Moving apart: job-driven residential mobility and the gender pay gap Evidence from a large industrial firm.

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Abstract

This article uses a 15-year panel data set from a large French industrial firm to investigate the role of intra-firm job-driven residential mobility on the gender pay gap of executives. We find that job-driven residential mobility is highly profitable for both male and female workers due to a generous mobility bonus policy, but that it does not affect their careers. We also find that female executives are less likely than males to experience job-driven residential mobility, and that it brings higher gains to male relative to female executives. However, these differences between men and women linked to the mobility allowance make limited contribution to the total gender pay gap, which is almost entirely due to other bonuses linked to the positions held.

Keywords: insider econometrics, personnel economics, gender pay gap, job mobility, residential mobility

JEL Classification: J16, J31, M12, M51, R23

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1 Introduction

The pay gap between women and men has not narrowed much over the last 20 years in OECD countries (OECD 2021), and France is no exception: women still earned 23% less than men in 2018 (Bodier et al. 2021). However, the levels of education and labour market participation of women and men are now comparable, and traditional explanations based on differences in human capital are becoming less relevant.

Among the vast literature on possible other explanations for the gender pay gap (for a survey, see Francine D. Blau and Kahn 2017 or Ponthieux and Meurs 2015), recent papers highlight the role of spatial mobility mechanisms. Mainly due to family constraints, women are disadvantaged in their job search by smaller job search areas (Le Barbanchon et al. 2020, Zimmer et al. 2021), face adverse commuting effects (Dauth and Haller 2020; Dilmaghani 2021; van Ommeren et al. 2000). However, using French longitudinal data, Pailhé and Solaz 2008 finds mitigating results: when a couple moves, the female partner's earnings increase after the residential move if she continues to work after the move. The aggregate negative impact of residential mobility on women compared to men is due to access to work and not to income from work. A similar result is found by Nisic and Melzer 2016 for highly educated West German women (but not for East German women). These results suggest that the impact of mobility differs depending on whether it takes place on the external market, with a spell of unemployment, or within the firm, which ensures career continuity. We can therefore see that women who move house while keeping their job do not suffer the same penalty as those who interrupt their employment contract. But this does not tell us anything about their career in the company, compared to their male counterparts, who are also subject to job mobility. The purpose of this article is to fill this gap.

Here, we examine the impact of internal mobility on the wages and careers of men and women in a large firm. Using individual panel data from an internal market allows us to compare the returns of mobility among male and female workers, whose job mobility was also associated with a residential mobility. The use of a case study of a firm excludes any 'access to work' effects of residential mobility on the gender pay gap. Moreover, since we have information on workers' family situation as well as their occupational and job characteristics, we're also able to disentangle individual and occupational determinants of job and residential mobility. It should be noted, however, that our analysis is limited by the fact that we don't have any information on the partner's occupation or on the household's assets. We show that a human resource policy that explicitly covers the costs associated with job mobility strongly limits the impact of mobility on gender pay differentials. Nevertheless, there is still a significant gender pay gap based on the jobs held, and the bonuses associated with them.

This research is part of a large and growing body of literature looking at the internal mechanisms of the gender pay gap. A long-established stylised fact is that for similar jobs and individual characteristics in the same company, there are only limited differences in pay between women and men (Francine D Blau 1977). Most of the observed differences within the firm are the result of vertical segregation and gender differences in career paths. Women and men do not have the same career paths within the organisation, and this is to the detriment of women. A first empirical approach is to estimate the extent of this inequality linked to these promotion gaps, known as the "glass ceiling"(i.e. the difficulty for women to climb the hierarchical ladder to the top), as coined by Albrecht et al. 2003.[1] The chain of positions and barriers to women's advancement in an American company is clearly illustrated by research from Oaxaca and Ransom 1994. In the same spirit, Cassidy et al. 2016 find that within-firms, women have lower promotion probabilities than men, and that their promotion probability is more sensitive to their educational attainment. Using internal data from a large Chinese service company, Zhang 2019 highlights the role of within-firm gendered segregation of jobs on the promotions' probability gap and the subsequent wage gain differential.

A number of mechanisms have been explored to try to understand the reasons for this gender disadvantage in career. Demand-side factors and discrimination against women account for part of this disadvantage, as clearly shown by the case studied by Oaxaca and Ransom 1994 for instance. Other internal mechanisms related to internal procedures for allocating jobs that may explain the gender pay gap have also been examined. Using case studies and internal databases, papers show the causal effect on the gender inequalities within firm of hiring practices (Araki et al. 2016), of promotion procedures (Hospido et al. 2019), of gendered bargaining effects (Card et al. 2016; Stevens and Whelan 2016), collective bargaining (Bruno et al. 2021 or of maternity leave (Lucifora et al. 2021). This career disadvantage may also be due to supply-side factors. The specific time constraints faced by women are one of the most frequently studied causes of this intra-firm pay disadvantage. Goldin 2014 shows that gender imbalance is higher for high-rewarded jobs that require personal availability to work hours and overtime. Women's preference for predictable working hours and fewer hours of extra work accounts also for the gender pay gap (Bolotnyy and Emanuel 2021).

One aspect that has been less studied to date is the role of internal geographic mobility in these career differences. Indeed, we may wonder whether promotions may depend on the acceptance of geographical mobility, which could be to the disadvantage of women, who are a priori less mobile than their male counterparts. One of the few papers to address this issue is by Sato et al. 2019. They consider the effect of differentiated intra-firm geographical mobilities on the gender pay gap. Using internal data from a Japanese industrial company, they show that after a mobility across establishments within the same firm, women's wages increase less than men's, echoing the sticky floor hypothesis of Booth et al. 2003. They also show that the incidence of promotion is associated with a greater work experience for women than for men.

In this paper, we similarly explore the spatial dimension of intra-firm mobility and promotions on the gender pay gap. We use data on executives who joined the firm between 2000 and 2015, observed for the period 2005 to 2020 (i.e. 57,674 observations based on 6,278 individuals). Additionally, because our database provides information on the location of the firm's 500 productive units scattered throughout France, we'll extend the analysis by disentangling the combined effects of job mobility and residential mobility on the gender pay gap.

This case study is instructive firstly because, like other companies in the sector, it adheres strictly to industry regulations on internal mobility. It is therefore reasonable to infer that the results for this company are representative of the industry as a whole. Second, its internal job dynamics has the characteristics of an internal labour market (Doeringer and Piore 1971), i.e. a labour market relatively protected from external competition, where internal workers compete for promotions and pay[2]. Workers of the firm tend to be hired within the first few years after graduation, and they generally stay there until retirement; the turnover rate is very low, at 4% per year, mainly due to retirement. This allows us to study a "clean" effect of internal mobility on the gender pay gap, without having to take into account the selection effect of the departure of some workers.

Although female executives are more likely to experience intra-firm jobs mobility, they are less likely to also experience a residential mobility. Using an event study model, we find that when it is not associated with a residential mobility, job mobility does not lead to increased benefits for neither male nor female executives. By contrast, because of a firm-specific residential mobility premium, a job + residential mobility leads to a significant and long-lasting pay increase. We also show that residential mobility has no impact on career development as such, neither for men nor for women. The bonus policy, which offsets the material costs of residential mobility, is responsible for all the monetary benefits observed. In terms of the gender pay gap, we find that the mobility premium creates an additional pay gap between mobile male and female executives, but very limited. Our interpretation of these surprising results is that it is due to two factors:

industry policy, which explicitly compensates for the costs of geographical mobility; and company size, which offers a wide range of career prospects, with or without geographical mobility.

The paper is structured as follows. Section 2 presents the institutional context, the data used in the paper and descriptive statistics. Section 3 presents results on the determinants of mobility by gender. Section 4 relies on an event study analysis to assess the impact of mobility on earnings and careers. Results comparing the impact of residential mobility on the gender pay gap are presented in section 5. Section 6 concludes the paper.

2 Institutional context and data

In this section, we describe the firm's institutional context, wage & career specifications and internal mobility procedures (2.1.). We then present our sample selection and some descriptive statistics (2.2.) on the workforce characteristics, the wage structure, the job and residential mobility of workers, as well as on the raw gender pay gap.

2.1 Institutional context: wages and job mobility policy

Our research is using the case of a large, old firm with a strong union presence. Remuneration and career development procedures are well-defined in the firm's internal documents, which are communicated to all employees. This section sets out the main rules on the composition of remuneration, then the firm's internal job mobility policy.

The total remuneration is composed of 5 elements (see section below for descriptive statistics)

- **A base wage** is determined by the worker's hierarchical level and his/her seniority. For all the firm's tenured workers[3], careers are organized by a progression across a 30 to 370 grid of hierarchical levels. The entry-level hierarchical level of a worker is determined by his/her diploma and status (operator, middle manager or executive[4]). Afterward, wage progression is mainly mechanical and determined by the worker's seniority within the firm, although career advancement may[2] come from a promotion or from an evolution in the content of the job (e.g. managing a larger team, moving from operator to middle manager).
- **Premiums for overtime or on-call** are granted to workers who work past the normal 35 or 32-hour-long week, have on-call duty hours or staggered hours. Also included in this category are night allowances and hardship allowances.
- **An individualized performance premium** depends on the worker's efficiency relative to his or her team, according to the appreciation of his or her direct manager.This premium is normally capped at 8% of the annual wage. [5]
- **A mobility premium** granted only to workers who experience a mobility of place of residence as a consequence of a mobility of place of work within the company (see Table 12 in Appendix 1 for descriptive statistics on this premium). It is this component of the remuneration that allows us to identify the residential mobility linked to occupational mobility[6](see *infra*).
- **Other premiums** : for example: 20- or 25-year mark seniority premium.

The firm's mobility policy, as well as other rules governing the components of remuneration, was negotiated at the level of the firm's industrial sector. This bonus was designed to encourage

internal mobility among its employees [7]. It is therefore representative of the policy implemented in its industrial sector, which employs around 136,000 people. It should be also noted that the rules of remuneration as presented above are also common to the industry, with only limited variations from one company to the next.

For the firm, internal mobility is a strategic issue because its vacancies are mainly filled internally, with limited recruitment on the external market as much as possible. To fill vacancies, internal 'headhunters' look for potentially suitable candidates among employees who have indicated their willingness to change jobs in the employee network 'Call for Skills'. Employees can also find out about vacancies through their personal network or during their annual meeting with their career counsellor and request a bilateral meeting with their potential new manager. Internal vacancies are not officially advertised until the receiving manager has selected a candidate; job mobility is then validated by a registration chamber. There is little or no open competition between employees for a given position.

As mentioned, the firm has designed a mobility premium that is systematically awarded to employees who experience a long-distance (> 50 km) job mobility only if combined with residential mobility [8]. The mobility premium[9] is awarded during 10 years after the move, and decreases after the first 5 years. It has 3 components:

- A one-off bonus ("hello bonus") given immediately after the change of job to compensate for moving expenses and negotiated individually with the employee's new manager.
- Full compensation for lost previous hardship premiums after moving.
- A residential premium for tenants or first-time homeowners with an ongoing loan of 10% to 30% of the gross monthly salary (40% for the Paris region), with a ceiling equal to €1,700/month and 80% of the rent or loan payments.

The cost of this policy is far from negligible. Over the period covered by our sample, it represents an average of around 3% of total compensation.

2.2 Data and sample selection

The data files consist of employees with open-ended contracts who were present during the 12 months of the year, and are drawn from the administrative data of the enterprise. The individual characteristics are those observed in December of each year from 2008 to 2018. Our database provides detailed information on each worker's individual (age, gender, detailed education, marital status, number of dependent children) and ii) job-related characteristics (detailed wage components, mobility premium, profession, seniority in the firm, work hours). One limitation of this research is that we have no household information other than marital status and number of children.

