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# The outsourcing wage penalty along the wage distribution by gender

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# The outsourcing wage penalty along the wage distribution by gender

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## **Abstract**

This paper studies if and to what extent the outsourced status entails a wage penalty for workers during the period 2005–2019 in France and how these differences vary between genders. Our findings show that workers in outsourced jobs suffer a wage penalty which is higher for female workers compared to male ones. The outsourcing penalty does not depend on part-time arrangements, the repetitive nature of the job nor sector of employment. The effect of these covariates adds to the direct effect, but only for female workers. The longitudinal analysis reinforces cross-sectional results: the outsourcing wage penalty is not due to changes in individual characteristics of the workers, but to differences in the job status and time-invariant characteristics between them. Overall, being an outsourced worker implies a worsening in the wage treatment and the gender gaps which, considering the expansion of this practice, lead to important policy issues.

**Keywords:** subcontracting, gender gap, wages, labour market

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## Executive summary

This paper studies if and to what extent the outsourced status entails a wage penalty for workers during the period 2005–2019 in France and how these differences vary between genders. We restrict our attention to the domestic outsourcing of service activities – that is, when a firm contracts out some labour services to other entities located in the same country. Using data from the Enquête Complémentaire Emploi: Conditions de Travail, we explore wage differentials using both pooled cross-sectional data and the longitudinal character of the sample. More specifically, our contribution is threefold. First, unlike most of the existing literature, we not only focus on the bottom of the occupational structure, but also look at the process of outsourcing that involves occupations at the middle and top of the professional hierarchy (e.g. IT engineers, lawyers). This type of analysis makes it possible to assess whether there are significant variations in the modalities through which the wage penalty, if any, operates across the occupational distribution.

Second, thanks to the richness of the data employed, we control not only for the individual characteristics of outsourced/non-outsourced workers, but also for different indicators that detail the contractual arrangement and the organisational practices prevailing at the workplace. The latter is relevant because it addresses one of the critiques formulated by Goldschmidt and Schmieder (2017), according to whom part of the outsourcing wage penalty could be imputable to differences in the job characteristics (i.e. tasks) of the outsourced vs non-outsourced workers. By considering the working methods characterising individuals' work activities, it is possible to assess whether wage differentials are attributable to differences in tasks between types of workers.

Third, we study whether there are substantial differences in the wage penalties between male and female workers. As has been widely documented by the literature, female workers are often in a more vulnerable position than men in the labour market. Given the expansion of outsourcing in contemporary economies, the existence of gender differences in the wage penalty could amplify the existing and already vast gender disparities. This topic becomes even more relevant because it has been largely overlooked by the existing literature.

According to our findings, workers in outsourced jobs suffer a wage penalty which is higher for female workers compared to male ones. The outsourcing penalty does not depend on part-time arrangements, the repetitive nature of the job nor sector of employment. The effect of these covariates adds to the direct effect, but only for female workers. The longitudinal analysis shows that the outsourcing wage penalty is not due to changes in individual characteristics of the workers, but to differences in the job status and time-invariant characteristics between workers, reinforcing cross-sectional results. Overall, these results reinforce the idea that being an outsourced worker implies, *ceteris paribus*, a worsening in the wage treatment and the gender gaps which, considering the expansion of this practice, lead to important policy issues.

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## 1 Introduction

Outsourcing is a key feature of contemporary economies. The aggregate evidence reveals a process of increasing fragmentation characterised by firms contracting out some service activities to external providers, such as other firms or autonomous workers (Weil, 2014). According to Berlinghieri (2013), outsourcing plays a pivotal role in explaining structural change, from manufacturing to the service sector. The study shows that 90% of the total output from professional and business services is absorbed as intermediaries rather than final demand. While not all scholars assign to outsourcing the same importance in shaping structural change at sectoral level (for a more nuanced interpretation of the phenomenon, see Duernecker and Herrendorf, 2021), it is undeniable that outsourcing has expanded over the last decades becoming a key characteristic of contemporary labour markets (Dey et al., 2013; Katz and Krueger, 2019).

Given its relevance, the process of outsourcing has attracted the attention of numerous scholars who have studied the wage penalty in outsourcing using industry-occupational-level data (Dube and Kaplan, 2010) and/or event studies (Goldschmidt and Schmieder, 2017; Bilal and Lhuillier, 2021; Deibler 2021).<sup>1</sup> The existing literature quite unanimously finds that outsourced workers are subject to lower pay than their in-house peers. Despite this evidence, this topic still deserves attention as there are open issues yet to be investigated. This paper contributes to three fronts using both cross-sectional and longitudinal techniques.

First, unlike most of the existing literature, we not only focus on the bottom of the occupational structure, but also look at the process of outsourcing that involves occupations at the middle and top of the professional hierarchy (e.g. IT engineers, lawyers).<sup>2</sup> This type of analysis makes it possible to assess whether there are significant variations in the modalities through which the wage penalty, if any, operates across the occupational distribution.

