Gender equity among IT freelancers – preliminary study on selected European countries

Dariusz Dymek
Krakow University of Economics
Kraków, Poland *dymekd@uek.krakow.pl*

Tetiana A. Vakaliuk
Zhytomyr Polytechnic State University
Zhytomyr, Ukraine *tetianavakaliuk@ztu.edu.ua*

Paweł Konkol
Krakow University of Economics
Kraków, Poland *konkolp@uek.krakow.pl*

Mariusz Grabowski
Krakow University of Economics
Kraków, Poland *grabowsm@uek.krakow.pl*

Vladan Ivanovic
University of Kragujevac
Kragujevac, Serbia *vivanovic@kg.ac.rs*

Jakub Kanclerz
Krakow University of Economics
Kraków, Poland *kanclerj@uek.krakow.pl*

Bartłomiej Balsamski
Krakow University of Economics
Kraków, Poland *balsamb@uek.krakow.pl*

Abstract

This study examines gender equity among IT freelancers across selected European countries, focusing on differences in digital labor market participation and earnings between male and female freelancers. Using a non-invasive data scraping approach we obtained a rich dataset about 16 524 freelancers from Poland, Romania, Serbia, Spain, and Ukraine, we analyzed both labor market participation and earnings gap differences across three sectors: IT services, writing related services, and consulting services. The results show that there are gender differences in earnings among IT freelancers, but this is not a phenomenon observed in every sector. Possible future research directions are discussed, including expanded sectoral and geographical analyses and exploration of skill-specific influences on gender-based earning differences in digital labor markets.

Keywords: freelancing, platform work, gender pay gap, IT professionals

1. Introduction

The rise of freelancing has changed the way people work. This is particularly true for IT professionals, where freelancing plays a crucial role. According to analysis of Upwork, about 38% of workforce in United States done freelancing. Gen Z and Millennials are the

most probable groups to engage in freelancing. In 2023, 52% of all Gen Z professionals and 44% of all Millennial professionals worked as freelancers [11]. To characterize the freelance market in Europe, it is useful to refer to the domain of self-employment within the labor market, since freelancers are usually working under independent contracts. At the EU level, freelancers are often observed over gender, age or level of educational. According to Eurostat analysis, men are more likely to be self-employed than women. For the third quarter of 2022, there was over 25 million self-employed workers in the EU, where 16.1% of entire male workforce were self-employed individuals, compared to 9.4% for women [5]. Country differences are pronounced – Cyprus with the most equal and Slovakia with the most unequal labor market participation of women.

Not only that women participate less in the labor market, then they earn less than men. Women's gross hourly earnings were on average 12.0% below those of men in the EU. The group of countries with a highest gender pay gap in the EU are Latvia (19%) and Austria (18.3%), whereas the lowest salary gap is recorded in Belgium (0.7%). Moreover, Luxembourg is the country which has closed the gap [6]. For the tech sector, a median pay gap between sexes is even higher – reaching 26% [4], while France being the most equitable with 18% pay gap. An even greater gap exists in the labor market participation in the IT sector. At the EU level, 80.6 % of IT specialists were men and only 19.4 % were women in 2023. The main reason lies in the low share of women among STEM graduates (35.4% in 2022) in the EU [8]. In a dynamic perspective, however, the position of women is changing. Namly, between 2013 to 2023, the number of men working as the IT specialists increased by 53.9%, and the number of female IT specialist increased by 86.3% [7].

Despite huge expectations that recent technological advancement of digital labor platforms could contribute to more equitable labor market outcomes, differences in earnings between sexes regarding the participation and pay in freelancing, generally, and on digital labor platforms, particularly, stayed pronounced. According to a study by Giraffe360 (2023) [9], females in freelancing earn up to 16% less than males despite having similar education and experience levels. Interestingly, the pay gap was found to be even more prominent in sectors traditionally dominated by men, such as technology and finance. The study shows that female freelancers often charge lower hourly rates for their services, with an average hourly rate of £46 compared to £54 for male freelancers.

