulnerable, by shifting entrepreneurial risk onto the workers, by requiring them to do unpaid work, and by putting them in direct competition with equally qualified workers in the Global South. The findings related to job quality challenge the "empowering" qualities of platform labour and the notion of the platform economy as an enabler of upward mobility.

5.6 Formalisation: the situation of domestic workers in the gig economy

Another aspect to be addressed here relates to the gig economy's promise to empower domestic workers. Ranging from cleaning to personal care services, the domestic service sector is notorious for relying on an almost exclusively female and immigrant workforce whose intersecting vulnerabilities can put them in an impossible bargaining situation (Farris 2012, Van Doorn 2017).

It is claimed that the commodification of domestic work (Section 2.2) enabling women's entry into the labour market is afforded at the expense of those service workers forced to perform this much-needed, yet certainly often unrewarding work at hourly pay rates far below national minimum wages (Fudge 2013, Van Doorn 2017). This dynamic persists due to the high prevalence of informality in the sector (Enste 2017).⁴⁴ The invisibility of domestic workers vis-à-vis authorities makes them vulnerable to exploitation (Farris 2012). They have no legal means of combatting wage theft, discrimination or abuse. Where they are victims of criminal undertakings, they might fail to report to authorities for fear of losing the income they depend on or having to abandon their country of residence (Farris 2012).

⁴³ This is the case in 39% and 48% of all reported instances (FRA 2014, p.50).

⁴⁴ It has not been possible to quantify the extent of the European shadow economy in domestic work thus far. A 2017 study by the European Commission estimates that 9.3% of total labour input in the private sector in the EU is undeclared. However, this does not tell us anything on the activities of interest. In addition, the study relies on LFS-data; thereby excluding non-residents seasonal workers, cross-border workers from other EU countries, legal immigrants who entered the country within one year prior to the survey and illegal immigrants who participate in the labour force (European Commission 2017).

To find informal domestic workers, people have relied mainly on personal recommendations (Enste 2017). In the absence of such referrals, online platforms can deliver on the urban population's growing needs of domestic services (Enste, Hülkamp and Schäfer 2009) by establishing the conditions of trust necessary to facilitate transactions between strangers. Cleaning, child- and eldercare services are increasingly contracted via digital platforms (Eurofound 2018a).

According to Tropf and Meinecke (2017), this is a win-win situation for clients and workers alike. Families have access to affordable services, while workers are assured a steady workload and the opportunity to grow their customer base, which reduces their financial dependence on a single client (Tropf and Meinecke 2017). More importantly, platforms claim to empower domestic workers by providing avenues into the formal economy (Ravenelle 2019).

As of today, there is only anecdotal evidence on the experiences of these workers in Europe (Hunt and Samman 2019, Eurofound 2018b). However, Ticona and Mateescu (2018) provide insights into the working conditions in on-demand household services in the U.S., while Hunt and Machingura (2016) interviewed domestic gig workers in developing countries. The researchers draw a bleak picture of the working conditions in the sector and cast doubts on the platform economy's discourse of empowerment. Their findings include accounts of discrimination, harassment and exploitation. The scholars are convinced that the unequal power relations endemic in domestic work are exacerbated for platform-managed labour (Ticona and Mateescu 2018, Hunt and Machingura 2016).

While review systems and ratings are the only means of quality control, they are not always reciprocal (Ticona and Mateescu 2018, Van Doorn 2017). At the same time, workers are subjected to intense technology-enabled scrutiny. According to Van Doorn (2017), the magnitude of commodification of workers is illustrated by the high turnover rates of these platforms. As the workforce is considered expandable, platforms ensure a continuous offer to clients by constantly attracting new workers rather than improving the conditions for existing workers (Van Doorn 2017). In addition, Van Doorn (2017) challenges the notion that platforms enhance visibility of domestic workers. Instead, he claims, platforms shield themselves from workers through purposefully orchestrated information asymmetries, outsourced "customer service representatives" and algorithmic management systems.

At the same time, additional intermediary services limit the necessity for personal interactions between clients and domestic workers. Technologies like "Alfred", "Handy", and "Managed by Q" are digital assistants which allow clients to outsource not only the domestic services, but also the contracting of the workers who perform the services. Consequentially, domestic workers are made invisible and "dehumanised" to platforms and their clients (Van Doorn 2017).

To assess the potential effects of formalisation, employment status appears to be of relevance. Household service platforms have been accused of insisting on independent contractor models in spite of limited or non-existent work autonomy (e.g. via extensive schedule control or minimum work requirements; Enste 2017, Van Doorn). Domestic workers in bogus self-employment pay the platforms a share of their earnings and lose the right to set their own fees, but in return, they have no claims to minimum wage, have to provide their own equipment, bear all the risks outlined in Section 5.5), all the while accruing liabilities towards insurance, social security and taxes (Enste 2017, Ticona and Mateescu 2018).

Taking all this into account, it is highly doubtful whether these workers will end up earning higher incomes than they could have achieved working informally. Yet, we have learned in Section 5.5.1 that precarious workers engage in gig work precisely for these two reasons; the chance to earn better incomes, followed by the need for schedule control ("flexibility"). Therefore, the benefits of formalisation are not self-evident for this group of workers.

In contrast, where domestic workers move from informality into an employment relationship with the platform, they stand to benefit considerably from their involvement in gig work. Besides gaining access to social and legal protections afforded only to employees, they benefit from increased job and income security.

Naturally, it would be an oversimplification to assume that all workers who engage in some form of paid domestic work are doing it because their livelihood depends on it or that all of them share the same interest in a formalisation of their status. The occasional student baby-sitter may see little merit in ensuring a steady workload and providing for social rights they already enjoy. In addition, tax liabilities are unlikely to be of concern to those who are earning far below thresholds where such obligations may arise.

Nevertheless, the digital documentation of the activities of domestic workers in the platform economy might contribute to improving working conditions in the sector in the long run. A lack of statistics about domestic workers has contributed to their invisibility to policymakers. Platforms collect in-depth information about workers and their activities and offer a great opportunity to understand the livelihoods and needs of these workers, if only that data was made available (Hunt 2017).

European countries have developed different responses to support on-demand workers in household services and/or encourage formalisation of activities on online platforms.

In Germany, the online job portal “Haushaltsjobbörse” is a government-funded service, which allows households to hire on-demand domestic workers legally (Minijob-Zentrale 2019). The jobs offered via the platform fall into either of two categories:

- marginal employment opportunities (so-called “Minijobs”) capped at EUR 450 tax-free monthly earnings;
- jobs above this earning threshold, which include social security coverage for workers.