Second, thanks to the richness of the data employed, we control not only for the individual characteristics of outsourced/non-outsourced workers, but also for different indicators that detail the contractual arrangement and the organisational practices prevailing at the workplace. The latter is relevant because it addresses one of the critiques formulated by Goldschmidt and Schmieder (2017), according to whom part of the outsourcing wage penalty could be imputable to differences in the job characteristics (i.e. tasks) of the outsourced vs non-outsourced workers. By considering the working methods characterising individuals' work activities, it is possible to assess whether wage differentials are attributable to differences in tasks between types of workers.

Third, we study whether there are substantial differences in the wage penalties between male and female workers. As has been widely documented by the literature, female workers are often in a more vulnerable position than men in the labour market. Given the expansion of outsourcing in contemporary economies, the existence of gender differences in the wage penalty could amplify the existing and already vast gender disparities. This topic becomes even more relevant because it has been largely overlooked by the existing literature.

Using data from the *Enquête Complémentaire Emploi: Conditions de travail* (Complementary Survey of Employment: Working Conditions) we perform a cross-sectional analysis using surveys for the years 2005, 2013, 2016 and 2019. Moreover, the structure of the survey over time makes it possible to perform a longitudinal analysis from 2013 to 2019, which allows us to control for time-variant and invariant individual characteristics.

After this introduction, in Section 2 we review the relevant literature on outsourcing and wages, highlighting the limitations of the existing studies and our contribution. Section 3 presents the

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<sup>1</sup> Like these scholars, in this study we restrict our attention to the domestic outsourcing of service activities, that is, when a firm contracts out some labour services to other entities located in the same country. This definition excludes the provision of intermediate goods from one sector to the final production stage in another country.

<sup>2</sup> Coherent with the 'jobs approach' (Wright and Dweyer, 2003; Hurley, John et al., 2013) we distinguish between occupations and jobs. A job is defined by the combination of a certain occupation in a given industry. Hence, clerks in the industry  $j$  will be in a different job from clerks in industry  $i$ . This classification makes it possible to exploit both the vertical division of labour (bottom-to-top occupations) and the horizontal division of labour (across industries).

methodology employed. We then present the econometric analysis – Section 5 – after a brief description of the database in Section 4. Finally, in Section 6 we conclude the paper, discussing the results and the main implications of the analysis.

## **2 Outsourcing and wages. A review of the literature**

Outsourcing is not an entirely new phenomenon, but its importance has been growing, also thanks to the deregulation of the labour markets and the rise in technologies that expand the number of outsourceable jobs. From the perspective of the firms, some of the advantages of outsourcing are immediately visible. Outsourcing allows businesses to benefit from work executed in compliance with corporate objectives, while not being required to treat outsourced workers as their employees with the duties and obligations that this relationship would entail (Holst, 2013; Grimshaw et al., 2019; Weil, 2019).

In this section, we revise the literature that deals with the relationship between outsourcing and labour compensation (for an overview of the relationship between outsourcing and other spheres, see Vrangbæk et al., 2015), with special attention paid to the identification strategies used to capture outsourced labour.

While outsourcing is conceptually easy to understand, it presents several complexities when it comes to its empirical operationalisation. Intersectoral linkages provided by input-output tables are best suited to measure the relevance of outsourcing practices at aggregate level. At the same time, data built on productive interlinkages are unable to identify the multifaceted effects of outsourcing practices at micro-level. Other studies employ survey data to account for apparent differences in employment characteristics between sectors intended as service providers and sectors specialised in the production of final goods (OECD, 2021). However, this evidence fails to account for the degree of productive integration, therefore resulting in broad – if not biased – estimates. Perhaps for this reason, the initial contributions on the topic are typically case studies which focus on the experience of outsourcing local services from public to contracted private companies (Kavanagh and Parker, 2000; Gustafsson and Saksvik, 2005; Bel and Costas, 2006; Cunningham and James, 2009). Despite the variety of the contexts analysed, these papers find that the shift towards the private sector generally involved a worsening of the compensation and working conditions (Cunningham and James, 2009). However, these studies only provide a narrow perspective on the phenomenon and usually do not consider the process of outsourcing that takes place within the private sector.

One ground-breaking contribution that provides an expansion of the focus is represented by the work of Dube and Kaplan (2010). Their empirical strategy is relatively simple but, at the same time, effective. The authors focus on two occupations, janitors and guards (that are viewed as highly outsourced occupations) and establish that a janitor (guard) is to be considered outsourced when they are employed in the service to buildings and dwelling industry (protective service industry) yet should be considered in-house when they are employed in other industries. This is because janitors (guards) employed in the service to buildings and dwelling industry (protective service industry) necessarily provide services only to other industries as intermediate production inputs rather than producing final demand. In this way, the authors obtain two groups of janitors (guards): in-house and outsourced workers. Virtually, this approach has the advantage of capturing the whole population of a given occupation, thus allowing more general conclusions to be reached. Despite Dube and Kaplan only focussing on two occupations, it is also possible to expand the focus to other categories.