On a global level, the global gender gap regarding labor force participation rates, wage equality for similar work and estimated earned income, remains highly pronounced. The inequalities are especially pronounced in IT sector, where women account for only 28.5% of the workforce in IT occupations worldwide. Furthermore, the biggest challenges women face refers to access to capital, to networks, and to mentorship opportunities, all being crucial for success in freelancing and self-employment ventures. These structural barriers contribute to the persistence of gender pay gaps even in flexible work arrangements like freelancing [12].

In the rest of the analysis, we try to address these issues and set up directions for the future research. In particular we want to compare IT sector with other sectors, on which the freelancers are active. The paper is structured to encompass a research approach, data analysis and discussion of the results, aiming to answer particularly two research questions:

1. What are the levels of payment inequalities in the various freelancing sectors?
2. Are these inequalities common for all sectors in freelancing?

2. Research methodology

We analyzed data on freelancers obtained from one of the largest platforms for freelance job postings. Our data gathering methodology employed a non-invasive scraping approach. The retrieval process inflowed: (1) Authentication Layer Integration, (2) API Endpoint Interaction, (3) Controlled Pagination and (4) Rate-Limited Execution. This approach was selected to minimize detection risks while ensuring ethical data collection practices, i.e., (1) restricting to only publicly accessible data or data the researcher has legitimate access to were collected, (2) preventing server overloading, (3) utilizing off-peak hours and (4)

eliminating identifiable information unessential to research questions.

After collecting the data, we have employed data transformation process including the following stages: (1) Processing pipeline, (2) Data cleansing, and (3) Providing output data model. In the last stage we have defined *Schema design* related to attributes describing, (a) Project listing entity (e.g., unique identifier, category, budget parameters, geographical attributes, engagement metrics), (b) Skill entity (e.g., standardized identifier, name, category, frequency of occurrence) and (c) Client entity (e.g., anonymized identifier, historical metrics, geographical region, industry classification).

In this paper we have used only part of attributes provided in CSV format (and then transformed to Excel). The data analysis methodology included descriptive statistics enabling us to make a comparison across the various freelancers' attributes and categories.

3. Data analysis

Five European countries are covered in the analysis (Poland, Romania, Serbia, Spain and Ukraine) encompassing freelancers from three sectors: (1) IT related services (ITR) (including: Web, Mobile & Software Dev and IT & Networking), (2) writing related (WR) services (including: Writing and Translation) and (3) accounting and consulting related (ACR) services (including: Accounting & Consulting, Admin Support and Legal). After controlling for the outliners, the final data set contains information about 16 524 freelancers, among them 10385 (63%) males and 6139 (37%) females. Based on data about activity time (AT) and number of completed works (CW) on the platform, freelancers were divided into four experience levels: (1) EX - ***experienced*** with AT and CW > median, (2) AP – ***active practitioners*** with AT < median and CW > median, (3) PP – ***passive practitioners*** with AT > median and CW < median, and (4) BE – ***beginners*** with AT < median and CW < median. The distribution of observations by gender, market sector and level of experience is presented in Table 1.

Table 1. Number (and percentage) of observations by gender, market sector and level of experience.

Market sector:	ITR				WR				ACR			
Gender	M		F		M		F		M		F	
	7584	77%	2265	23%	1291	38%	2114	62%	1510	46%	1760	54%
Exp. Level												
EX	2265	23%	580	6%	319	9%	476	14%	362	11%	340	10%
AP	430	4%	212	2%	79	2%	118	3%	66	2%	53	2%
PP	1861	19%	443	4%	201	6%	404	12%	323	9%	353	10%
BE	3028	31%	1030	10%	692	20%	1116	33%	759	22%	1014	30%

When comparing the gender distribution across sectors, there are more males than females in ITR (77% vs 23%). This finding corresponds to results of other studies who identified a mismatch in ITR, mentioned in the introduction. Contrary to ITR, in WR the situation is quite opposite, in favor of female where they comprise 62% of labor force. Not only that this corresponds to the findings of other studies [2], then it reflects the domination of female graduates in language and literature studies [1], [10]. The most balanced situation is in ACR where we find a modest predominance of females, i.e., their share is 54%.