All domestic workers recruited via the platform are legally entitled to a gross hourly rate of EUR 9.19 (Mini-Job Zentrale 2019).

In Denmark, the Danish cleaning services digital platform Hilfr and the United Federation of Danish Workers signed a collective agreement guaranteeing platform workers the same conditions⁴⁵ as elsewhere on the Danish labour market. The Danish government created the framework for the agreement. In addition, an agreement was reached in Parliament on automatic sharing of information by platforms to tax authorities (Garben 2019).

Belgium is the first European country to have introduced a platform tax law in 2016. The *loi sur l'économie collaborative* encourages the declaration of “miscellaneous income” by offering a flat-rate tax of 10% (as opposed to 33%) for platform income below EUR 6,250 p.a.⁴⁶ (Kilhoffer and Lenaerts 2017, Listminut 2019). The favourable tax rate is limited to location-based services in the peer-to-peer economy and applies only to activities carried out on officially approved platforms. It does not include access to social protection (Kilhoffer and Lenaerts 2017).

In Estonia, tax authorities have concluded agreements with the asset-sharing platform Airbnb and the labour-sharing platform Uber committing platform operators to automatically declare earnings on behalf of workers to authorities. Similar agreements with other platforms are in preparation (OECD 2019b).

These measures are important to gain a better understanding of the situation of workers in the platform economy and a necessary first step to render the invisible workforce visible. Moreover, it will be necessary for governments to detach the rights to social and legal protection from employment status (as discussed in Section 6.1) in order to ascertain that the participation in the formal economy is actually “empowering” this vulnerable group of workers.

⁴⁵ Occupational health and safety requirements are exempted from the agreement.

⁴⁶ Amount for 2019, subject to indexation

5.7 Collective voice

In the European labour market, collective interest organisations such as trade unions are advocates for workers' rights. The role of collective voice in advancing minimum wages (e.g. collective bargaining) and improving working conditions (e.g. working time limits) is widely acknowledged.

Although in Europe the probability of women to be employed rather than independent is much higher than of men (particularly in the public sector), making women likelier candidates for union membership, union density is still considerably lower among women overall (Ledwith 2012). Nevertheless, the incorporation of women has played an important role in countering unions' general membership contraction following the decline in blue collar jobs, traditional union strongholds (ETUC 2011).

In the context of this paper, it is of interest to understand why gig workers are seemingly less successful in applying these proven modes of collective voice to enforce better working conditions. Furthermore, I will explain why there are no unions at all among female gig workers. Finally, I am discussing the benefits and disadvantages of online communities that gig workers use to connect to each other.

Collective voice of workers is very limited in the platform economy due to the isolated nature of gig work and a highly dispersed labour force. In addition, the absence of institutional power (Schmalz and Dörre 2013) and gig workers' status as independent contractors make collective organisation difficult (a. o. because minimum wage agreements for the self-employed can legally be classified as anti-competitive price-fixing; Vandaele 2018).

A loose attachment to the labour market is generally associated with a lower willingness to disrupt, as the expected benefits of collective action may decrease relative to the costs (Vandaele 2018). This is likely to be the perception of many gig workers, particularly when they are supplemental earners.

Another explanation relates to the highly heterogeneous interests of different groups of workers. High-skilled online freelancers and creative workers are likely to be genuinely self-employed (Petropoulos et al. 2019). Their primary concerns are linked to minimum wage standards and access to social protection (Vandaele 2018). Low-skilled workers in location-based work are often "involuntarily self-employed". For them, the fight against misclassification of their employment status and issues related to safety and liability are important concerns besides remuneration (Eurofound 2018a).

In addition, platforms can undermine workers' organisation in the way they shape relationships among workers (e.g. through competitive performance pay), through surveillance (e.g. using GPS tools to track movements of workers and see whether they gather in specific locations) or through the threat of sanctions (which could be escalated all the way from rankings to deactivation of accounts; De Stefano 2016 in Petropoulos et al. 2019, Van Doorn 2017).

The few examples of quasi-unions which have nonetheless emerged from the gig economy can be found in the male-dominated food delivery and transport sectors (Deliveroo and Uber). In some cases, these organisations have successfully litigated classification actions and combatted bogus self-employment (Eurofound 2018b). In addition, Deliveroo and Uber drivers now have access to some form of occupational and health insurance (Vandaele 2018).

Vandaele (2018) explains the relative success of these movements and why such forms of collective organisation are remarkably absent in other forms of platform work, including those with higher shares of women. Cloudworkers have limited to no bargaining power and little incentive to cooperate due to the international competition for work on these platforms (what Graham et al. 2017 term "labour arbitrage").

On-demand workers in domestic services are geographically concentrated, like couriers and drivers, but they face specific obstacles to collective organisation. The direct, face-to-face contact that these

workers have with individual clients and the level of trust required in personal care, for instance, is higher than in other forms of locally-delivered work. Thus, these workers may feel a sense of loyalty towards their clients (Silver 2003), making them less willing to use their “disruptive capacity” (Vandaele 2018).

In addition, workers in household services undergo more stringent forms of scrutiny via online rankings and detailed reviews (Van Doorn 2017). Besides judging quality of service and workers’ reliability, social feedback may mirror or reinforce stereotyped perceptions of appropriate behaviour (Ticona and Mateescu 2018).

In the absence of an “institutionalised voice”, platform workers use online communities and informal networks to self-organise and communicate with each other (Eurofound 2018b). Some platform operators host online communities to enable direct communication between workers and the platform (e.g. Upwork Community, Clickworker Lounge). Other communities for self-organisation of workers are operated by third parties and are mostly intended for workers of a specific platform (e.g. Reddit groups, TurkOpticon). Finally, groups on social media platforms (e.g. Facebook groups, Messenger groups, group chats on Whatsapp) are predominantly closed groups for a specific type of work and platform (Musil 2018).

Depending on a community’s members, host, reach and exclusivity, the issues on which workers exchange information range from platform workers’ legal obligations, insurance needs, platform tools and processes to working conditions, pay, task content, improvements and clients (Musil 2018, p.25). In addition, a large share of information exchanged via these communities is non-work related, indicating platform workers’ need of social interactions and possibly, a desire to compensate for the isolated nature of their work (Musil 2018, p.26).