We also have information on the worker's work-environment. We know their productive unit, defined as establishments (or groupings of establishments) geolocated at a single mailing address. We know the size and functional division of each unit (such as management, production, maintenance...). For each worker, we know the characteristics and mobility profiles of their coworkers; in particular, we know the gender ratio among executives in their unit, and the amount of mobility premiums awarded in the past to executives of their unit.

We restrict our sample to executives (about 34,000 workers) because both their job- and residential-mobility is much higher than non-executives. To avoid generational effects, we consider the executives who joined the firm between 2000 and 2015 (about 11,500 observations per year)

and who were observed during at least 5 years in the database. Job and associated residential mobility profiles were observed between 2008 and 2018.

The final database consists of 6,278 workers (57,674 observations) who either experienced a single episode of job mobility (with and without a residential mobility) or were immobile (did not experience any mobility in terms of job or place of residence)[10].

2.3 Summary statistics

Female managers are under-represented in our sample (33% of the sample). This is common in industrial companies like the one we studied. However, Table 1 shows that their sociodemographic characteristics are not very different from those of from their male counterparts. Female managers have a higher level of education, but are more likely to have business rather than engineering degrees. They are slightly more likely to be single, and slightly less likely to have dependent children and work full hours (although only 1.5% are "true" part-timers working less than 90% of the full time.)

Table 1. Descriptive statistics (%)

	No mobility		**Job mobility**		**Job+res. mob**		**All**	
	M	F	M	F	M	F	M	F
	45.2%	42.9%	26.8%	33.6%	28.0%	23.5%	100.0%	100.0%
Age								
Under 30	25.3	24.9	19.6	20.3	32.1	37.9	25.7	26.4
[30 – 35[	39.3	39.9	28.9	33.2	45.1	44	38.1	38.6
[35 – 40[	16	15.2	22.7	21.4	14.4	11.5	17.3	16.4
[40 – 45[	7.7	7.7	14.4	14	5	4.3	8.7	9.0
Over 45	11.7	12.3	14.5	11.2	3.4	2.3	10.1	9.6
Education								
Below Bachelor (< Bac+3)	2.6	2.3	2	2.4	1.7	0.6	2.2	1.9
Bachelor level (Bac + 3)	4.3	3.6	2.7	3	1	2.1	2.9	3.0
Master level (Bac + 5)	24	34	24.7	36.1	17.3	26.7	22.3	33.0
PhD	4.1	4.5	9	8.6	4.1	5.1	5.4	6.0
Engineer school	42.4	34	34.9	23.9	47.9	40.1	41.9	32.0
Top 10 engineer school	14.3	9.7	12.2	5.4	16.7	14.6	14.4	9.4
Top 5 engineer school	4.7	3.4	10.1	5.9	7.1	4.9	6.8	4.6
Business school	3.7	8.4	4.6	14.7	4.3	6	4.1	10.0
Family status								
In a couple	75.9	78.3	73.4	75.4	71.3	70.4	73.9	75.5
No children	52.7	45.9	47.7	47.2	59	64.6	53.1	50.7
1 child	20.7	27	18.6	20.8	19.2	17.3	19.7	22.6
2 children and more	26.6	27.1	33.6	32	21.8	18.1	27.1	26.6
Working time								
Less than 90%	0.4	2.1	0.1	1.5	0	0.2	0.2	1.5
[90% – 100%[	11	12.8	6.9	10.6	4.3	6	8.0	10.5
Full time	88.6	85.1	93.1	87.9	95.7	93.8	91.8	88.1
Total	1849	940	1094	735	1146	514	4089	6278

Source: Internal administrative data on male and female executives (2008-2018)

In the firm, the average monthly base wage[11] is 49,841.1 euros for female executives and 50,404.0 euros for male ones[12], i.e. a raw pay gap of 1.1pp, which is quite low (see Table 2). This is not the case if we look at total pay (salaries and bonuses). Here the average for women is 56,604.4 and for men 59,590.7, i.e. a raw pay gap of +5.3 pp.

The gender wage gap is mainly driven by premiums, not careers (i.e., base wages). This reflects both the policy of the firm's hardship and overtime premiums and its high level of gendered functional segregation: female executives tend to have business degrees and work in the commercial sector, whereas men are more likely to have an engineering degree and to be in production jobs, so they have a greater chance of receiving bonuses in relation to their occupation. (e.g. on the night shift).

Table 2. Wages across mobility profiles (in €2020)

	All	Males	Females	GWG (%)
All sample				
Total wage	58,557.7	59,590.7	56,604.4	+5.3
Base wage	50,186.8	50,404.0	49,841.1	+1.1
Premiums	8,371.0	9,186.7	6,763.3	+35.8
No mobility				
Total wage	59,050.4	60,003.9	57,174.9	+4.7
Base wage	49,480.9	49,332.0	49,773.8	-0.9
Premiums	9,569.5	10,671.9	7,401.2	+32.5
Job Mobility only				
Total wage	59,394.8	60,499.6	57,750.4	+4.5
Base wage	53,707.7	54,430.9	52,631.1	+3.3
Premiums	5,687.2	6,068.7	5,119.3	+15.6
Job+residential mobility				
Total wage	56,807.6	57,895.0	54,383.1	+6.1
Base wage	47,493.3	47,768.3	46,880.1	+1.9
Premiums	9,314.3	10,126.7	7,503.0	+25.9
Total	6,278	4,089	2,189	

Table 3. Mobility by gender

	All		Males		Females		Gender gap
	Obs.	%	Obs.	% pts	Obs.	%	% pts
No mobility	2,789	44.4	1,849	45.2	940	42.9	+2.3
With job mobility	3,489	55.6	2,240	54.8	1,249	57.1	-2.3
No resid mobility	1,829	52.4	1,094	48.9	735	58.9	-10.0
Resid. mobility	1,660	47.6	1,146	51.1	514	41.1	+10.0
Total	6,278	100.0	4,089	100.0	2,189	100.0	

Source: Internal administrative data on male and female executives (2008-2018)

Further, job and residential mobility is common among the firm's executives: Table 1 shows that more than half of them, male and female, changed establishments during the period. It is noteworthy that in this firm, job mobility alone, without residential mobility, is not rewarded by higher wages. Table 3 shows that, compared to executives who experienced no mobility, job-mobile executives are on average higher on the base wage career grid but have considerably fewer premiums (-40.6%). Job + residential-mobile executives are both lower in the career grid (reflecting their younger age, as seen in Table 1) and receive fewer premiums (Table 2) than immobile ones. However, compared to those who change jobs without experiencing a residential mobility, the gap in premiums is much lower, by 37.9 percentage points. According to H&R officials, this is due to the generosity of the mobility bonus, designed to boost internal mobility.

Table 3 also shows some differences in the mobility profiles of male and female executives. Among the executives with job mobility, women are less likely than men to change their place of residence (-10.0 percentage points) and more likely to experience a job mobility without a residential mobility (+9.8 percentage points). In the next section, we'll provide evidence on the gendered differences in the determinants of mobility.

We also observe that, compared to male and female executives who do not experience mobility, the gender pay gap slight drops for job-mobile executives (from 4.8% to 4.5% of the average male wage), but sharply rises (to 6.1%) for job+residential mobile executives. In Section 4, we'll explore how residential mobility causes a differentiated impact on male and female executive's wages and careers. In Section 5, we'll study its effect on the firm's gender pay gap.

3 Internal mobility determinants by gender

In this section, we study how individual, workplace and local characteristics are correlated with the mobility profiles of executives, using a multinomial regression model presented in subsection 3.1. In subsection 3.2, we'll present results showing differences between the mobility profiles of men and women. We'll also show how individual characteristics differ among mobile women (resp. men) and not mobile women (resp. men).

3.1 Empirical strategy

The model is as follows:

$$U^g_{ikj} = X^{g'}_i \beta^g + Y^{g'}_k \gamma^g + Z^g_i \delta^g + \epsilon^g_{ikm} \tag{1}$$

$$Pr(Y^g_{ik} = c) = Pr(U^g_{ikc} > U^g_{ikj} \text{ for all c} \neq \text{j})$$

The dependent variable is the executive's mobility status : no mobility, job mobility without a residential mobility, or job and residential mobility. U^g_{ikj} is the utility of employee i with gender $g = male, female, all$ who selected the choice j in the local labour market k.

Besides year dummies, covariates are

- individual characteristics (X^g_i): executive's age (in log years), tenure status (yes, no), tenure^2, detailed diploma (9 categories), living with a partner (yes, no), number of children living at home, and gender (male, female) when the gender dummy of the dependent variable is *all*.
- workplace environment (Y^g_k): exit rate of workers, average mobility premium in percentage of the total wage and sex ratio quartile in the executive's establishment and division (the firm's main functional units) and plant size dummies
- residential municipality characteristics (Z^g_i): type of municipality[13], average rent prices of homes and flat.

3.2 Results

Table 4 presents results from the multinomial probit model run on all executives, with gender as a control. It shows gender differences among executives in their mobility choices. Female executives are more likely than male ones to experience no mobility at all (neither job nor residential mobility). They are also less likely to experience a job+residential mobility. However, the magnitude of the effect, although significant, is very small, since the value of the coefficient is less than 0.7 percentage points.

Furthermore, Table 5 shows that the job + residential mobility of female executives is more sensitive to past mobility bonuses distributed among members of their establishment than male executives. Having children is also more determinant for the residential mobility of female executives.

Second, Table 6 shows how individual, workplace and residential characteristics are linked with job and/or residential mobility among female and male executives.

Table 4. Multinomial probit - marginal effects - All

	No mobility	**Job mobility only**	**Job + residential mobility**
Female	0.00797	-0.000752	-0.00722*
	(0.00457)	(0.00290)	(0.00369)
Year dummies	YES	YES	YES
Division dummies	YES	YES	YES
Size of plants dummies	YES	YES	YES

Controls: age, tenure, tenure^2, child (ref = none), couple (ref = single)
education (ref = engineer), municipality (ref = non-Paris major center)
and workplace environment controls.
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5. Multinomial probit - marginal effects - Men vs Women

	No mobility	***Job mobility***	***Job + residential mobility***
Hello mobility premium			
Men	0.105*	-0.120*	0.0154*
	(0.0457)	(0.0523)	(0.00687)
Women	0.244***	-0.274***	0.0294
	(0.0697)	(0.0781)	(0.0162)
Children			
1 child			
Men	0.00700	0.00141	-0.00840*
	(0.00507)	(0.00310)	(0.00411)
Women	0.0133	0.00235	-0.0157**
	(0.00762)	(0.00540)	(0.00574)
2^+ **children**			
Men	0.0142**	-0.000960	-0.0133**
	(0.00487)	(0.00281)	(0.00408)
Women	0.0218**	0.00157	-0.0234***
	(0.00759)	(0.00529)	(0.00575)

All things being equal, among both genders, we find that, mobility is higher for younger executives and for executives without children, implying that job and/or residential mobility is more likely in early careers than later. Interestingly, educational variables are not significantly associated with either job or residential mobility. Also, being in a couple is significantly positively associated with residential mobility among male executives only. Job mobility is also higher in municipalities where rents are higher; bigger cities provide a greater diversity of accessible units and internal opportunities.

Among male workers, we also find that workplace environment characteristics are also significantly associated with mobility: they experience more job and/or residential mobility when there is a higher proportion of female executives in their work unit.

Last, we find that among both male and female executives, the amount of the mobility premium awarded in the past to other executives of their units is significantly correlated with job and/or residential mobility.