Table 2. Hour rates (USD) by gender, market sector and level of experience.

Market sector:	ITR						WR						ACR					
Gender	M			F			M			F			M			F		
Avg	39,35			31,36			22,56			23,39			35,94			28,41		
Exp. Level	min	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	avg
EX	5	600	48.62	6	250	38.86	5	150	28,95	5	200	29.39	4	200	46.55	4	299	36.19
AP	10	500	41.36	9	110	35.64	3	75	26,20	8	200	28.84	5	150	51.93	8	250	44.96
PP	3	200	39.14	3	111	30.89	3	90	21.28	3	200	23.15	3	300	34.37	3	130	27.41
BE	3	200	32.25	3	283	26.45	3	150	19.57	3	220	20.11	3	300	30.15	3	350	25.29

Table 2 provides a summary of the minimum, maximum and average hourly rates (in USD) by gender, service sector and experience. It is worth noting that despite the adoption of a fairly simple method of defining the level of experience, the average hourly rates behave as expected, i.e. they increase with the level of experience in each sector, regardless of gender. The exception is the AP cohort in the ACR sector, for which the average rates

are higher than for the EX cohort. A possible explanation for this is the fact that the (small) size of the group, and single values can significantly affect the average value of hourly rates. An additional explanation is that people with less experience are ready to switch to freelancer career only under considerably higher remuneration rates then these offered within the traditional labor contract within firms.

Nominal rates, while providing insight into the general market trends, do not fully reflect the gender position in terms of earnings in individual sectors. It is therefore worth considering the average hourly rates for the distinguished sectors (Table 3). The average hourly rate in each sector for different experience levels, regardless the gender, was assumed as 100%.

Table 3. Average hourly rates for each gender in percentage terms

Market sector:	ITR			WR			ACR		
Gender	M	F	Difference	M	F	Difference	M	F	Difference
Exp. Level	105%	84%	21%	98%	102%	-4%	113%	89%	24%
EX	104%	83%	21%	99%	101%	-2%	112%	87%	25%
AP	105%	90%	14%	92%	105%	-13%	106%	92%	14%
PP	104%	82%	22%	94%	103%	-8%	112%	89%	23%
BE	105%	86%	19%	98%	101%	-3%	110%	92%	18%

An analysis of average hourly rates in individual market sectors shows that there is a difference between males and females in ICR. The average difference reaches 21% in favor of males, which means that females earn more than 20% less on average. This difference ranges from 14% to 22% depending on the level of experience and remains significant. The situation in the ACR sector is comparable with the ITR sector. The average difference is 24% in favor of males, ranging from 14% to 25% at different levels of experience. An exemption is the WR sector. The average difference is 4% in favor of females and persists regardless of the level of experience. The smallest difference (2%) is for the highest level of experience (EX), which allows us to put forward the thesis that in this sector we cannot talk about gender inequality in terms of earnings.

Observing closer the level of experience and gender differences, we may notice the same zigzag pattern in ITR and ACR services. Transitioning from the BE to PP the inequality rises, while within the next cohort (AP) it falls again and rises again within the most experienced workers. These results suggest that male freelancers are monetizing early experience in much better way than the women. But as experiences rises women become more competitive and pay gap falls. Reaching the highest level of experience (EX), brings male workers again in advantaged position with wider gap in earnings. While there are many possible explanations, from tendency of women to undervalue themselves [3] to the fact that woman more prone to work on irregular basis using platform work as supplementary source of income, the fact remains that the top-level (those who work longer and those who has more projects finished) and part-time male workers (those who work longer but executed less jobs) in ITR services are being better paid and that the difference is larger than it is the case for BE and AP cohorts.

