Teleworking and the Gender Pay Gap

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May 2025

Abstract

In this dissertation, I estimate the causal effect of teleworking on the gender pay gap. First, I find that women are more likely to telework than men. Second, using an instrumental variable based on a teleworkability measure at the occupational level, I find no significant effect of teleworking on wages. Therefore, I find no evidence that teleworking contributes to the gender pay gap.

The replication code of the study is on the following GitHub repository: https://github.com/blengereau/TeleworkingGenderGap.

1 Introduction

The Covid-19 pandemic triggered a sharp increase in the adoption of teleworking. Lockdowns led to the democratization of IT tools enabling people to work from home, as well as the formalization of teleworking in company agreements. From 2019 to 2024, the proportion of private-sector employees in metropolitan France who were teleworking at least once a month rose from 4% to 22% according to INSEE [1]. By 2022, 72% of company agreements in firms with 10 or more employees included at least 2 days of telework per week, against 34% in 2019. In addition, the French labour market is still marked by a significant gender pay gap. According to INSEE, in the private sector in 2023, women earned 14.2% less than men in full-time equivalent net pay, and 3.8% less for comparable jobs[2]. The lasting transformation of work organization brought about by teleworking raises questions about its implications for the gender wage gap in the labour market.

This project addresses the following question: **does the greater use of teleworking by women contribute to the gender pay gap?** I first document that, holding sector, age, and monthly salary constant, women are 7.4% more likely to telework than men. I then estimate the causal impact of remote work on wages: for workers with the

[1] INSEE study: 'Telework and face-to-face work: hybrid work, a practice now firmly established in companies', published on 05/03/2025

[2] INSEE study: 'Gender pay gap in 2023', published on 04/03/2025

same gender, educational background, occupation (PCS), and age, teleworking significantly reduces monthly salary. However, when controlling for sector, teleworking has no significant effect on wages.

One explanation for why remote work may increase the gender wage gap is the existence of a gender-specific compensating wage differential for flexibility or less commuting time. Wiswall and Zafar (2017) show that women, on average, have a higher willingness to pay for job flexibility, and Le Barbanchon et al. (2020) relate gender differences in willingness to commute to the wage gap. Teleworking can also be perceived as a disadvantage and a cost for companies. Mas and Pallais (2017) argue that the impact of teleworking on productivity is heterogeneous across firms, being more costly when teamwork is essential and monitoring difficult. Bloom et al. (2015) finds that workers randomized to work from home have lower promotion rates, even though they increase their productivity while reducing capital costs for the firm. These studies discuss the possible link between teleworking and wages, but do not strictly assess causality.

These studies discuss the possible link between teleworking and wages but do not strictly assess causality. This project contributes to the existing literature by estimating the causal effect of teleworking on wages and documenting women's preference for remote work. Section 2 describes the dataset, Section 3 presents the estimation strategy, and Section 4 reports the results.

2 Data

The analysis relies on data from the Enquête Emploi Continue (EEC) in metropolitan France, collected between 2021 and 2023. In this survey, one-sixth of the sample is renewed every quarter. I restrict the analysis to the first wave of participation for each household, as questions related to remote work are only asked at the beginning of the survey cycle. The resulting data are cross-sectional and at the individual level. I filter the dataset to include only employees who answered the teleworking questions and declared monthly salaries between 0 and 20,000 euros. In this dataset, which contains information on 53,650 employees, 10,960 reported teleworking at least once a month.

3 Empirical Strategy

3.1 Gender preference for teleworking

I estimate the probability that an employee works remotly using a probit model with gender as an explanatory variable:

$$\Pr(Remote_i = 1) = \Phi\left(\alpha + \beta \cdot Female_i + X_i'\gamma + \varepsilon_i\right) \tag{1}$$

where X_i is a vector of control variables, Φ denotes the cumulative distribution function of the standard normal distribution, and β the coefficient with the dummy variable of being a woman. Then, I estimate the marginal effects of a change in employee characteristics on the probability of teleworking.

3.2 Causal effect of teleworking on wages

To estimate the causal effect of teleworking on wages, the use of an OLS regression could be subject to a selection bias:

$$w_i = \delta_0 + \delta_1 \cdot x_i + X_i' \cdot \delta_2 + \eta_i \tag{2}$$

with :

$$Cov(x_i, \eta_i) \neq 0$$

The key concern in equation (2), where is x_i is a dummy for teleworking and w_i the net monthly salary of worker i, is that unobserved characteristics (e.g. motivation, preferences) may affect both the likelihood of teleworking and wages, leading to a correlation between the residuals and the dependent variable. To avoid this selection bias, I use an instrumental variable (IV) of the teleworkability of an occupation. Hensvik et al. (2019) provide an estimate of the share of working hours that can be done at home, by occupation for the finest level of the ISCO-08 nomenclature. I associate this measure with the level 4 PCS categories present in the EEC using a correspondence matrix proposed by INSEE[3]. I assume that the teleworkability measure is plausibly an exogeneuos instrument uncorrelated with the error term in the wage equation. This measure is determined by the intrinsic nature of the occupation, not by individual worker choices or unobserved personal traits.