Table 6. Multinomial probit - marginal effects

	Women			Men		
	No mobility	**Job mobility only**	**Job + resid. mobility**	**No mobility**	**Job mobility only**	**Job + resid. mobility**
Individual characteristics						
Age	0.00244***	0.000116	-0.00256***	0.00142**	0.000720**	-0.00214***
	(0.000670)	(0.000378)	(0.000580)	(0.000465)	(0.000223)	(0.000419)
Tenure	-0.0402***	0.0122***	0.0280***	-0.0462***	0.00974***	0.0364***
	(0.00296)	(0.00148)	(0.00279)	(0.00254)	(0.000981)	(0.00252)
Tenure^2	0.00239***	-0.000620***	-0.00177***	0.00310***	-0.000549***	-0.00255***
	(0.000252)	(0.000101)	(0.000249)	(0.000236)	(0.0000711)	(0.000240)
1 child	0.0127	0.00218	-0.0149**	0.00681	0.00152	-0.00833
	(0.00699)	(0.00488)	(0.00521)	(0.00522)	(0.00318)	(0.00426)
2^+ children	0.0204**	0.00144	-0.0218***	0.0144**	-0.000917	-0.0135**
	(0.00699)	(0.00479)	(0.00526)	(0.00501)	(0.00288)	(0.00422)
couple	-0.00281	0.00431	-0.00150	-0.00678	-0.00359	0.0104**
	(0.00623)	(0.00435)	(0.00462)	(0.00450)	(0.00272)	(0.00372)
Education						
< Master	0.0111	-0.00842	-0.00272	0.00955	0.00353	-0.0131
	(0.0107)	(0.00627)	(0.00891)	(0.00824)	(0.00486)	(0.00677)
Master	0.00148	0.00177	-0.00325	0.00108	0.000465	-0.00155
	(0.00653)	(0.00441)	(0.00505)	(0.00495)	(0.00271)	(0.00425)
Business school	0.0157	0.000707	-0.0164*	-0.00633	0.00137	0.00496
	(0.00957)	(0.00636)	(0.00730)	(0.0102)	(0.00547)	(0.00877)
Top 20 Engineer school	0.00348	-0.00730	0.00382	-0.00232	0.000171	0.00215
	(0.0102)	(0.00693)	(0.00788)	(0.00560)	(0.00343)	(0.00460)
Top 10 Engineer school	-0.00249	0.00407	-0.00159	-0.00691	-0.000770	0.00768
	(0.00953)	(0.00690)	(0.00684)	(0.00663)	(0.00387)	(0.00554)
Top 5 Engineer school	-0.00801	0.00324	0.00477	-0.00417	0.00370	0.000473
	(0.0111)	(0.00696)	(0.00879)	(0.00655)	(0.00355)	(0.00562)
PhD	-0.0158	0.00637	0.00948	-0.00633	0.000740	0.00559
	(0.00849)	(0.00501)	(0.00704)	(0.00669)	(0.00326)	(0.00595)
Residential municipality characteristics						
log(average rent)	-0.113***	0.0501**	0.0633**	-0.0382*	0.0262*	0.0121
	(0.0257)	(0.0159)	(0.0193)	(0.0177)	(0.0104)	(0.0140)
Local center	-0.0490*	0.0335*	0.0155	-0.0744***	0.0201**	0.0543***
	(0.0196)	(0.0149)	(0.0148)	(0.0117)	(0.00773)	(0.00986)
Intermediate center	-0.0402**	0.0343***	0.00595	-0.0649***	0.0241***	0.0408***
	(0.0141)	(0.00837)	(0.0120)	(0.00816)	(0.00430)	(0.00726)
Structural center	0.0411**	0.00267	-0.0437***	0.00514	0.0167***	-0.0219***
	0.0138)	(0.00687)	(0.0119)	(0.00752)	(0.00351)	(0.00652)
Major center: Paris	0.0410**	0.0123	-0.0533***	0.00478	0.0214***	-0.0262***
	0.0145)	(0.00860)	(0.0116)	(0.00858)	(0.00477)	(0.00699)
Major center: Lyon	0.105***	0.0537***	0.0511***	-0.110***	0.0691***	0.0407***
	0.0176)	(0.0118)	(0.0152)	(0.0118)	(0.00902)	(0.00921)
Major center: Marseilles	0.00313	0.00313	0.00000203	-0.0251*	-0.00579	0.0309**
	0.0186)	(0.0102)	(0.0161)	(0.0108)	(0.00314)	(0.0104)
Workplace environment						
Exit rate of male workers	-0.509***	0.356***	0.153*	-0.387***	0.270***	0.117
	(0.0900)	(0.0592)	(0.0616)	(0.0911)	(0.0565)	(0.0667)
Average Hello mobility premium	0.237***	-0.264***	0.0268**	0.108*	-0.124*	0.0161*
	(0.0688)	(0.0773)	(0.00989)	(0.0497)	(0.0571)	(0.00763)
Gender ratio $< Q1$	-0.0505***	0.0107**	0.0398***	-0.0244**	-0.00537	0.0298***
	(0.00754)	(0.00382)	(0.00658)	(0.00749)	(0.00408)	(0.00635)
$[Q1 - Q2[$	-0.00401	-0.000934	0.00494	0.00688	-0.00716	0.000286
	(0.00743)	(0.00401)	(0.00606)	(0.00774)	(0.00479)	(0.00591)
Over Q3	0.00606	-0.00955*	0.00349	0.00724	-0.0113*	0.00403
	(0.00697)	(0.00449)	(0.00542)	(0.00769)	(0.00534)	(0.00567)
Year dummies	YES	YES	YES	YES	YES	YES
Division dummies	YES	YES	YES	YES	YES	YES
Size of plants dummies	YES	YES	YES	YES	YES	YES

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Inrae (2020) amenity-based municipality classification.

Average "Hello mobility premium" excluding the observed worker. Reference factors for family size : no child.

Reference factor for Education : Engineer. Reference factor for Access to amenities: Other Major Centres.

Reference factor for couple status : single.

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4 Effects of mobility on wages

In this section, we examine the impact of mobility on wages. Figures 1 depict yearly raw changes in total wages for female and male executives. They show that residential mobility does indeed seem to be associated with a jump in pay that seems to correlated with the payment of the "hello" mobility bonus, being more pronounced in the year of the move. An additional and important observation is that residential mobility does not seem to have an impact on the base pay of managers (2), which reflects the manager's position in the hierarchical pay scale, i.e. there do not seem to be any specific career leaps as a result of residential mobility.

FIGURE 1. EVOLUTION OF EARNINGS (TOTAL WAGE)

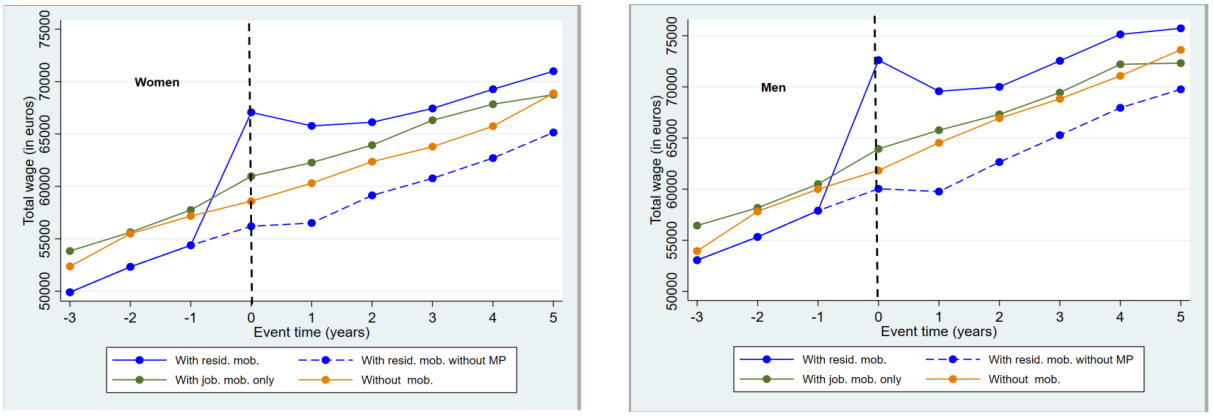
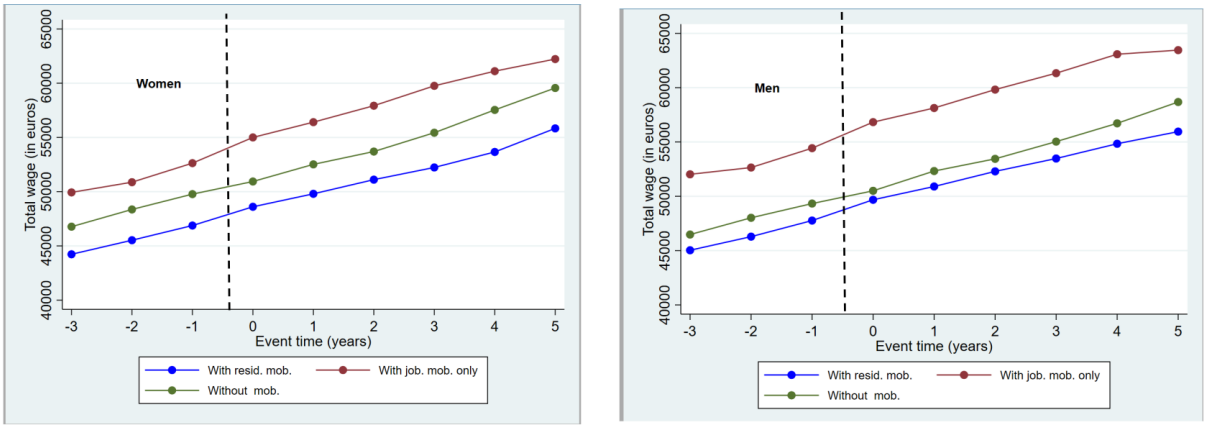


FIGURE 2. EVOLUTION OF EARNINGS (BASE WAGE)



To disentangle possible confounding factors and determine whether there is a causal impact of mobility on base and total wages, we use an event study, presented in section 4.1, with results presented in section 4.2.

4.1 Empirical strategy

Our panel consists of employees who either moved once or did not move during the period, at different dates. So we have in our data set units that are 'treated' and units that are 'never

treated' and variations in the date of treatment between the units. This data structure is very common in event studies (Miller 2023) and gives us an appropriate configuration for identifying changes in pay net of structural effects.

The single event studied over the period in the panel is mobility - with or without a change of residence - and its consequences for annual pay and wage trajectories. The control group (or 'never treated' units) consists of employees who did not experience any geographical mobility during the period. As mobility bonuses are granted for 10 years, the absence of a mobility bonus for those in the panel guarantees that these employees have not experienced any geographical mobility in the past 10 years or since their entry into the panel. However, we do not know if they will have any mobility after 2018. Note that we are sure of the absence of residential mobility thanks to this premium, but these control group workers may have experienced job mobility without residential mobility in the years before 2008.

Let Y_{ijt}^g be the income of worker i ($i = 1, \ldots, N$) with the gender g ($g = f, m$) recorded for the period t ($t = 1, \ldots, T$) in the region j ($j = 1, \ldots, J$). T is between 2008 and 2018, a 10-year period.

We create a binary variable d_{it} equal to 1 if the worker i was mobile during period t and 0 otherwise[14]. We note τ_i^g the calendar year during which the worker i with gender g experiences a mobility.
$\tau_i = t \times d_{it}$

The events μ_i^g of the model are obtained using τ_i^g and t by simple subtraction: $\mu_i^g = t - \tau_i^g$

- A negative value of μ_i^g means that worker i will experience a move in μ_i^g years in the future
- A positive value of μ_i^g means that worker i has experienced mobility μ_i^g years ago
- A null value of μ_i^g means that it is the year in which worker i is mobile

The estimated equation is then:

$$Y_{ijt}^g = \sum_{\substack{\mu=-3 \\ \mu \neq -1}}^{5} \gamma_\mu^g 1(\mu_i = t - \tau_i) + X_{it}' \beta^g + v_i + v_j^g + v_t^g + \epsilon_{ijt}^g \tag{2}$$

- Variables v_i, v_j^g and v_t^g correspond to the individual, region and time fixed effect. Variable v_i controls for individual effects that remain constant over the entire period (gender, level of education, fixed unobserved characteristics). Variable v_j^g controls for region effects that are common to all workers of gender g. Variable v_t^g controls for temporal effects that are common to all workers of gender g (cyclical shocks, economic and financial shocks that affect all workers in the group in the same way, fixed unobserved effects).
- Vector X_{it}' contains variables that characterize individual i and that change over time (the logarithm of hours worked, seniority, the hierarchical position, the division in which the worker works and the number of children in the family).
- Parameters γ_μ for $\mu_i > 0$ capture the effect of mobility on the wage trajectory, while the parameters γ_μ for $\mu_i < 0$ characterize the wage trajectory before mobility.