The benefits of small and private online communities for vulnerable groups of workers are evident. Exclusive communities among like-minded individuals in close geographical proximity – enabling personal contacts among members – promote mutual trust (Sharratt and Usoro 2003, Musil 2018). These forums can be a safe space for women to speak openly without fear of reprisal and can act as alternative, worker-driven systems of quality control (Eurofound 2018b). By sharing authentic reviews of clients and flagging cases of misconduct, group members can use these networks to alert other women and prevent experiences related to non-payment, harassment or abuse. Nevertheless, these practices also present concerns over violations of privacy related to the dissemination of protected information and reputational damage caused on the basis of little verifiable evidence.

Crucially, as Musil (2018) points out, these online spaces – though set up with the objective of connecting workers – can have adverse effects on collective organisation. The fragmented structure of self-organisation in myriads of small, specialised online communities undermines collective organisation in two ways: First, the friction of information flows across various online communities and the absence of consolidated information impede access to relevant knowledge by outsiders, such as trade unions. Second, the sheer number of groups and the privacy settings can reduce online visibility and make it more difficult for new gig workers to locate groups with shared interests (Musil 2018).

In conclusion, workers have little to no bargaining power in the platform economy. Women are likelier not to be unionised due to the type of activities they pursue on platforms. Finally, informal and decentralised (online) networks are beneficial to women’s safety but may hamper effective collective organisation.

5.8 Gender pay gap

To systemically review the gig economy's promises of inclusivity and fairness, this chapter addresses the gender pay gap in the platform economy. Section 2.3 introduced four main reasons for the gender pay gap:

1. Human capital determinants and occupational segregation: Women self-select into lower-paying jobs on the basis of their skills (Boll et al. 2016).
2. Motherhood penalty: Caring responsibilities limit women's availability to the labour market (Mas and Pallais 2017)
3. Bargaining capacity: Women tend to undervalue themselves and are less prone to negotiate salaries (Bowles and Babcock 2013).
4. Discrimination: Women are discriminated against on the basis of stereotypes (Kricheli-Katz 2012).

The gig economy promises to mitigate all of these factors. Nevertheless, as we have learned in Section 5.5.1, occupational segregation seems to be an important factor in explaining the overall earnings gap between female and male gig workers.

The implications of compensation differentials for women's standing in the platform economy are somewhat ambivalent. Since working time flexibility is an inherent feature of gig work, the 'motherhood pay differential' may play a lesser role. In contrast, wage risk is arguably higher in platform work than in the (formal) offline economy.

This chapter provides empirical evidence for the gender pay gap in the gig economy looking at differences in working time and work intensity, wage bargaining strategies and customer bias.

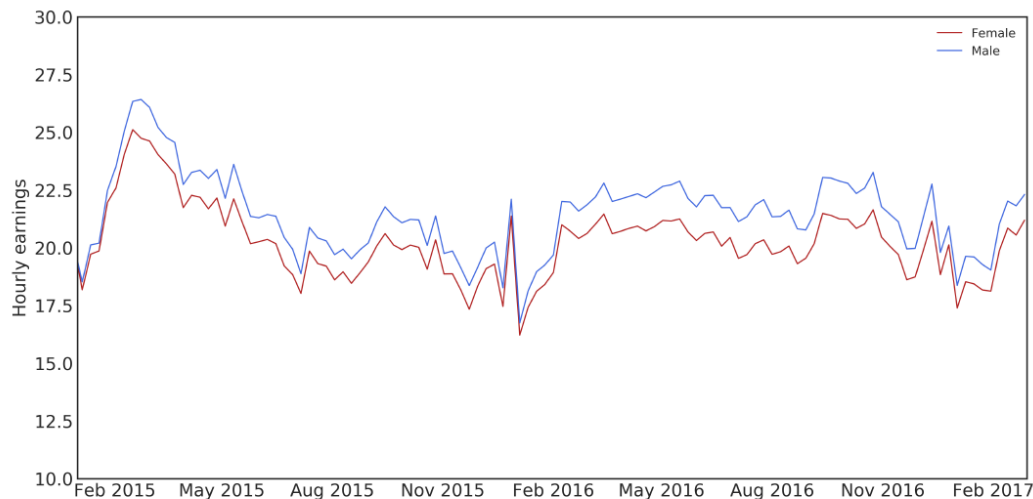
The existing evidence, albeit limited, reveals a gender pay gap across all types of platforms even for similar or equivalent work. Research on clickwork (Adams and Berg 2017), online freelancing (Galperin et al. 2017, Barzilay and Ben-David 2017), and location-based gig work (Cook et al. 2018) reveals earning differentials; in some cases, above those in the traditional economy. The findings highlight potential pitfalls (Hannák et al. 2017), which will need to be addressed to ensure that the gig economy does neither perpetuate nor exacerbate existing inequalities. While more research is needed to confirm their reliability, the studies indicate that

Female platform workers earn less than their male counterparts in the same work.

5.8.1.1 Working hours and work-family conflict

As demonstrated in Section 5.2.1, female platform workers are more likely to have caring responsibilities. The time spent on unpaid work can act as a constraint on the participation of women, which in turn, affects their earnings. Hunt and Samman (2019) state that flexibility offered by platforms is subject to trade-offs between income and choice over working times. This trade-off is most visible, where it is built into the platform's design, such as Uber's 'surge-pricing' feature, offering drivers incentives to offer their services at specific times determined by the platform or complete a set number of rides (Hunt and Samman 2019, p.18). Similarly, Agrawal et al. (2013b, p.11) find that some platforms incentivise their workers to log onto applications at specific times by guaranteeing a certain hourly wage.

Cook et al. (2018) use granular data on U.S. Uber drivers to measure driver productivity and returns to behaviour. In the absence of discrimination (Uber employs a gender-neutral matching algorithm) or gendered differences in wage-bargaining (rates are determined by the platform) they find a 7% gender earnings gap amongst drivers.



Note: Data based on hourly earnings averaged across all UberX and UberPOOL drivers who worked in a given week. The percent of drivers who are female varies across city; to mitigate composition effects, we weight averages at the city level by *total* number of drivers in a city, rather than by number of male (or female) drivers. Earnings are gross; costs such as the Uber commission or gas are not subtracted.

Figure 24 Average hourly earnings in USD, US Uber drivers (Cook et al. 2018, p.11)

The authors explain the pay gap with women's relatively high opportunity cost of unpaid working time (Hall and Kruger 2015) and gender differences in preferences and constraints such as concerns over safety.⁴⁷ According to this study (Cook et al. 2018, p.4), over a third of the pay gap can be explained by on-the-job learning, i.e. where and when to drive and how to strategically cancel and accept trips. Indeed, hourly rates vary significantly throughout the day. Male drivers accumulate more experience (total no. of rides completed) by driving more hours per week (1.5x) and being less likely to leave the platform (retention).