The estimation follows a Two-Stages Least Squares (2SLS) approach:

$$\widehat{x}_i = \pi_0 + \pi_1 \cdot z_i + X_i' \cdot \pi_2 + u_i \tag{3}$$

$$w_i = \delta_0 + \delta_1 \cdot \widehat{x}_i + X_i' \delta_2 + \eta_i \tag{4}$$

where z_i denotes the teleworkability of the occupation, X_i represents a set of control variables, and w_i the net monthly wage of worker i. The coefficient δ_1 captures the causal effect of teleworking on wages, under the assumptions that the instrument is both correlated with remote work and exogenous.

A potential concern is that teleworkable jobs may be systematically associated with higher wages, which would violate the exclusion restriction—the instrument should affect the outcome only through the endogenous regressor. However, by including controls for

[3]Probabilistic transition matrix from PCS 2020 to ISCO-08, INSEE, published the 16/12/2024

sector and PCS in equation (4), I assume that teleworkability affects wages solely through its impact on remote work.

4 Results

This section presents the results of my empirical strategy. Table 1 displays the marginal effects of employee and firm characteristics on the probability of teleworking, estimated using the Probit model specified in equation (1). The coefficient associated with being a woman is significant at the 1% level, indicating that, holding sector, age, and monthly wage constant, women are 7.4% more likely to telework than men. The information, communication, insurance, and finance sectors are associated with the highest probabilities of teleworking. Teleworking is also more common among high-paid occupations: earning over 4,000 euros per month increases the probability of working remotely by 17.7%.

The 2SLS regression is realized using two different sets of controls. The first one (referred to as the "Basic set") includes the sexe, age, the number of children, a dummy variable for having at least one child, the PCS classification at its broader level (6 different groups) and the ISCED level of education. The second set of controls ("Extended set") adds controls for the firm's sector of activity.

Table 2 confirms the relevance of the instrument: for the two sets of controls in the first stage regression, teleworkability measure is significant at the 1% level and the F-statistic exceeds the conventional threshold of 10.

Table 2: First stage regression

	Basic controls	Extended controls
Teleworkability	0.211***	0.176***
	(0.025)	(0.025)
F-statistic	357.3	307.1

Table 3 shows that, holding gender, educational level, occupation, number of children, and age constant, teleworking is associated with a significant decrease of €1,413 in monthly wages (significant at the 1% level). However, once sector fixed effects are included, this effect becomes statistically insignificant. This suggests that the negative effect of teleworking on wage is likely driven by differences across sectors rather than a direct causal effect of teleworking on wages.

One potential explanation is that teleworking may be more prevalent in sectors with lower average wages. Figure 1 shows that teleworking is most common in the Information and Communication, and Finance and Insurance sectors. While Finance and Insurance is the highest-paying sector in the dataset, the Information and Communication sector

Table 1: Probability of teleworking depending employee and company characteristics

Employee and company characteristics	Marginal Effects	P-value
Sexe		
Man	ref.	-
Woman	7.15	0.00
Age		
Under 20	-15.9	0.00
20-25	-2.1	0.00
25-30	0.9	0.17
30-35	0.6	0.33
35-40	ref.	-
40-45	-0.9	0.11
45-50	-3.1	0.00
Over 50	-6	0.00
Sector		
Agriculture	ref.	-
Manufacturing	4.3	0.00
Construction	-2.1	0.2
Retail, transport, catering and accommodation	0.5	0.73
Information, Commnunication	38	0.00
Insurance and finance	27	0.00
Real estate	12.6	0.00
Specialised, scientific and support activities	14.3	0.00
Public	3.6	0.01
Other services	11.6	0.00
Monthly net salary		
0-1000 euros	-22.7	0.00
1000-2000	-14.4	0.00
2000-3000	ref.	-
3000-4000	9.4	0.00
Over 4000	17.7	0.00