A reference group is needed in order to identify and estimate all the parameters of this model, otherwise the model is under-identified (Borusyak and Jaravel 2017). Here, as mentioned earlier,

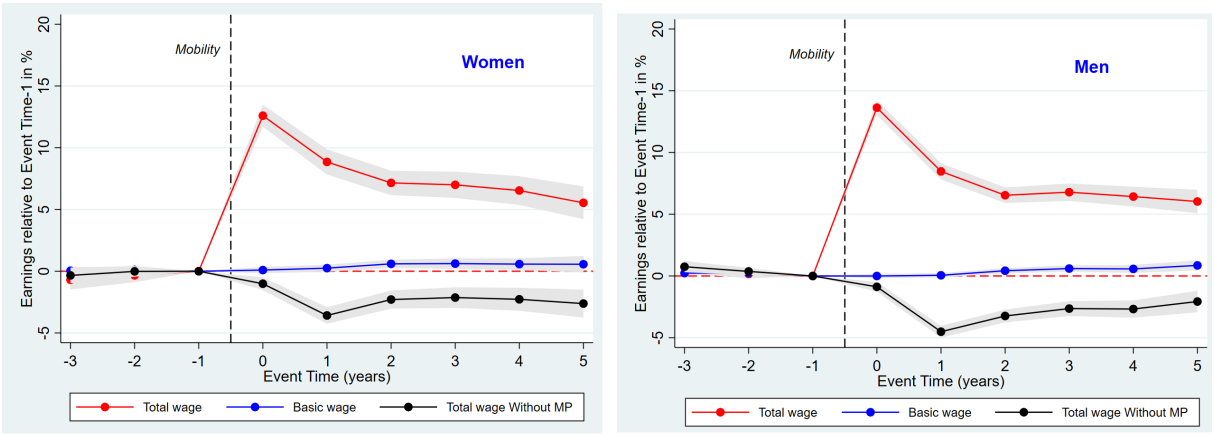
the control group is composed of workers who have been present in the company for at least 3 years and have not experienced any mobility over the period considered. To have a "treatment effect" for this group, we consider they have the event "mobility" three years after they entered the panel. More precisely, we compare the groups two by two, i.e. those without mobility versus those with geographical mobility, then those without mobility versus those with work mobility but no geographical mobility. In both cases, therefore, we attribute fictitious mobility to the 'immobile' groups for the comparisons. As a robustness check, we also conducted analyses where the 'immobility' group was given random mobility data. The results (not reported here) were similar.

4.2 Results

First, we look at the differences in pay growth between employees who have experienced residential mobility and those who have not. Figure 3 shows the net differences between the treatment group and the control group in the annual variation of their total remuneration, including the mobility allowance, of their remuneration excluding the mobility allowance and of the basic wages.

There are no statistically significant differences between the two groups in terms of the net change in salary before the event. Also, we observe for both gender a clear increase in total pay for those who have moved compared to the control group. This increase is greater in the first year for both men and women. This is consistent with "Hello Bonus" practice. But there is little difference in the evolution of wages when the mobility bonus is removed from the total pay. The slight penalty observed in the first two years may be due to the loss of bonuses corresponding to the previous position (partly or fully compensated by the mobility bonus) and/or to the time needed to adapt to the new position in order to access certain bonuses. We can also see that there is no difference in changes in basic salary between those having moved and those not having moved. In other words, residential mobility did not accelerate their career compared to others (Figure 3).

FIGURE 3. EVENT STUDY (JOB + RESIDENTIAL MOBILITY VS. NO MOBILITY)



Event study with individual, location and year fixed effects. Control variables: logarithm of working time and tenure, marital status, presence of dependent children, firm division. The shaded area give the 95 percent confidence interval.

Table 7 quantifies the net effect of mobility on the total wage and the wage without the mobility premium. Compared to male executives who experienced no mobility, male executives who experienced a job+residential mobility had a +17.6% total wage boost the year after the mobility;

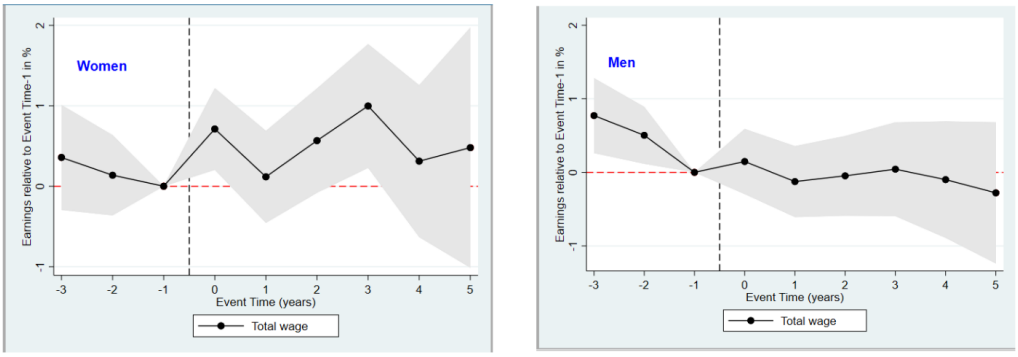
5 years after the mobility, the total wage increase was still significantly high, at +8,9% [15]. We find similar results among female executives: compared to no-mobility female executives, those who experienced a job+residential mobility had a +16.0% total wage boost the year after the mobility (+8.3% 5 years later). [16]

We also find that the wage boost associated with job+residential mobility is exclusively due to the mobility premium: the wage boost vanishes completely for the total wage without the mobility premium.

The results are different if we compare employees who moved from one establishment to another without changing their place of residence with those who did not move from one establishment to another (but may have changed jobs within that establishment during the period). We can see that there are no significant differences in the annual growth of earnings between the two groups and a great variability in the annual changes in total compensation. We also observe a pre-trend for men: those who had moved between establishments had experienced higher pay growth than the others before the event (Figure 4 and table 7)[17].

At this stage, it can be said that the mobility bonus policy leads to a significant increase in remuneration following the acceptance of geographical residential mobility. This is true for both women and men. On the other hand, this mobility does not seem to have any impact on career development, with employees' careers progressing similarly on average, regardless of their geographical location. This means that the bonus policy of this industry would make it possible to clearly separate the components of remuneration according to the reason for which they were granted. This could also mean that career progression is possible without geographical mobility. This is probably because the size of the company provides many opportunities without the constraints of geographical mobility.

FIGURE 4. EVENT STUDY (JOB MOBILITY VS. NO MOBILITY)



Event study with individual, location and year fixed effects. Control variables: logarithm of working time and tenure, marital status, presence of dependent children, firm division. The shaded area give the 95 percent confidence interval.

TABLE 7. EVENT STUDY RESULTS - ESTIMATED COEFFICIENTS

	Job +residential mobility versus no mobility				**Job mobility only versus no mobility**	
	Total Wage		**Total Wage without MP**		**Total Wage**	
Time to event	Women	Men	Women	Men	Women	Men
T=-3 years	-0.00555	-0.000544	-0.00694	-0.00161	0.00358	0.00772***
	(0.00446)	(0.00298)	(0.00430)	(0.00287)	(0.00333)	(0.00260)
T=-2 years	0.00353	0.00211	0.00336	0.00175	0.00137	0.00504**
	(0.00325)	(0.00198)	(0.00323)	(0.00194)	(0.00254)	(0.00198)
T= 0	0.162***	0.176***	-0.0094***	-0.0083***	0.00712***	0.00147
	(0.00577)	(0.00398)	(0.00364)	(0.00255)	(0.00259)	(0.00226)
T= 1 year	0.119***	0.111***	-0.0295***	-0.0369***	0.00117	-0.00125
	(0.00613)	(0.00420)	(0.00445)	(0.00313)	(0.00292)	(0.00246)
T= 2 years	0.0973***	0.0923***	-0.0138***	-0.0186***	0.00567*	-0.000471
	(0.00601)	(0.00409)	(0.00500)	(0.00355)	(0.00331)	(0.00276)
T= 3 years	0.0987***	0.0996***	-0.00853	-0.00745*	0.00998**	0.000428
	(0.00689)	(0.00479)	(0.00595)	(0.00423)	(0.00393)	(0.00325)
T= 4 years	0.0924***	0.103***	-0.0112*	-0.00297	0.00312	-0.000986
	(0.00744)	(0.00583)	(0.00640)	(0.00513)	(0.00482)	(0.00404)
T= 5 years	0.0777***	0.0931***	-0.0164**	-0.000688	0.00480	-0.00279
	(0.00819)	(0.00667)	(0.00738)	(0.00624)	(0.00762)	(0.00490)
Constant	5.997***	8.183***	5.881***	8.321***	4.583***	8.787***
	(0.442)	(0.572)	(0.430)	(0.588)	(0.414)	(0.556)
Observations	9,290	16,743	9,290	16,743	13,217	23,739
Number of id	1,249	2,240	1,249	2,240	1,675	2,943
YEAR FE	YES	YES	YES	YES	YES	YES
ID FE	YES	YES	YES	YES	YES	YES
COVARIATES	YES	YES	YES	YES	YES	YES

5 Effects of mobility on the gender wage gap

In this final section, we look at how this mobility premium affects the gender pay gap. To do this, we look first at annual gender pay differentials of pay advantage for mobility, then at the accumulation of these differentials over the period, in order to gain a more accurate assessment of the impact of mobility on the gender pay gap.

5.1 Empirical Strategy

We use two complementary methods to assess the impact of mobility on the gender pay gap. We first estimate the effect of residential mobility on the gender pay gap using the methodology of Kleven et al. 2019. Next, we use a classic Oaxaca or Blinder decomposition to identify the proportion of the estimated average gender gap that is due to the observed individual characteristics, including the geographical mobility. These two approaches are presented in turn in this section.

5.1.1 Gender pay gap cumulative indicator

We estimate the cumulative impact of mobility on female executives relative to male executives using the methodology of Kleven et al. 2019. The difference is that the event we consider is the mobility (and not the childbirth).

The indicator is:

$$\Delta_\mu = \frac{[exp(\widehat{\gamma}_\mu^m) - 1] \times E(exp(\widetilde{Y}_{ijt}^m)) - [exp(\widehat{\gamma}_\mu^f) - 1] \times E(exp(\widetilde{Y}_{ijt}^f))}{E(exp(\widetilde{Y}_{ijt}^m))} \tag{3}$$

where

- $\widehat{\gamma}_\mu^g$ are the estimated coefficients associated to the event dummies for $gender = (male, female)$
- Parameters γ_μ for $\mu_i > 0$ capture the effect of mobility on the wage trajectory, while the parameters γ_μ for $\mu_i < 0$ characterize the wage trajectory before mobility.
- $\widetilde{Y}_{ijt}^g = X_{it}' \widehat{\beta^g} + \widehat{v_i^g} + \widehat{v_t^g} + \widehat{v_j^g}$ is the predicted outcome when omitting the contribution of the event dummies.
- Variables v_i and v_t correspond to the individual and time fixed effect. Variable v_i controls for individual effects that remain constant over the entire period (gender, level of education, fixed unobservable characteristics). Variable v_t controls for temporal effects that are common to all workers (cyclical shocks, economic and financial shocks that affect all workers in the group in the same way, fixed unobservable effects)
- Vector X_{it}' contains variables that characterize individual i and that change over time (the logarithm of working time and seniority, the hierarchical position, the division in which the worker works and the number of children in the family).