Linked to lower work intensity⁴⁸, women's earnings are less incentive-driven. Nevertheless, Cook et al. (2018, p.39) find that - contrary to what might have been expected - work intensity and the specific hours of the day at which women choose to drive are not as important as the drivers' experience on the platform.

In contrast to location-based work, cloud work promises to level the playing field by providing women and men the flexibility to work from home at the times most convenient to them.

Adams and Berg (2017) analyse earnings of American women and men on the clickwork platform Amazon Mechanical Turk (AMT). Since microtasks are sourced from the crowd at fixed prices, earning inequalities based on discrimination or bargaining differences can be excluded. In addition, men and women in the sample have similar amounts of crowdworking experience and educational attainment levels.

Nevertheless, female AMT workers earn on average USD 4.90 per hour compared to USD 5.90 for men. The gender pay gap is highest amongst the lowest earning Turkers (24% at the 10th percentile of the wage distribution) and smallest for higher earning individuals (11% at the 90th percentile).

Despite being over-qualified, women select the tasks with the lowest earning potential.

Liang et al. (2018) derive similar findings for the global freelancing platform freelancing.com. Female gig workers submit their bids later and choose gigs with a lower hourly wage budget (Liang et al 2018, p.19)

⁴⁷ Female drivers appear to avoid driving in areas deemed unsafe (higher crime rates and number of businesses with liquor licenses) and drive at slower average speed (Cook et al. 2018).

⁴⁸ Incentives are dependent on the total number of rides, drivers' acceptance rates and ratings (Rosenblat et al. 2017). The authors (Cook et al. 2018, p.7) find no statistically relevant difference in drivers' ratings, suggesting discrimination on the basis of gender is not a likely driver of the pay gap.

On the basis of qualitative information (ILO 2015) from the same sample of AMT workers, Adams and Berg (2017, p.16) find that 'juggling' of family responsibilities explains between 4.2 and 5.7 percentage points of the overall wage gap at different points of the distribution. This factor is the most significant for the lowest earning crowdworkers, where the pay gap is the most pronounced (Adams and Berg 2017, p.20). It appears that caring responsibilities limit women's autonomy in selecting the highest paying jobs:

"Faced with interruptions from young children or adult family members, women appear less able to select the longer, more complex tasks posted on the platform, some of which also require a quiet working environment. As a consequence, low-earning women are more likely to be constrained to accepting menial 'penny HITs', such as data entry, cataloguing or verification, because they can be performed quickly as opposed to other tasks that require a greater amount of concentration and dedicated time to complete the tasks (such as audio transcription)" (Adams and Berg 2017, p.2).

While a 'motherhood penalty' may be less explicit than in the offline economy (Bertrand et al. 2010), Dubey et al. (2017) provide first evidence on gender differences in career progression in the gig economy. Tracking earnings of male and female Indian freelancers in software development and design from 2012-2015, they find that average earnings of male freelancers progress much faster than those of comparable female freelancers over the same time period (Dubey et al. 2017, p.17). Unfortunately, the reasons for this are unclear. However, since the researchers controlled for experience on the platforms and ratings, the widening pay gap is unlikely to be caused by first mover advantages.

Barnes et al. (2015) highlight the importance of networks to provide recommendations and repeat business to ensure gig workers' continued success. It is possible that male freelancers networked more effectively or that they were met with positive bias (Uhlmann and Silberzahn 2014) and entrusted with increasingly challenging gigs while female platform workers stagnated in spite of comparable credentials. Parallel to this it is possible that female workers undervalue themselves and maintain low rates, while men justify charging higher rates as they gain experience on the platform.

5.8.1.2 Wage bargaining

Gendered differences in wage bargaining strategies of jobseekers can contribute to a gender pay amongst platform workers. According to Bowles and Babcock (2013), women avoid negotiations and fare worse when they do negotiate. Accordingly, the lack of collective voice and institutionalised wage setting in the gig economy can be expected to affect women's earnings negatively (Piasna and Drahokoupil 2017). Women tend to avoid competition Croson and Gneezy (2009), yet international online labour markets are hypercompetitive spaces where gig workers compete for jobs with an unknown number of professionals from around the world who may have considerably lower reservation prices for their own labour.

Since many platforms have a fixed-rate system where price is non-negotiable, a 'self-inflicted' pay gap on the basis of lower bidding rates can only emerge on platforms where workers set their own rates.

Women may find it easier to negotiate for equal pay online rather than in person, and in horizontal (peer-to-peer economy) rather than hierarchical relationships (Barzilay and Ben-David 2017, p.400, Leibbrandt and List 2015). As online platforms enable greater anonymity, this could counteract gender interaction effects. Accordingly, one might expect women to be more successful in negotiating equal wages than in the offline economy

Galperin et al. (2017) analyse gender differences in the bargaining behaviour of online freelancers, which confirms the notion that men are more competitive. Male freelancers are found to be more likely to compete by price even when it is fixed, i.e. they enter negotiations in a non-bargaining context (Galperin et al. 2017, p.36).

Analysing billing rates, occupations and work-hours of 4,600 online freelancers, Barzilay and Ben-David (2017, p.394) find that female taskers request hourly rates that are on average 37% lower than men's. This pay gap persists even after controlling for feedback score, experience, occupation, hours

of work and educational attainment of the freelancers. Considering that freelancers are unlikely to earn above their requested rates (Dubey et al. 2017), women's hourly earnings are expected to average two-thirds that of men, despite working for more hours on the platform (Barzilay and Ben-David 2017, p.394).

Among all occupational categories available on the platform, the most pervasive gaps can be found in the category of legal services, an occupational category where women outnumber men (70% women, (Barzilay and Ben-David 2017, p.398).⁴⁹ In this category, female freelancers request only 44% of men's hourly rates, a gap apparent in all ranges of work experience and most pronounced between women and men with the highest educational attainment (Barzilay and Ben-David 2017, p.414, Figure 25).