Table 3: Second stage regression results

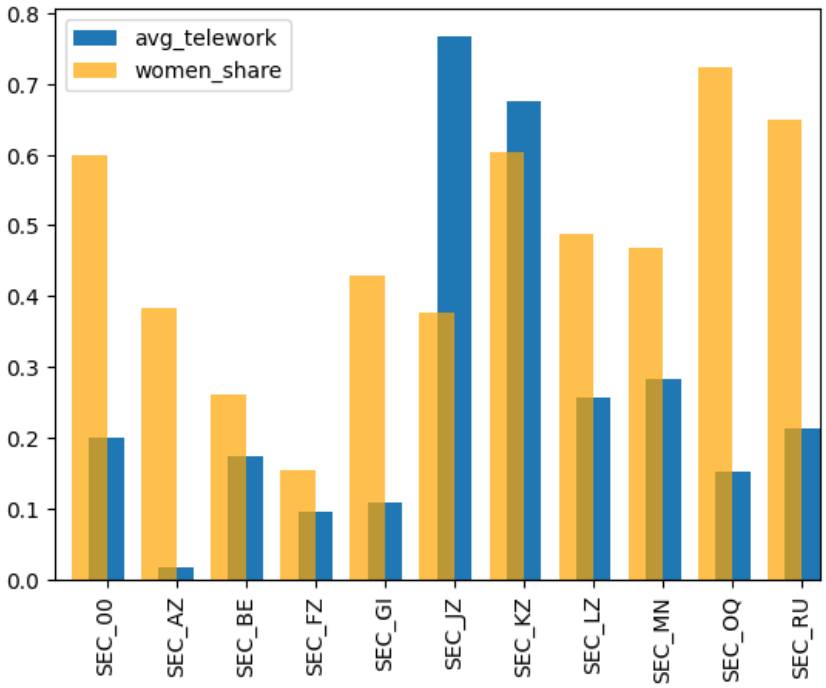
	Basic controls	Extended controls
Intercept	1142***	740***
Telework	-1413.44***	-438.32
Female	-355.8***	-310.5***
Number of children	38.97***	35.24***
Has at least one child	72***	62**
Age	19.92***	20.69***
Occupation (PCS classification)		
Agricultural workers	-1739***	-1261**
Craftsmen Traders and business managers	ref.	ref.
Executives and higher intellectual professions	1038 ***	766***
Intermediate professions	-290	-271
Employees	-762.93***	-659***
Blue collar workers	-732.11***	-672***
Education level		
No formal education	ref.	ref.
ISCED 1	-178	-186*
ISCED 2	260**	219*
ISCED 3	508***	436***
ISCED 4	522**	459.44*
ISCED 5	878***	670***
ISCED 6	921***	782***
ISCED 7	1511***	1201***
ISCED 8	1196***	957***
Sector		
Agriculture		ref.
Manufacturing		622***
Construction		501***
Retail, transport, catering and accommodation		316***
Information, Commnunication		444**
Insurance and finance		822***
Real estate		590***
Specialised, scientific and support activities		273***
Public		179***
Other services		-122

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. Coefficients that are not significant at the 10% level are not marked with any *.

offers average wages. Therefore, the high prevalence of teleworking in the latter may partly explain the negative wage association observed in the basic model.

Overall, I do not find conclusive evidence that teleworking has a causal impact on wages. Furthermore, as Figure 1 indicates that women are not in the majority in the Information and Communication sector, I find little support for the idea that women sort into more flexible, telework-friendly sectors as a driver of the gender wage gap.

Figure 1: Share of women and teleworkers by sector



The x-axis represents sectors of economic activity based on the French NAF classification. The sector codes correspond to the following categories: AZ – Agriculture, forestry, and fishing; BE – Manufacturing, extractive industries, and related sectors; FZ – Construction; GI – Retail, transportation, hospitality, and food services; JZ – Information and communication; KZ – Financial and insurance activities; LZ – Real estate activities; MN – Professional, scientific, and technical services; OQ – Public administration, education, and health; RU – Other service activities; 00 – Not specified.

5 Conclusion

In this document, I show that although women are significantly more likely to telework than men, this does not appear to be a contributing factor to the gender wage gap. Using an instrumental variable approach based on occupation-level teleworkability, I find no robust causal effect of remote work on wages. However, I identify that teleworking may be more present in lower paying sectors such as the Information and Communication sector. However, this sector does not exhibit a higher share of female workers. Therefore, I find no evidence that women are sorting into more flexible, telework-friendly but lower-paying sectors in a way that would influence gender pay disparities. It may be useful to extend this analysis to a larger and more representative dataset. In such a dataset, the Information and Communication sector might be more accurately reflected as a higher-paying sector. This could help clarify whether the observed negative association between teleworking and wages is a result from sampling limitations in the current analysis.

References

Bloom, N., J. Liang, J. Roberts, and Z. J. Ying (2015). "Does Working from Home Work? Evidence from a Chinese Experiment". In: *The Quarterly Journal of Economics* 130.1, pp. 165–218.

Hensvik, L., T. Le Barbanchon, and R. Rathelot (2019). "Which jobs are done from home? Evidence from the American Time Use Survey". In: *CEPR Discussion Paper*.

Le Barbanchon, T., R. Rathelot, and A. Roulet (2020). "Gender Differences in Job Search: Trading off Commute against Wage". In: *The Quarterly Journal of Economics* 136.1, pp. 381–426.

Mas, A. and A. Pallais (2017). "Valuing alternative work arrangements". In: *American Economic Review* 107.12, pp. 3722–3759.

Wiswall, M. and B. Zafar (2017). "Preference for the Workplace, Investment in Human Capital, and Gender". In: *The Quarterly Journal of Economics* 133.1, pp. 457–507.