This indicator measures the average gender gap due to differences in the residential mobility premium for each year after moving, controlling for individual characteristics. The sum over the 5 years following the move gives the cumulative effect of these differences over that period of time.

5.1.2 Oaxaca decomposition

Finally, we estimate the effect of worker's characteristics on the cumulative total gender wage gap using a standard Oaxaca-Blinder decomposition (Oaxaca and Ransom 1994 or Neumark 1988). The equation to be estimated is of the following form:

$$W_m - W_f = (X_m - X_f)\beta^{norm} + (X_m)(\beta^m - \beta^{norm}) - (X_f)(\beta^f - \beta^{norm}) \quad (4)$$

β^{norm} are the coefficients of the covariates estimated on the pooled data set without the covariate "gender".

The dependent variables are the cumulative total wages

- on a balanced panel (9 years)
- on a data set with at least 5 years of presence

The covariates are the log average age, the Log cumulative working time - this is the proportion of working time over the period, taking into account any periods of part-time work, dummies of diploma (9 categories), dummies of hiring year, average situation with regard to be in couple, to have child or not, firm's divisions.

We complete this baseline model with dummies for mobility (job, place of residence, ref: none) in order to isolate the effect of this factor on the explained part of the average gender pay gap.

5.2 Results

5.2.1 Cumulative mobility impact

First, we report the results on the cumulative impact of mobility on female wages relative to male wages using the methodology of Kleven, Landais and Sogaard (2019) in the table .

Table 5 shows the annual effect of residential mobility on total earnings for women and men, and then the cumulative total over the five years following the move. It can be seen that in the first year, men's additional earnings are higher than women's, with a significant difference of 3%. For the other years, it is in favour of men (not significantly) from 3 years after the change. Taken together, this gives men a cumulative advantage of around 5% due to this mobility alone.

To understand this difference better, we distinguish three types of movement: from Paris to the provinces, from the provinces to the provinces and from the provinces to Paris. The reason for this distinction is the fact that the manufacturing industries are mainly located in the provinces of the country and so offer more opportunities in terms of bonuses (on-call duty, overtime, hardship) than positions in Paris, where tertiary activities are concentrated.

The cumulated disadvantage for women is around 9% for moves between provinces and is concentrated in the first year (6). The reason for this is difficult to disentangle. It could be due to the compensation in the first year of the former premium perceived by men or to a better ability of men to negotiate the "hello bonus".

For Paris-to-Province trajectories, the female wage gap is higher and significant, estimated at 11.7% of cumulated male wages (about 6,472.4€) (6). We can also observe that the gap appears in the third year after the move. This may be due to the time it takes to gain access to the various bonuses (overtime, hardship, on-call, etc.) associated with the new positions, bearing in mind that these bonuses are generally more accessible to men than to women.

As a result, job + residential mobilities do worsen the gender pay gap between mobile male and female executives.

FIGURE 5. CUMULATIVE GENDER PAY GAP EFFECT OF JOB + RESIDENTIAL MOBILITY

	Job + Resid mobility versus No mobility					
	Estimated effect (in euros)		Gap (in euros)		Gap (in % of the men's wage in t=-1)	
	Men	Women		Bootstrap 95% IC		Bootstrap 95% IC
T = 0	11,092.9	9,386.8	**1,707.4****	[924.0 ; 2,485.8]	**2.96%****	[1.6 ; 4.29]
T = 1 year	6,737.1	6,755.0	-18.5	[-675.3 ; 624.9]	-0.03%	[-1.17 ; 1.08]
T = 2 years	5,435.9	5,566.1	-130.9	[-708.3 ; 432.2]	-0.23%	[-1.23 ; 0.75]
T = 3 years	5,824.8	5,719.3	103.9	[-548.4 ; 740.7]	0.18%	[-0.95 ; 1.28]
T = 4 years	6,003.7	5,446.2	557.7	[-156.5 ; 1254.0]	0.97%	[-0.27 ; 2.18]
T = 5 years	5,391.1	4,717.1	674.6	[-131.5 ; 1,487.6]	1.17%	[-0.23 ; 2.58]
Cumulative effect	**40,485.5**	**37,590.5**	**2,894.2***	**[17.2 ; 5,637.2]**	**5.01%***	**[0.03 ; 9.81]**

FIGURE 6. CUMULATIVE GENDER PAY GAP EFFECT OF JOB + RESIDENTIAL MOBILITY

Province to Province

	Job + Resid mobility versus No mobility					
	Estimated effect (in euros)		Gap (in euros)		Gap (in % of the men's wage in t=-1)	
	Men	Women		Bootstrap 95% IC		Bootstrap 95% IC
T = 0	11,118.9	8,541.8	**2,574.7*** **	[1,589.1 ; 3,647.9]	**4,39%** **	[2,71 ; 6,21]
T = 1 year	5,246.2	4,717.0	529.5	[-293.4; 1,383.6]	0,90%	[-0,49 ; 2,36]
T = 2 years	4,017.4	3,698.4	320.2	[-449.1 ; 1,098.0]	0,55%	[-0,77 ; 1,87]
T = 3 years	4,242.4	3,798.9	441.9	[-434.6 ; 1,218.4]	0,75%	[-0,74 ; 2,08]
T = 4 years	4,291.4	3,812.1	480.2	[-519.2 ; 1,448.0]	0,82%	[-0,88 ; 2,46]
T = 5 years	3,772.5	2,915.0	855.0	[-204.5 ; 2,000.1]	1,46%	[-0,35 ; 3,4]
Cumulative effect	**32,688.8**	**27,483.2**	**5,201.5** **	**[1,430.5 ; 8,896.1]**	**8,87%** **	**[2,43 ; 15,19]**

Paris to Province

	Job + Resid mobility versus No mobility					
	Estimated effect (in euros)		Gap (in euros)		Gap (in % of the men's wage in t=-1)	
	Men	Women		Bootstrap 95% IC		Bootstrap 95% IC
T = 0	9,898.1	8,819.2	1,077.9	[-150.69;2,325.18]	1.94	[-0.27;4.19]
T = 1 year	8,696.7	8,682.8	13.8	[-959.41;1,039.98]	0.02	[-1.73;1.86]
T = 2 years	8,134.8	7,859.3	276.2	[-615.67;1,102.20]	0.50	[-1.11;1.99]
T = 3 years	9,037.0	7,529.3	**1,505.9*** **	[556.31;2,469.32]	**2.71*** **	[1.00;4.44]
T = 4 years	8,651.2	6,855.8	**1,797.5*** **	[773.18;2,779.79]	**3.24*** **	[1.39;4.99]
T = 5 years	7,974.4	6,175.3	**1,801.2*** **	[576.03;2,949.53]	**3.24*** **	[1.04;5.34]
Cumulative effect	**52,392.2**	**45,921.8**	**6,472.4*** **	[2,389.85;10,598.85]	**11.66*** **	[4.29;18.97]

5.2.2 Oaxaca decomposition

The gender raw gap in the panel is around 2% when the dependent variable is the basic wage (table 8). The Oaxaca decomposition indicates that individual characteristics taken into account explain almost all the difference for basic pay. In other words, the entire basic pay gap between women and men is due to structural effects (age, seniority, education, etc.).

TABLE 8. OAXACA DECOMPOSITION (EXPLAINED VARIABLE: LOG CUMULATIVE BASIC WAGE)

	Balanced	**All**
Men	12.84***	13.01***
	[12.83,12.85]	[13.00,13.02]
Women	12.82***	12.99***
	[12.81,12.83]	[12.97,13.00]
Difference	0.0183*	0.0208*
	[0.00407,0.0325]	[0.00486,0.0367]
Explained	0.0135	0.0195*
	[0.00000536,0.0271]	[0.00387,0.0351]
Unexplained	0.00476	0.00133
	[0.000187,0.00933]	[-0.00205,0.00470]
N	4688	7755

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. 90% confidence intervals in brackets

Covariates: log cumulative working time, log average Age, dummies of diploma (9 categories), dummies year of entrance, average situation regarding to be in couple, to have child, divisions

On the contrary, in terms of total cumulated pay (bonuses included) over 5 years, the gender pay gap is large (6%) and the characteristics taken into account around half of the total gap (table 9). So, it is not differences in career progression as measured by base salary progression that account for the pay gap between male and female managers and executives in this company. The gap is due to gender differences in the way additional pay (bonuses and premiums) is earned.

We have found that the bonuses for geographical mobility are, on average, higher for men than for women. How much do they contribute to the observed pay gap? The introduction of the variable "mobility" in the covariates ((table 9), columns 2 and 4) slightly increases the explained part of the gap (by 0.02 percentage points compared to a situation in which these variables are not included in the covariates of the decomposition). The impact of residential mobility on the explained part of the gender pay gap is significant but very limited: it increases the gap by +0.4ppts. On the other hand, the part that is explained only by job mobility (and not by residential mobility) is slightly in favour of women. This is consistent with the proportion of women undertaking this type of mobility being higher than that of men.

In summary, we can see that geographical mobility is more rewarding for men than for women (the cumulative gain over 5 years related to mobility only compared to those who do not moving is 5% higher for men than for women). However, if we look at the gender pay gap as a whole, we see that the raw gap is relatively high (6%), that it is mainly due to premiums and bonuses, and that in this total of bonuses, those linked solely to residential mobility occupy a limited place.

TABLE 9. OAXACA DECOMPOSITION (EXPLAINED VARIABLE: LOG CUMULATIVE EARNINGS - ALL BONUSES INCLUDED)

	Balanced		**All**	
	with dummy mob	no dummy mob	with dummy mob	no dummy mob
Overall				
Men	13.08***	13.08***	13.25***	13.25***
	[13.07,13.09]	[13.07,13.09]	[13.24,13.26]	[13.24,13.26]
Women	13.02***	13.02***	13.19***	13.19***
	[13.01,13.03]	[13.01,13.03]	[13.18,13.20]	[13.18,13.20]
Difference	0.0579***	0.0579***	0.0579***	0.0579***
	[0.0427,0.0731]	[0.0427,0.0731]	[0.0415,0.0743]	[0.0415,0.0743]
Explained	0.0284***	0.0263**	0.0318**	0.0283**
	[0.0142,0.0426]	[0.0122,0.0404]	[0.0159,0.0476]	[0.0124,0.0441]
Unexplained	0.0294***	0.0315***	0.0261***	0.0296***
	[0.0236,0.0352]	[0.0254,0.0377]	[0.0218,0.0304]	[0.0251,0.0341]
Explained				
job mob.	-0.00135**		-0.00114***	
	[-0.00217,-0.000527]		[-0.00165,-0.000617]	
job + resid mob	0.00429**		0.00494***	
	[0.00166,0.00693]		[0.00333,0.00655]	
N	4688		7755	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. 90% confidence intervals in brackets

Covariates: log cumulative hours worked, log average Age, dummies of diploma (9 categories), dummies year of entrance, average situation regarding to be in couple, to have child, divisions

6 Conclusion

In this article, we study the impact of job and/or residential mobility on the gender wage gap between male and female executives within a large multi-site French industrial company. The added value of using an internal personnel database is the possibility to disentangle the effect of job mobility & job-driven residential mobility. Another advantage is the rich information on wage structure and on-the-job characteristics, and insider information on the company's H&R processes.

In this company, workers' residential mobility is organised, and a mobility premium is intended to compensate mobile workers for housing costs and for losing previous hardship/overtime premiums. Local job mobility, on the other hand, is not the subject of any specific support measures. We also find that residential mobility at the industry level does not alter career trajectories within the firm. Mobile and immobile managers have similar career trajectories, male or female.

We find also that male and female executives have different mobility profiles: female executive experience more local job mobility than males ones, who are more likely to experience job+residential mobility. We also find that local job mobility (i.e., not associated with residential mobility), is not profitable for either male or female workers. By contrast, we find that job + residential mobility is strongly profitable for male and female workers, and that this effect last at least 5 years after the move. Origin/destination profiles have an impact on these gains: moving from Parisian to Provincial units leads to the higher benefits.