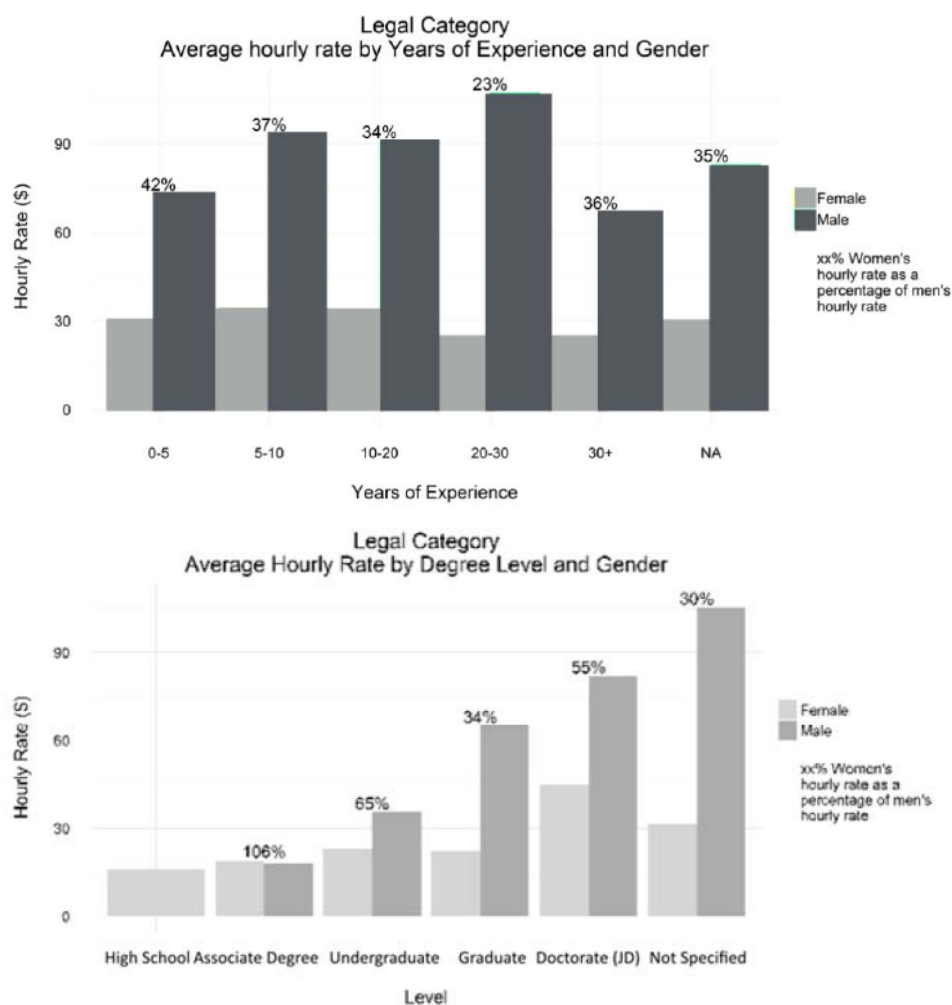


Figure 25 Freelancers' average hourly billing rate, by a) years of experience b) degree level and gender (Barzilay and Ben-David 2017, p.389)

What we do not know is why women undervalue themselves. Do they bid lower because they are more reliant on the money (Barzilay and Ben-David 2017, p.420)? Are they – in the absence of price transparency – “importing” their wage expectations from the offline economy into the digitally mediated market? Or do female gig workers adjust their reservation wages only after attempts to request rates equal to those of men failed?

⁴⁹ In contrast, U.S. Census Bureau (2018) data shows that women employed in the top 10 largest occupations for women experience the most favourable gender pay ratios (with the exception of retail supervisors at 74%). Women in male-dominated fields are likely to benefit from higher wages, but often face much bigger pay gaps (AAUW 2018).

The research by Dubey et al. (2017) suggests that the latter could be the case. Extracting billing rates and earning rates of female and male online freelancers with comparable experience and activity in the same occupational categories,⁵⁰ Dubey et al. (2017) find that women bid lower than men (billing ratio) and end up earning below⁵¹ this self-assessment (earning ratio).

Table 4: Overall pay gap

	India	US A	Pakis tan	Banglade sh	Ukrain e
Earning ratio	0.84	0.89	0.78	0.62	0.79
Billing ratio	0.94	0.85	0.84	0.80	0.85

Figure 26 Female-male earning and billing ratio, by country (Dubey et al. 2017, p.16)

Cross-country differences in the pay gap are insofar insightful, as they support the notion of a gendered dimension to downwards pressures resulting from an international labour market. Competing on price with women facing comparatively greater disadvantage in their local markets may translate into a weakened bargaining position for female freelancers overall.

Crucially, earnings below billing rates suggest that the gender pay gap in freelancing is not entirely self-inflicted but that women are exposed to negative bias. Employer stereotypes of 'gender-appropriate' bargaining behaviour or productivity might be counteracting women's attempts at securing higher rates for their labour.

5.8.1.3 Discrimination

Discrimination may be another factor contributing to the gender wage gap. While some platforms employ gender-blind algorithms to match gig workers with their tasks, this is not the case on platforms where customers choose from a selection of service providers. First evidence suggests that gender interaction effects persist in the platform economy and that human bias may contribute to women's lower earnings (Galperin et al. 2017, Hannák et al. 2017).

An example of such research is the work of Galperin et al. (2017). While the study probed for differences on the basis of the employer's (client) gender and not that of the gig worker, the findings are nonetheless relevant as they highlight the role of stereotypes in the platform economy. Concretely, Galperin et al. (2017) tested whether male and female jobseekers competing for contracts in an online freelancing platform adjusted their bargaining strategies and reservation prices depending on the inferred gender of the employer. They find that jobseekers – regardless of gender – bid 22% lower to the male employer (p.30). This 'male-employer effect' may be linked to stereotypes regarding women's ability and willingness to negotiate on price.

⁵⁰ The gigs observed in the study pertain to one of the following occupational categories: administration, design, business services, networking and infrastructure management, sales and marketing, writing and translation and software development (Dubey et al. 2017), The overall pay gap is the average value across all categories.

⁵¹ with the exception of U.S. freelancers

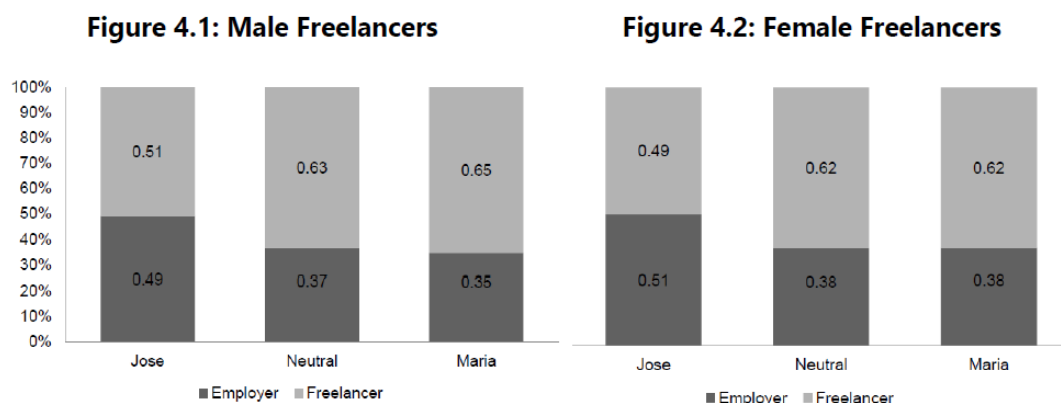


Figure 27 Employer's surplus in bargaining context (Galperin 2017, p.31)

Hannák et al. (2017) studied the online marketplaces Fiverr (web-based) and TaskRabbit (location-based) for gender and racial bias. They crawled data on 13,500 workers' gender and race and position in search rankings, ratings and customer reviews. Ranking algorithms can be viewed as creating status differentiation, as profiles at the top of search rankings are more likely to be clicked (Richardson, Dominowska and Rago 2007).