4. Discussion and future research

(RQ1) Results show that there are considerable differences between sexes among freelancers in the IT sector, a situation comparable with traditional labor market. Pay differences between males and females with the same competences are around 20% in favor of males. (RQ2) Comparing the situation regarding gender equality between selected market sectors does not provide a clear answer. In the case of ITR, there is a disproportion between the genders in favor of males. We have same situation in the case of ACR, while in the case of WR the equality in earnings prevails. This clearly indicates that the gender inequalities in hourly rates are somehow sector specific. However, to understand differences regarding the market sectors and gender earning inequality, a more comprehensive analysis involving more sectors is needed.

Future avenues of research are planful since the phenomena of freelancing and digital labor markets are relatively new. Besides the previously mentioned extension to the other market sectors, analysis could cover a much broader range of countries or could be even performed on the global level. This is especially important since the differences in access

to education, opportunities on the traditional labor or demand for services in technology sector vary considerably between the countries around the globe. The richness of data collected on freelancers and their skills, enable future research on skills and earning differences between gender, which could highlight the importance of adequate skill set for a better positioning on the market and whether adequate skill set may neutralize differences between gender regarding the pay. The most promising avenue for future research is to match differences between demand and supply of labor force on the digital labor market and explore how these differences are exerting an influence on gender inequalities. The richness of data set could be used to reveal and explore some themes that are not fully clarified or with ambiguous results even for the traditional labor market, such as the issue of sorting, which is not until now at all tested in the digital labor market or within the population of freelancers.

Among the challenges related to our research, the most important refers to the rather complicated and demanding procedure of data collection. The other possibilities of using automatic methods are limited by the data access policy of the main platforms. Another challenge is the difficulty in reaching local/regional platforms resulting from problems with their identification and use of national languages.

Acknowledgements

Co-funded by the European Union (Project no 2024-1-PL01-KA220-HED-000248152) and by the subsidy granted to Krakow University of Economics, Poland. Views and opinions expressed are however those of the author or authors only and do not necessarily reflect those of the EU or the Foundation for the Development of the Education System. Neither the EU nor the entity providing the grant can be held responsible for them.

References

1. American Academy of Arts and Sciences: Gender Distribution of Degrees in English Language and Literature. https://www.amacad.org/humanities-indicators/higher-education/gender-distribution-degrees-english-language-and-literature. Accessed April 10, 2025
2. Anđelković, B., Jakobi, T., Ivanović, V., Kalinić, Z., Radonjić, Lj.: Gigmetar Region, Oktobar 2024, Centar za istraživanje javnih politika (2024)
3. Dubey, A., Abhinav, K., Hamilton, M., Kass, A.: Analyzing Gender Pay Gap in Freelancing Marketplace. In: Proceedings of the 2017 ACM SIGMIS Conference on Computers and People Research, pp. 13–19 (2017)
4. Egba, V.: Women Are Earning 26% Less Than Men in the Tech Sector. ToTalent. https://totalent.eu/women-are-earning-26-less-than-men-in-the-tech-sector/. Accessed April 4, 2025
5. European Commission: Self-employment in the EU: More Men than Women. Eurostat (2023)
6. Eurostat: Gender Pay Gap Statistics. Statistics Explained (2025a)
7. Eurostat: Gender Equality in the EU – 10 Years in Review. Statistics Explained (2025b)
8. Eurostat: Females Graduated in Tertiary Education, by Education Level and Programme Orientation (% of Total Graduates) (2025c)
9. Giraffe360: Study Reveals Gender Pay Gap in Freelancing: Women Earn up to 16% Less Despite Similar Education and Experience. (2023), https://giraffe360.development-visionsharp.co.uk/development/study-reveals-gender-pay-gap-in-freelancing-women-earn-up-to-16-less-despite-similar-education-and-experience.html. Accessed March 16, 2025
10. Richardson, J. T.: Degree Attainment, Ethnicity and Gender: A Literature Review. Higher Education Academy, York, UK (2008)
11. Upwork: Upwork Study Finds 64 Million Americans Freelanced in 2023, Adding $1.27 Trillion to U.S. Economy (2023), https://investors.upwork.com/node/10426/pdf. Accessed April 2, 2025
12. World Economic Forum: Global Gender Gap Report 2023 (2023)