Finally, we find that job-related residential mobility generates higher gains for male managers relative to female managers. However, it only marginally increases the gender pay gap. This is due to the fact that other bonuses (hardship bonuses, etc.) are less available to women because of occupational segregation. It should be noted, however, that the gender pay gap is still relatively high.

The main limitations of this study are i) the external validity of its results; more evidence is needed on other large multi-site companies that face the challenge of managing the internal mobility of their employees, ii) the absence of data on the workers' spouses' wages and employment status. Additionally, iii) we find no effects on the gender wage gap, but other unobserved gendered effects might happen, such as access to residential property or marital status.

Notes

[1]For a recent methodology to assess the extent of the glass ceiling, see Gobillon et al. 2022.

[2]A comprehensive literature review on internal markets is beyond the scope of this paper. For literature reviews, see Gibbons 1997, Gibbons and Waldman 1999, E. Lazear 1999, Lazear and Oyer 2013 and Waldman 2013

[3]Our database does not include information on subcontractors or temporary workers.

[4]In French: "*employé(e)*", "*maîtrise*", "*cadre*".

[5]It depends on the worker's unit available budget. This factor is all the more important when the number of employees in the management unit is high and when there are sick, absent or inefficient employees in this unit. It is then possible to reallocate the unused balance to efficient employees. The transferring manager who wants to keep the most efficient employees treats the good ones with this form of bonus. Paradoxically, a high performer who joins an efficient team will have fewer opportunities to differentiate himself or herself and to receive higher performance bonuses

[6]We do not have the employee's home address

[7]This echoes Brillet and Janand 2016 who note that two large French companies (EDF i.e. Électricité de France in the energy sector and SNCF i.e. Société Nationale des Chemins de Fer in the transport sector) have explicitly internalized the benefits of promoting internal worker mobility.

[8]In some rare cases, excluded from this study, some non-residential job mobility premiums can also be awarded:

- Job mobility premium granted for 1 year when an occupational mobility generates a loss of on-duty premiums
- On-the-job training premium (e.g. change from a tertiary function to a technical function) that amounts to 2 months' salary.
- Trainer premium, granted for 5 years to workers who become trainers.
- Geographical celibacy premium awarded to workers who experienced a job mobility of at least 50 km but whose family stayed in their original place of residence. The company compensates the new transportation and housing costs associated with the worker's second home for a period of 3 years, plus a maximum of 1 year.

[9]The bonus is paid only once for a couple working in the same company and moving together. Intra-firm couples' mobility is not identified in our data-set, but they are rare according to the firm's H&R officials

[10]Results from the 2,020 workers (23,055 observations) who experienced multiple job mobilities are presented in Appendix XXX.

[11]The average wages presented in these tables are defined as the average annual wage over the period 2008 to 2018, expressed in 2020 euros.

[12]Wages in our firm are relatively high compared to the national average of 42,310€ for executives in 2019 Bodier et al. 2021).

[13]We used the INRAE classification of municipalities

[14]A worker will be considered treated if he/she undergoes at least one mobility during the studied period of time, so that $\sum_{t=1}^{T} d_{it} = 1$

[15]The wage boost of those with job+residential mobility is similar compared to male executives who experienced a job-only mobility (+17.6% the first year, +9.3% after 5 years).

[16]These effects are similar when job+residential female executives are compared to job-only mobility ones: +11.9% the year after the mobility and +7.77% five years later.

[17]For results differentiated for Paris/Province origin and destination, see Appendix ***

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7 Appendix

7.1 Appendix 1 - Additional Summary Statistics

Table 10. Distance in km and in time between two jobs

	Job mobility only		**Job + residential mobility**	
	M	F	M	F
Distance in km				
Min	1.3	1.3	2.8	2.1
Median	13.5	13.5	361.0	389.8
Mean	62.0	33.3	389.0	406.3
Max	915.0	1,102.0	1,158.5	1,178.0
Distance in time (min)				
Min	4.0	4.0	4.0	4.0
Median	36.0	34.0	230.0	245.0
Mean	60.2	42.7	241.6	251.0
Max	522.0	631.0	722.0	722.0

Table 11. Mobility by origin and destination (%)

	Men	**Women**	**All**
Location			
Province to Paris	12.0	13.6	12.5
Province to Province	61.2	54.5	59.1
Paris to Province	24.9	28.6	26.0
Paris to Paris	1.9	3.3	2.4
Unit function			
Production to Other	10.8	8.0	9.9
Production to Production	36.0	32.7	34.9
Other to Production	9.0	13.0	10.3
Other to Other	44.2	46.3	44.9

FIGURE 7. DATE AND SENIORITY WHEN MOBILITY IS OBSERVED

	Job mobillity only		*Job+resid. mobility*	
	M	F	M	F
Date of Mobility				
2008	3.6	5.2	2.0	2.3
2009	2.6	3.4	1.9	1.8
2010	2.3	4.8	1.6	1.4
2011	5.6	7.2	2.4	3.3
2012	6.9	5.9	4.3	5.6
2013	8.6	8.3	8.4	8.2
2014	8.9	8.0	9.5	10.3
2015	8.5	7.9	11.5	11.7
2016	27.7	22.0	21.2	18.1
2017	16.3	16.2	20.9	19.1
2018	9.2	11.2	16.4	18.3
Tenure at time of mobility				
1th year	8.0	8.2	3.8	4.9
2 year	14.5	13.3	10.0	10.1
3 year	18.6	21.2	20.9	23.5
4 year	15.8	13.9	28.8	26.3
5 year	8.0	8.4	13.5	14.6
6 year	9.2	7.3	6.6	7.0
7 − 8 year	13.4	14.1	13.4	8.9
9 year and more	12.2	13.5	3.0	4.7

FIGURE 8. DISTRIBUTION OF AVERAGE MOBILITY PREMIUM RELATIVE TO THE TOTAL WAGE

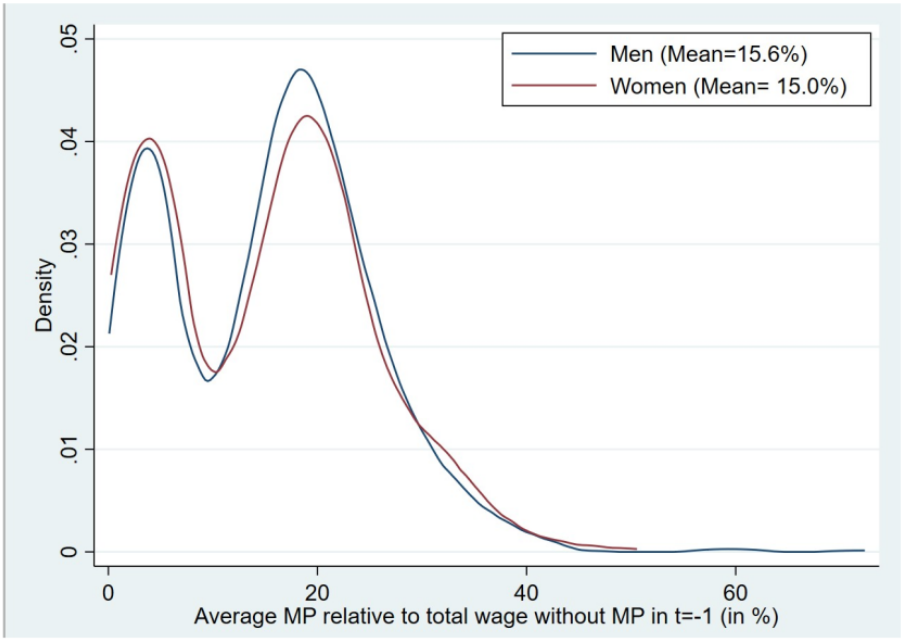


FIGURE 9. EVOLUTION OF EARNINGS (TOTAL WAGE)

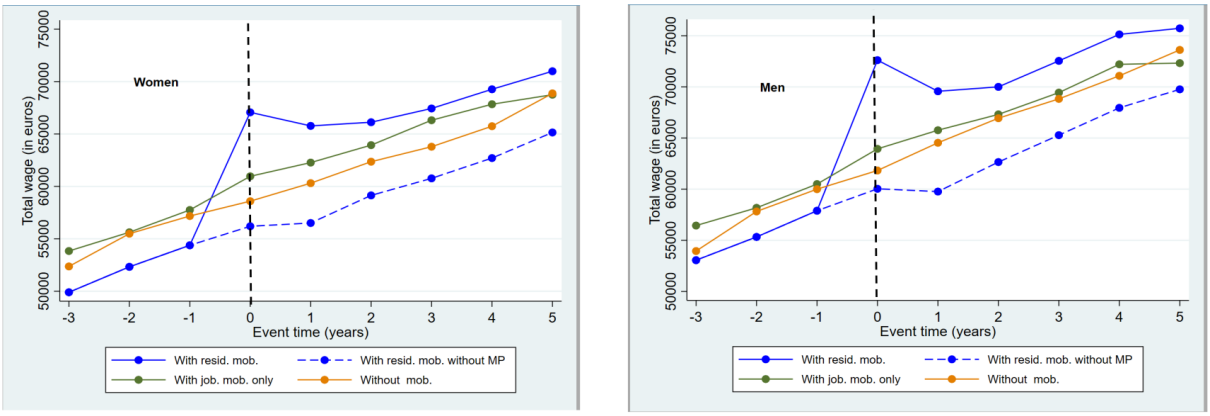


FIGURE 10. EVOLUTION OF EARNINGS (BASE WAGE)

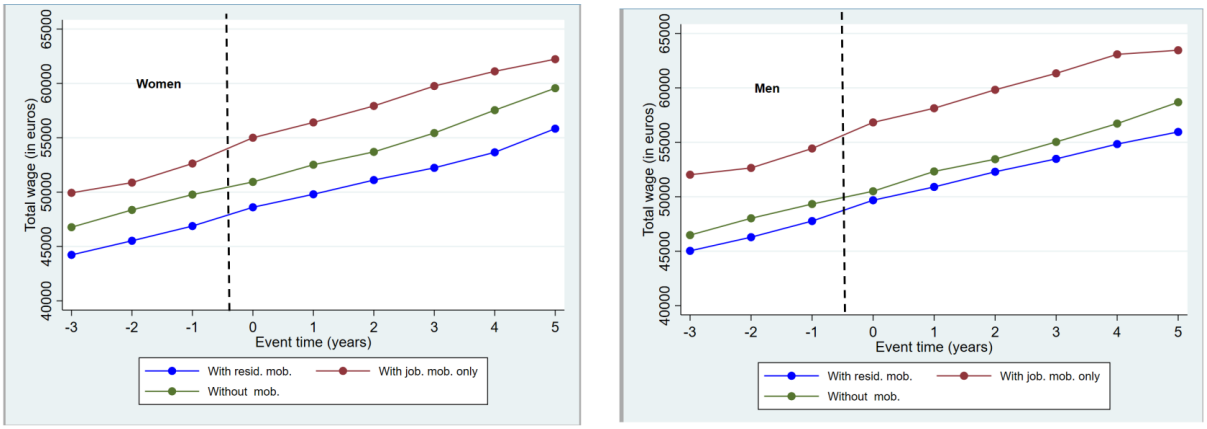


FIGURE 11. EVOLUTION OF EARNINGS (PERFORMANCE BONUS)