Customer feedback is instrumental to purchasing decisions in the online world and as such a significant means of control on gig workers' access to employment and income (Rosenblat et al. 2017).

Regarding the possibility for workers to take advantage of anonymity and omit demographic information to prevent discrimination, their findings suggest that omitting information might not be in the best interest of gig workers who wish to be frequently booked. While many freelancers take advantage of the anonymity offered by Fiverr and do not upload a picture that depicts a person (29%), or do not upload a picture at all (12%; Hannák et al 2017, p.5), this translates into a disadvantaged position in rankings and fewer reviews. Where users are already faced with limited information to make their hiring decision, increasing the users' information asymmetry by withholding information appears to put platform workers at a comparative disadvantage.

The number of reviews must not necessarily be an indicator of positive feedback, but it might indicate how often gig workers were booked. For all three races (White, Black, Asian), workers perceived to be women receive fewer reviews on average (p.8). On Fiverr, White women have better ratings than men and non-White freelancers, while social feedback on TaskRabbit is biased against women and Black freelancers (p.10).

With regards to search ranking, the authors fail to reconstruct how social feedback feeds into Fiverr's algorithm and they do not find evidence for bias.

In contrast, TaskRabbit's search algorithm appears to be biased against women and black workers. Hannák et al. (2017) find significant negative correlations of gender and race with search rank.

This illustrates that search algorithms built to take user behaviour (e.g. social feedback, clicks on profiles) into account reproduce customer bias and can exacerbate the effects of stereotypes. By ranking workers lower, the platform limits their visibility, which may reduce their job opportunities and income. This finding undermines the notion of the gig economy as a gender-neutral space, where objective algorithms provide customers with a suitable amount of workers solely on the basis of their skills and experience for the requested gig.

The limitation remains that these algorithms are well-kept secrets. In order to reliably answer whether platforms exacerbate existing bias, it would be necessary to obtain access to the code and understand how social feedback and user behaviour impact the algorithms.

6 European policy for empowering platform work

This chapter examines relevant European policies and highlights the need for additional measures to harness the potential of the platform economy and provide for a more inclusive and egalitarian European labour market.

Realising the gig economy's promises for women's empowerment requires interventions that are suitable to

- (1) address the precarity of platform workers;
- (2) promote fairness and transparency on platforms;
- (3) enable women's greater participation in the labour market.

Due to the transnational nature of much of the gig economy, joint efforts at the European level will be needed to develop effective regulatory responses. The necessity of a common approach was recognised in the context of the General Data Protection Regulation (GDPR) and the Platform-To-Business Regulation (DG EPRS 2019, Petropoulos et al. 2019).

Despite a common European labour market, matters in the area of social policy are understood to be intrinsically linked to national welfare states and as such largely outside the European Union's scope of competence. Nevertheless, the Social Policy Title in the Treaty on the Functioning of the European Union (Article 153 TFEU) enables the EU to set minimum standards to protect precarious workers. This has led to the development of an extensive body of law on issues such as atypical employment, working time and occupational health and safety (Garben 2019).

In addition, the right of women and men to equal pay for equal work has been enshrined in European treaties since 1957 (now Article 157 TFEU). The European Charter of Fundamental Rights (ECFR) upholds the right to equality and the right not to be discriminated on the grounds of gender as fundamental principles of European primary law.

The platform economy is difficult to regulate for various reasons. First, the low entry barriers and limited marginal costs associated with the business model result in new businesses being created constantly; while others are bought up by larger platforms or disappearing (Schmidt 2017). The platform economy is thus a "moving target" from a regulatory perspective (Garber 2019)

Second, most platforms have been able to grow in a regulatory vacuum under the banner of "permissive consensus", which confronts legislators with a de facto situation that is much more difficult to change.

Third, heterogeneity in the various online platforms, their scale, scope, organisational form and target groups make it impossible to apply a one-size-fits-all approach.

Finally, algorithms are protected business secrets and there are problems with explainability of algorithmic decision-taking (see Section 4.6).

6.1 Fighting precarity

The need to protect workers in atypical employment has been recognised in European legislation such as the Fixed-Term Work Directive 1999/70/EC, the Temporary Agency Work Directive 2008/104/EC and the Part-Time Work Directive 97/81/EC. The protective model followed in these directives is that atypical workers are to be treated on equal terms as full-time employees in their company, or in the absence of comparable workers, as workers in the same sector. The applicability of these directives to platform workers depends on their employment status under national law.

As addressed in Section 5.5.3; employment status is often decisive for an individual's right to social protection; leaving many Europeans, especially women insufficiently protected (European Commission 2019c). In addition, the self-employed may be excluded from collective bargaining, the right to unionise and negotiating mutual arrangements (Risak 2017), on the basis of competition or anti-trust

laws that were meant to serve a different purpose. Granting platform workers the right to collective organisation is a necessary step in increasing the voice of these workers and enabling them to rely on existing mechanisms and organisations to support them.

The European Union has demonstrated the willingness to enhance the protection of precarious workers, including platform workers, in the recent adoption of the Directive on Transparent and Predictable Working Conditions (2019). The directive replaces the “Written Statement Directive” and expands the scope of application to encompass platform workers and “*up to three million workers active in new forms of work, like workers on zero-hour contracts and domestic workers*” (European Commission 2019d) working more than 12h monthly. The policy increases the information duties for employers, shortens delays to provide information and introduces new material rights regarding probation, work autonomy and training. The material rights include a ban on exclusivity clauses, the right to predictability of work (workers on-demand should know in advance when they can be requested to work), the right to compensation when the employer cancels the work assignment after a specific deadline and the right to cost-free mandatory training.