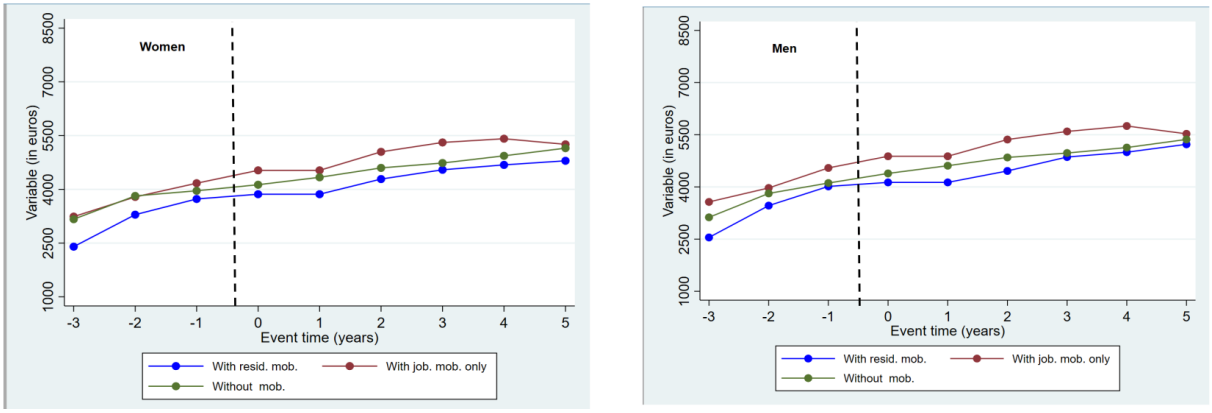
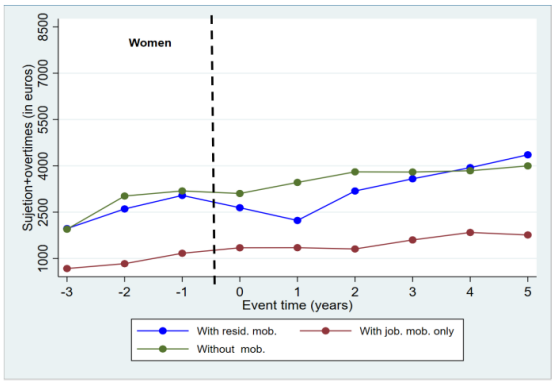


FIGURE 12. EARNING EVOLUTION (OVERTIME + HARDSHIP PREMIUM)



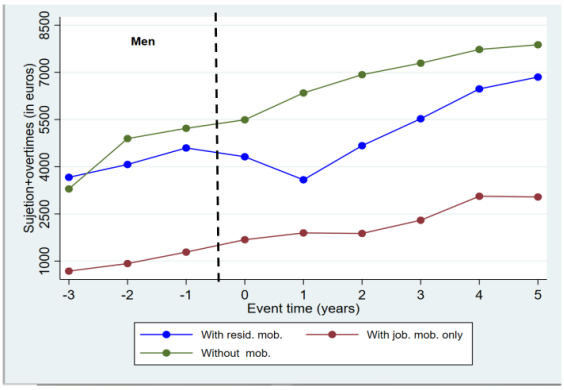
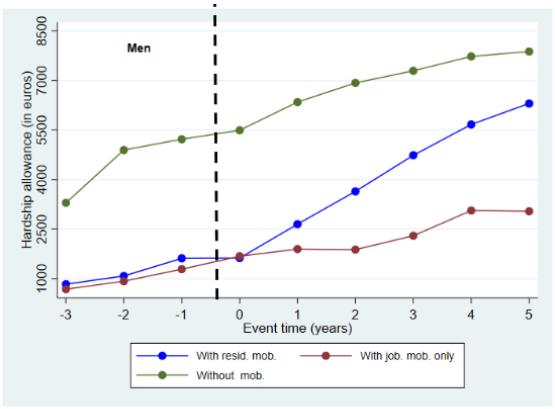
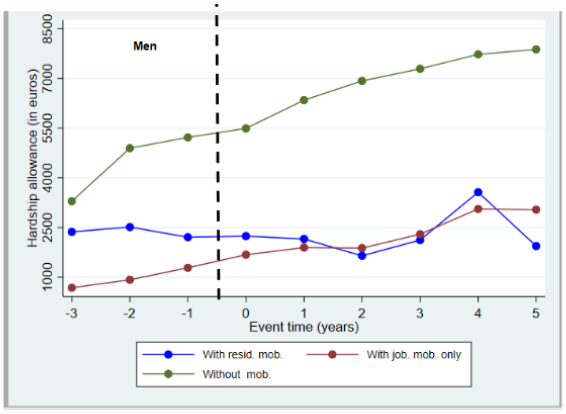


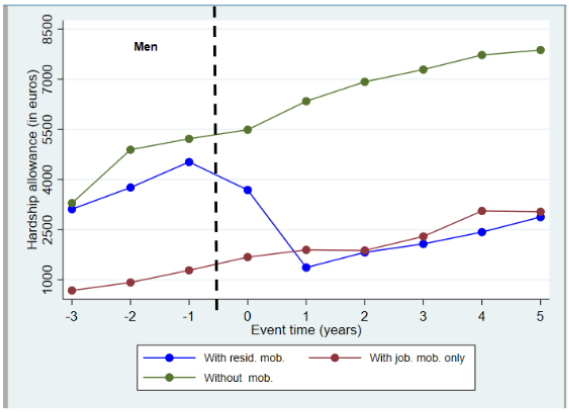
FIGURE 13. HARDSHIP + OVERTIME PREMIUMS BY ORIGIN/DESTINATION MOBILITY (MALE EXECUTIVES)



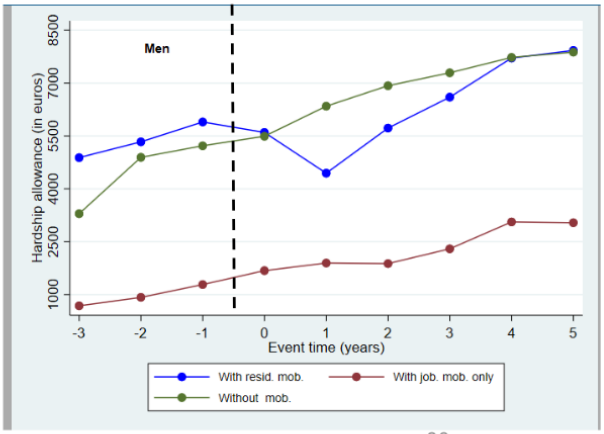
For Paris to Province area only



For Paris to Paris area only



For Province to Paris area only



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For Province to Province area only

FIGURE 14. HARDSHIP + OVERTIME PREMIUMS BY ORIGIN/DESTINATION MOBILITY (FEMALE EXECUTIVES)

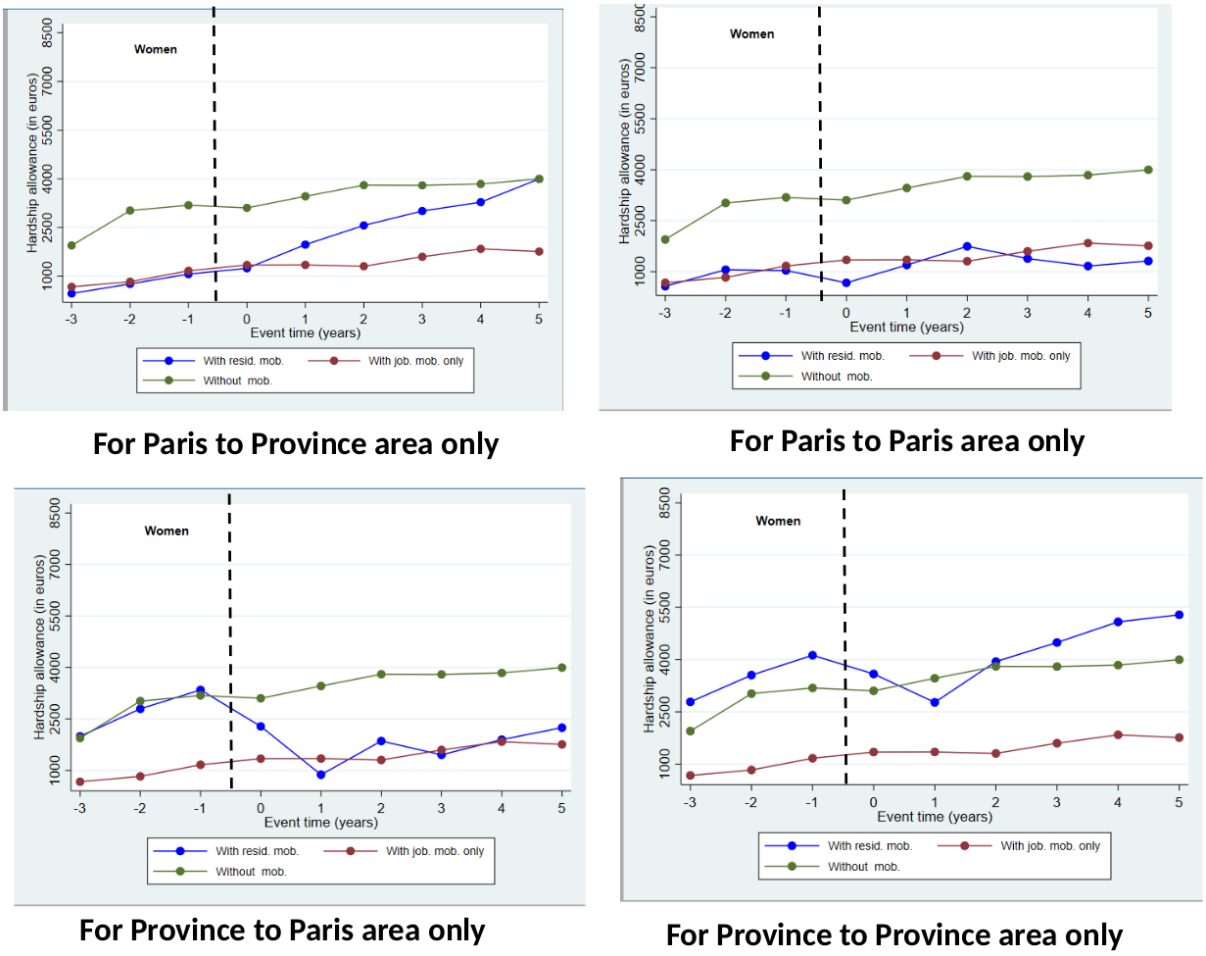


TABLE 12. HELLO MOBILITY PREMIUM (HMP) FOR ALL AND FEMALE

year	N		Total amount HMP (a)		Total wage (b)		ratio a/b	
	All	Female	All	Female	All	Female	All	Female
2015	6,629	2,233	11,628,664€	3,447,840€	397,226,333€	130,616,204€	2.9%	2.6%
2016	7,046	2,358	14,088,664€	3,966,522€	452,772,578€	146,219,790€	3.1%	2.7%
2017	7,298	2,449	16,814,450€	4,549,270€	482,303,745€	156,581,238€	3.5%	2.9%
2018	7,106	2,371	19,314,157€	5,606,630€	461,569,743€	148,554,149€	4.2%	3.8%
2019	6,822	2,277	19,597,924€	5,443,455€	453,442,362€	145,360,809€	4.3%	3.7%
2020	6,574	2,173	16,737,167€	4,634,244€	459,632,547€	146,101,713€	3.6%	3.2%
2021	6,268	2,065	13,721,466€	3,713,312€	443,965,022€	140,918,568€	3.1%	2.6%
Total	47,743	15,926	111,902,492€	31,361,273€	3,150,912,330€	1,014,352,471€	3.6%	3.1%

7.2 Appendix 2 - Event study: control groups

Table 13. Table A1. Event study - control groups (2)