The policy applies to “workers” in the sense of EU law, meaning that application to platform workers will depend on a case-by-case assessment of the subordination link, the nature of work and remuneration (see C-320/16 Uber France).

In light of the power asymmetries in the gig economy, Risak (2017) proposes a European “Platform Work Directive” to introduce “a rebuttable legal assumption” that the relevant underlying contractual relationship constitutes an employment contract between the platform worker and the platform.

Such an approach would greatly enhance the rights of platform workers by establishing a connection to the employment law of the country where the work is actually performed. Furthermore, it would shift the cost of litigation and the burden of proof in distinguishing between the genuine self-employed and those workers over which platforms “exert considerable control” from workers to platforms. Naturally, the solution is attractive because it would – given the political will – be relatively easy to implement. It cannot, however, resolve issues related to the accumulation of social rights across different employment situations.

The Council Recommendation (2018) on the expansion of social protection to workers in all forms of employment aims at closing gaps in coverage of non-standard and self-employed workers and at enhancing transferability of benefits between different schemes. The proposal covers social security schemes for sickness and healthcare, maternity or paternity, accidents at work and occupational diseases, disability, old age and unemployment (the latter on a voluntary basis; European Commission 2019d).

The Recommendation calls for considerable reform: “*Member States should ensure that entitlements ...are accumulated, preserved and transferable across all types of employment and self-employment statuses and across economic sectors*”.

This may presently only be feasible in a universally-funded system, indicating a growing awareness of the need to rely less on worker funding and move to a system of universal coverage from general revenues (Petropoulos et al. 2019). Indeed, it appears that the only effective way of supporting low earners in the changing world of work is a universal safety net, a floor of minimum standards and social rights applicable to all, regardless of their status (OECD 2015, OECD 2019b).

6.2 Promoting fairness and transparency

Enforcing the right to equal treatment in the platform economy is, admittedly, a task of Herculean proportion. Regulation may not be desirable in the field of peer-to-peer transactions. However, regarding the much larger share of platform labour contracted by businesses, it is difficult to justify why companies resorting to on-demand labour in digital online-markets should be exempted from the obligations that employers in the offline economy have to fulfil.

As some competition lawyers have emphasized (Kullmann 2018, p.11) “firms can circumvent antidiscrimination laws through the use of algorithms that automatically develop and refine categories in which people of certain race, marital status, age, sexual orientation, or religion are lumped together”.

Enabling freelancers to assert their rights to equal treatment would require much more transparency on the processes that drive hiring decisions and payment in the platform economy. This requires platform workers to be informed about the data collected by platforms. In addition, platforms should be obliged to set up mechanisms for dispute-resolution. The P2B-regulation requires “online intermediation services”⁵² to set up complaint-handling and mediation procedures for business users. It is unclear why platform workers should not have recourse to similar measures. Enabling reciprocity of reputational systems, giving workers means of addressing wage theft and reacting to unfair suspension of their accounts would improve the power imbalances on platforms.

Platforms should be obliged to enable greater pay transparency, for instance, through obligations to regularly publish average hourly earnings in different occupational categories, and where possible, broken down by gender. This would help orient platform workers how much to charge and raise awareness of inequalities among buyers and sellers on these platforms.

Furthermore, the need for interoperability requirements between different online labour markets is evident in light of the lock-in effect that non-transferability of digitised reputation can have on workers.

The regulatory problems related to a “right to be informed” are apparent in the context of the P2B-Regulation as much as the GDPR. In principle, the former obliges platforms to provide business users with the reasons for the termination of contract, the parameters and relative importance thereof in defining the position in search rankings and a description of access to personal data. However, online intermediation services and search engines are not required to disclose algorithms. As noted in DG EPRS (2019, p.9) “it seems to be impossible to release meaningful information on search ranking criteria without also releasing trade secrets”.

The GDPR has created the hope that a “right to explanation” will give victims of “discrimination-by-algorithm” recourse to human authorities, thereby mitigating the effect of such biases (Civin 2018). However, the GDPR only provides a formal ex-ante right to receive meaningful, but properly limited information. The claim of a legal right to an *ex-post* explanation of *specific decisions* is not correct (Wachter, Mittelstadt and Floridi 2017).

Taking all this into account, it appears that the proprietary nature of algorithms has so far presented a formidable obstacle to regulation.

Barocas and Selbst (2016) emphasise that there are also practical limitations to building fairness constraints into algorithms. In addition, where unintentional discrimination occurs as a result of bias in the data being mined, there may be no obvious method to adjust historical data, because any corrective measures altering the results of data mining after it is complete would equally be treading on legally disputed terrain (Barocas and Selbst 2016).

Nevertheless, several technical approaches to address the problem of algorithmic bias have emerged, which merit further attention. These can be broadly distinguished into “Equality by design” and “explainability” techniques.

⁵² It is widely disputed whether online labour markets are included in the scope of the regulation (amongst other reasons because of the CJEU ruling disputing Uber’s claim of being merely an “online information society” for effectively managing the “underlying transportation services”; Van Cleynenbreugel 2019)

Equality by design

The first approach consists in pre-processing data to maintain as much accuracy as possible while reducing the relationship between outcomes and protected characteristics (Silberg and Manyika 2019). Another option could be to remove information about sensitive attributes entirely (Hannák et al. 2017).⁵³ Yet another way to build fairness into algorithms is by subjecting algorithmic decision-making to a “counterfactual fairness” test. In such a test, the decision should remain the same in a counterfactual scenario where a sensitive attribute is changed (Silberg and Manyika 2019).

Post-processing techniques transform some of the model’s predictions after they are made in order to satisfy a fairness constraint.⁵⁴ Another approach imposes fairness constraints on the optimisation process or uses an adversary to minimise the system’s ability to predict the protected characteristic (Silberg and Manyika 2019).

Explainability

First techniques are being developed to address explainability issues in AI. These could be used to identify the biased elements in decision-making retroactively.

The European Commission’s High-Level-Expert Group issued voluntary guidelines for ethical AI in April 2019, which endorse an approach of “Ethics by Design” and provide businesses with a checklist of seven principles. The non-binding nature of this instrument only reflects how little is known on the processes and impacts of big data analysis and algorithmic decision-making. It is true that many companies will probably be motivated to apply ethical principles as much as possible simply to avoid unwanted negative publicity (such as the scandals evolving around discriminatory AI-enabled policing).

However, the majority of value-generating activities on online labour markets are taking place far removed from the public eye and platform workers are not in a position to make demands. It is therefore reasonable to assume that compliance on behalf of these platforms will require an enforceable legal instrument.

Kim (2017) suggests that regulation prohibiting classification bias requires a new approach to determining whether discrimination has occurred. Due to the information deficit of platform workers, it would be very difficult to prove individual cases of less favourable treatment. However, given that algorithmic decision-making is based on various data sources about a large number of people, which is complete according to the model (predictive accuracy satisfied operators to an extent where the algorithm is used), showing an adverse impact on women based on that data should be sufficient (Kim 2017).

Because online platforms have superior access to information about the design of the data model and the data, it should be their responsibility to establish that an algorithm is valid if there is a suspicion that this is not the case (Kullmann 2018, p.20). Such a requirement would encourage platforms to ensure fair outcomes. In Kullmann’s (2018) words: *“if a claimant has enough facts from which it may be presumed that there has been discrimination, the online platform can decide either to try to justify a difference in pay or to ensure equal pay in order not to disclose its ‘mysterious’ business secret.”*

6.3 Enabling participation

While it cannot be confirmed on the basis of existing data how much the gig economy effectively contributes to closing the female employment gap, it is evident that flexible working arrangements benefit women’s participation. However, it is also clear that as long as digital labour markets leave social relations of gender unchanged, the continuity and reproduction of gender inequalities is to be expected. Equal opportunities for women in the labour market require public policies that address the

⁵³ The latter approach certainly carries a trade-off with explainability; leaving sensitive information in datasets is useful to determine whether the data model or the underlying data caused biased outcomes (Kullmann 2018).

⁵⁴ Such an approach could be useful for platforms to counterbalance systematic bias in customer ratings against members with protected characteristics.

underlying sources of gender discrimination, such as the availability of affordable child care, support for equal commitment to unpaid work and care activities and working time regulations that promote work-life balance.

Even short periods of paternity and parental leave taken by fathers can have long-lasting effects on fathers' involvement in childcare and housework (European Commission 2019e). This in turn has a positive effect on women's labour supply. In addition, the gender gap in paid and unpaid work is smaller in EU countries with more generous paternity and parental leave opportunities for fathers (European Commission 2019e)

The Work-life balance directive for parents and carers (2019) represents an important step in this direction. According to the new legislation, fathers or second parents will be entitled to 10 working days of leave. Parental leave will be extended to an individual right of four months, of which two are non-transferable between the parents and paid (the level of payment is to be decided by the Member State). Working carers will be entitled to five days p.a. to care for relatives in need of care or support due to serious medical reasons. Furthermore, the right to request flexible working arrangements has been extended to include not only parents, but also working carers.

The introduction of a non-transferable component in parental leave is an important improvement. Nevertheless, evidence from Member States demonstrates that parental leave policies are only successful at increasing uptake by men if they include a "take-it-or-leave-it" part reserved for fathers, at a high wage replacement rate, and allow flexible allocation of the remaining time (DG IPOL 2016).

Unfortunately, it is to be expected that Member States will follow their family policy traditions in the implementation of the directive, with many adhering to the bare minimum and thereby rendering the policy largely ineffective.

Besides revising the leave policies, Member States should adopt fiscal policies that encourage female labour market participation. Family-based income taxation discourages female employment because of women's overrepresentation among secondary earners⁵⁵ (Bettio and Vershchagina 2013). While many countries have replaced joint taxation with individual taxation, they have often introduced allowances or benefits with equally detrimental effects on women's participation (such as dependent-spouse allowances; Bettio and Verashchagina 2013). Rather than crowding out female employment through cash benefits⁵⁶ that perpetuate the male-breadwinner model, Member States would be well-advised to make social reproduction services universally available and affordable. Similarly, tax credits for low-earning women encourage women's participation in the formal economy (Bettio and Varshchagina 2013).

Removing obstacles to women's employment requires substantial investment in social infrastructure, such as kindergardens, day care, schools, universities and care for the elderly. This is all the more important in light of the changing demographics and resulting rise in demand for these services. The European Social Fund (ESF+) can be used to co-finance such endeavours. However, it remains the responsibility of national governments to create the fiscal space⁵⁷ needed to prioritise social investments with the urgency they deserve.

⁵⁵ "Labour supply elasticity is higher for low-income earners, in particular women with children, therefore tax-benefit policies tend to have a disproportionately high negative effect on the employment outcomes of second earners (Rastrigina and Vereshchagina, 2015, Evans and Harkness, 2010, Thomas and O'Reilly, 2016)" (Jara and Popova 2019, p.5).

⁵⁶ Poverty-reducing measures for low earners remain important to ensure that everyone can live a life in dignity.

⁵⁷ The fiscal space is likely to come from taxation on capital given the declining share of labour (in gross value added as opposed to capital), the aging population and base erosion (in light of the ease at which profits of highly profitable firms are shifted to low-tax jurisdictions; Petropoulos et al. 2019)

7 Conclusion

In conclusion, the gig economy appears to deliver to some extent on its promise of inclusiveness; while female participation is lower overall, platforms have enabled the labour market entry of those who can only work from home and other marginalised groups. Nevertheless, there are also new gendered entry barriers to digital work related to digital skills, connectivity and location.

It is possible that women will move in higher numbers into the gig economy, as the demand for female-typed services, such as care and domestic work, continues to grow⁵⁸. However, this expansion will not necessarily lead to the creation of quality jobs.

The platform economy may be more inclusive, but platforms certainly do not provide a level playing field. Global online markets and digitized reputation can create winner-takes-all dynamics which exclude many workers from accessing work irrespective of their qualifications. The three-sided markets are ridden with information and power asymmetries that exacerbate the vulnerabilities of precarious workers. Online labour markets are highly segregated and reproduce divides along gender, class and ethnicity lines. Where the gig economy does offer upwards mobility, such as higher earnings in ICT-related work, women appear to be less able to reap these rewards. Women are overrepresented in the lowest-paying jobs associated with at times exploitative working conditions.

In addition, the gig economy fails to provide equal pay for equal work. Online and offline, women face trade-offs over working time, charge less for their work and face significant negative bias in counter-stereotypical work.

It is clear that many aspects of the employment practices on platforms would be illegal outside the virtual world, but platforms operate far removed from regulatory scrutiny. While workers are being treated as commodities for “instant task gratification”, employers have been able to outsource liability to algorithmic decision-making and immaterial software. Meanwhile, policy-makers are slow to catch up to the technological advances which are rapidly changing the way we communicate, work and live.

⁵⁸ Meanwhile, urbanisation is likely to grow both the “crowd” and user-base on platforms.

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