	Job mobility only vs No mobility		***Job + resid. mob. vs No mob or Job mob only***	
	Total Wage		***Total Wage***	
	Women	Men	Women	Men
Time to event				
T= -3 years	0.00358	0.00772***	0.00715***	-0.00315
	(0.00333)	(0.00260)	(0.00268)	(0.00415)
T= -2 years	0.00137	0.00504**	0.00448**	0.00359
	(0.00254)	(0.00198)	(0.00186)	(0.00316)
T= 0	0.00712***	0.00147	0.175***	0.161***
	(0.00259)	(0.00226)	(0.00397)	(0.00574)
T= 1 year	0.00117	-0.00125	0.110***	0.118***
	(0.00292)	(0.00246)	(0.00410)	(0.00606)
T= 2 years	0.00567*	-0.000471	0.0895***	0.0973***
	(0.00331)	(0.00276)	(0.00393)	(0.00585)
T= 3 years	0.00998**	0.000428	0.0955***	0.0992***
	(0.00393)	(0.00325)	(0.00452)	(0.00657)
T= 4 years	0.00312	-0.000986	0.0981***	0.0940***
	(0.00482)	(0.00404)	(0.00548)	(0.00703)
T= 5 years	0.00480	-0.00279	0.0879***	0.0808***
	(0.00762)	(0.00490)	(0.00627)	(0.00764)
Constant	4.583***	8.787***	9.095***	4.718***
	(0.414)	(0.556)	(0.492)	(0.371)
Observations	13,217	23,739	32,335	17,042
Number of id	1,675	2,943	4,089	2,189
YEAR FE	YES	YES	YES	YES
ID FE	YES	YES	YES	YES
COVARIATES	YES	YES	YES	YES
R2 within	0.755	0.775	0.753	0.746
R2 overall	0.174	0.231	0.170	0.129
R2 between	0.0124	0.0172	0.001	0.001

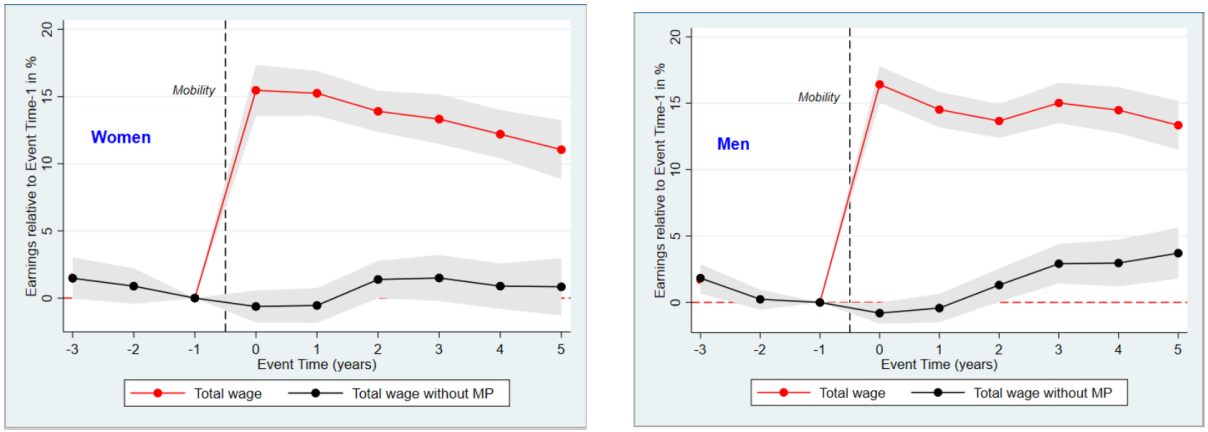
7.3 Appendix 3 - Event study - Paris / Province

Our event study results can be nuanced by differentiating trajectories by origin/destination residential trajectories.

For Paris to Province trajectories, we find that contrary to female ones, mobile male executives experience a wage boost that is not exclusively associated with the mobility premium (Figure 3). We believe that this is due to the fact that most productive plants are located in Province, while Paris concentrates the firm's headquarters and most administrative and training centers. Executives moving to Province are more likely to experience wage boosts due to higher hardship and overtime premiums ; since males are more likely to work production-oriented jobs, they're more likely than females to benefit from this kind of job + residential move.

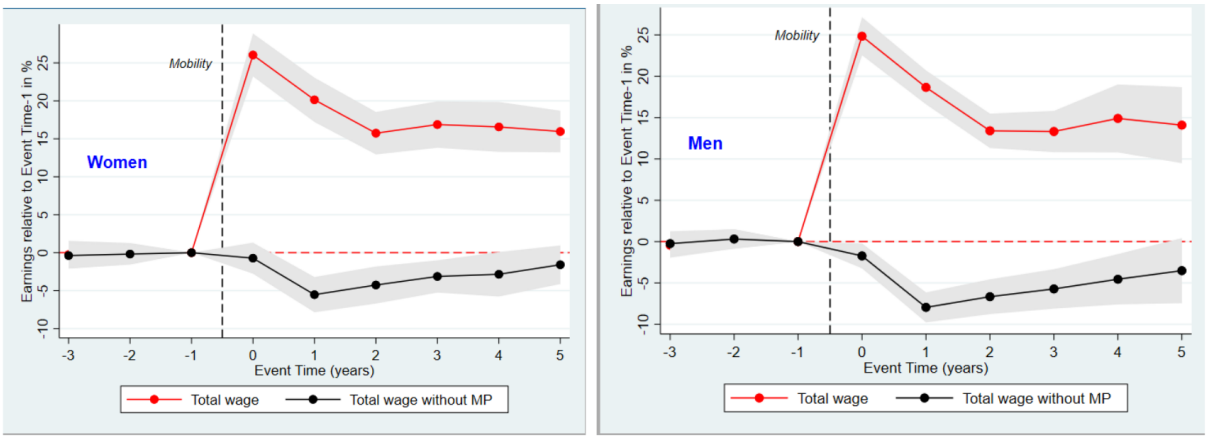
Conversely, moving from Province to Paris leads to a greater decrease of the likeliness to earn overtime and hardship premiums: job+residential mobility to Paris brings an actual significant decrease of the total wage after 5 years. The effect is stronger for male executives but still noticeable for female ones. However, for this origin/destination trajectory the mobility premium is much higher (because of higher housing prices and the compensation of premium losses due to the move), which leads to a higher total gain, for males and females alike.

FIGURE 15. EVENT STUDY (JOB + RESIDENTIAL MOBILITY VS. NO MOBILITY) (FROM PARIS TO PROVINCE)



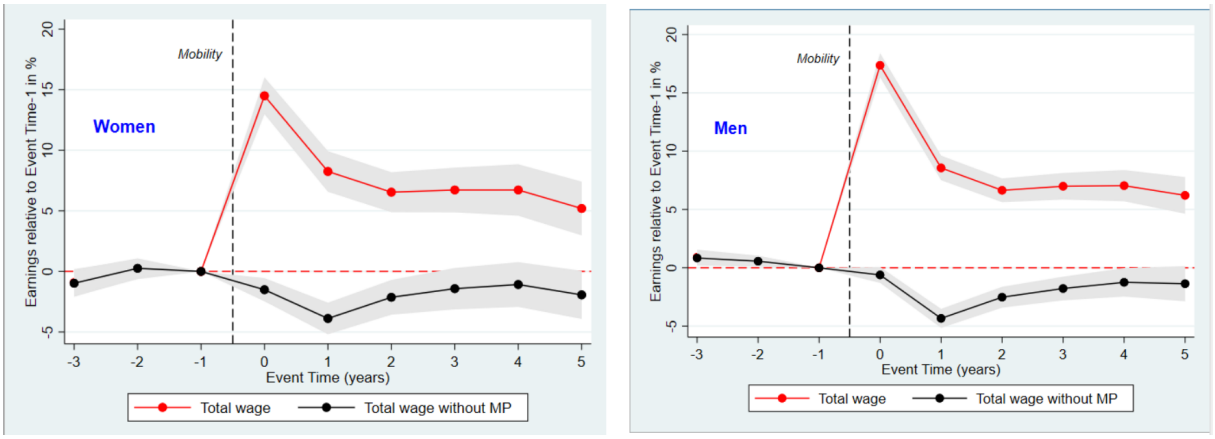
Event study with individual, location and year fixed effects. Control variables: logarithm of working time and tenure, marital status, presence of dependent children, firm division. The shaded area give the 95 percent confidence interval.

FIGURE 16. EVENT STUDY (JOB + RESIDENTIAL MOBILITY VS. NO MOBILITY) (FROM PROVINCE TO PARIS)



Event study with individual, location and year fixed effects. Control variables: logarithm of working time and tenure, marital status, presence of dependent children, firm division. The shaded area give the 95 percent confidence interval.

FIGURE 17. EVENT STUDY (JOB + RESIDENTIAL MOBILITY VS. NO MOBILITY) (FROM PROVINCE TO PROVINCE)



Event study with individual, location and year fixed effects. Control variables: logarithm of working time and tenure, marital status, presence of dependent children, firm division. The shaded area give the 95 percent confidence interval.

Table 14. Multinomial probit - marginal effects - All

	No mobility	Job mobility only	Job + residential mobility
Individual characteristics			
Female	0.00797	-0.000752	-0.00722
	(0.00457)	(0.00290)	(0.00369)
Age	0.00171***	0.000502*	-0.00221***
	(0.000382)	(0.000199)	(0.000337)
Tenure	-0.0439***	0.0106***	0.0333***
	(0.00196)	(0.000822)	(0.00192)
Tenure^2	0.00283***	-0.000571***	-0.00226***
	(0.000178)	(0.0000587)	(0.000180)
1 child	0.00893*	0.00192	-0.0109**
	(0.00420)	(0.00269)	(0.00333)
2^+ children	0.0158***	0.000525	-0.0163***
	(0.00410)	(0.00252)	(0.00333)
Couple	-0.00610	-0.000452	0.00655*
	(0.00367)	(0.00235)	(0.00293)
Education			
< Master	0.0111	-0.00205	-0.00901
	(0.00658)	(0.00384)	(0.00547)
Master level	0.00160	0.000436	-0.00204
	(0.00395)	(0.00238)	(0.00326)
Business school	0.00417	0.000630	-0.00480
	(0.00703)	(0.00403)	(0.00585)
Top 20 Engineer school	-0.00155	-0.00137	0.00292
	(0.00492)	(0.00316)	(0.00392)
Top 10 Engineer school	-0.00557	0.000664	0.00491
	(0.00552)	(0.00356)	(0.00435)
Top 5 Engineer school	-0.00423	0.00226	0.00197
	(0.00563)	(0.00324)	(0.00470)
PhD	-0.00883	0.00223	0.00661
	(0.00532)	(0.00281)	(0.00461)
Residential municipality characteristics			
log(average rent)	-0.0789***	0.0418***	0.0371**
	(0.0143)	(0.00834)	(0.0113)
Local center	-0.0693***	0.0244***	0.0449***
	(0.00999)	(0.00684)	(0.00817)
Intermediate center	-0.0603***	0.0294***	0.0309***
	(0.00707)	(0.00400)	(0.00613)
Structural center	0.0152*	0.0124***	-0.0276***
	(0.00657)	(0.00310)	(0.00568)
Major center: Paris	0.00940	0.0241***	-0.0335***
	(0.00751)	(0.00452)	(0.00584)
Major center: Lyon	-0.109***	0.0663***	0.0427***
	(0.00972)	(0.00715)	(0.00777)
Major center: Marseille	-0.0166	-0.00312	0.0197*
	(0.00921)	(0.00365)	(0.00852)
Workplace environment			
Exit rate of male workers	-0.107	0.0942	0.0127
	(0.109)	(0.0554)	(0.0961)
Average Hello mobility premium	0.264***	-0.300***	0.0356***
	(0.0444)	(0.0506)	(0.00639)
Gender ratio $< Q1$	-0.0374***	0.00991**	0.0275***
	(0.00613)	(0.00356)	(0.00505)
$[Q1 - Q2[$	0.0101	-0.00994**	-0.000168
	(0.00566)	(0.00306)	(0.00462)
Over Q3	0.00494	-0.00672	0.00178
	(0.00623)	(0.00444)	(0.00449)
Year dummies		YES	
Division dummies		YES	
Size of plants dummies		YES	

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Inrae (2020) amenity-based municipality classification. Average "Hello mobility premium" excluding the observed worker. Refrencence factors for family size : no child. Reference factor for Education : Engineer. Reference factor for Access to amenities: Other Major Centers. Reference factor for couple status : single.