Berlinski (2008) employs a narrower strategy to identify outsourced workers employed as cleaners and security guards. He uses American data from the ‘Contingent Workers and Alternative Employment Arrangements’ supplement of the Current Population Survey, which explicitly asks whether workers are employed by a company that contracts out their services. As in Dube and Kaplan (2010), he finds that outsourced cleaners and guards experience a wage penalty which is quantified to be between 15% and 17%. This strategy has the advantage of being extremely straightforward in the identification of outsourced workers. However, this type of questions is not common among labour force surveys. Moreover, this type of data has been criticised for not adequately capturing outsourced workers (Weil, 2019, p. 149–151).



Another group of authors employ study events to identify outsourced workers. This methodology usually consists in using administrative data to observe changes in the occupational structure at establishment level. The pioneers of this methodology are Goldschmidt and Schmieder (2017), who identify outsourced workers when at least 10 employees operating in an establishment A in time  $t$  work at  $t+1$  in an establishment B, which belongs to a service industry within food, cleaning, security, and logistics (FCSL) services. These authors apply this methodology to the case of Germany and find that that wage bill of workers employed in occupations subject to domestic outsourcing is, on average, 10–15% lower compared to workers in similar occupations directly employed by the leading firm.

Bilal and Lhuillier (2021), applying a similar identification strategy to French longitudinal administrative data, find that outsourcing events increase productivity and reduce the labour share at firm level. The same authors also highlight that the negative distributional impact can be mitigated without losing efficiency gains by means of an increase in the statutory minimum wage of around 9%. Note that, as in industry-level studies, these works also tend to focus on the outsourcing process of occupations at the bottom of the job ladder and do not consider what happens in industries others than that of FCSL.

These studies offer a very accurate methodology that explicitly accounts for causal inference, mapping the trajectory of the same (group of) worker(s) over time. However, by mapping only those workers who all move from one establishment to another in FCSL sectors, this methodology does not capture some outsourced services that do not follow this dynamic. For example, an establishment that, since its opening or once it expands its labour force, employs outsourced workers would not be captured in the methodology described by Goldschmidt and Schmieder (2017). Analogously, establishments that dismiss internal workers to employ 'other' workers from outsourced firms in FCSL industries would not be accounted for. Moreover, one drawback of this approach is that it offers limited replicability because data sources are scarce or are difficult to access.

Despite the differences in the identification of outsourced workers, the existing literature quite unanimously finds that outsourced workers suffer from a net loss in wages compared to non-outsourced colleagues. There are two common (and partly complementary) explanations behind this outcome. First, even though there may be relevant institutional differences in the implementation of outsourcing between countries (Grimshaw et al., 2015), it can be claimed that outsourced workers tend to enjoy fewer benefits compared to in-house workers, who usually have better collective agreements, wage and productivity premia, union protection, etc. Furthermore, outsourced workers are often more atomised than their in-house colleagues, which makes unionisation and wage bargaining more difficult (Segal and Sullivan, 1998; Dube and Kaplan, 2010).

Recently, to explain the rise in outsourcing and its effects on the employment structure, the standard theory on firm and transaction costs (Coase, 1937; Grossman and Hart, 1986) has been integrated into the tasks approach (Autor et al., 2003). From this perspective, the choice to 'make or buy' a certain service depends on the degree of standardisation and codifiability of job tasks needed to produce goods and services to be exchanged. For instance, the more job tasks can be codifiable into routines, the lower the transaction costs related to their contracting-out. It then follows that those jobs characterised by a high level of routine are those more likely to be outsourced. Recent studies empirically confirm this hypothesis (Costinot, Oldenski and Rauch, 2011; Marcolin, Miroudot and Squicciarini, 2019). An important consequence is that, according to the standard tasks approach, the more routine, the lower the wage associated with the specific job because of the high degree of substitutability with machines or – as in the case of outsourcing – with production fragmentation to specifically reduce the wage bill. From this perspective, it becomes crucial to assess the wage differentials between outsourced and non-outsourced workers considering the role played by jobs characteristics. If there are no relevant differences in organisational methods between the two groups of workers, then it can be concluded that these cannot explain the wage differentials between workers. However, both administrative datasets and most of the surveys on working conditions do not simultaneously provide information on jobs characteristics and wages, making it difficult to explore this relationship. In fact, to the best of our knowledge, there are no studies that explicitly consider this aspect.

This issue was also mentioned by Goldschmidt and Schmieder (Goldschmidt and Schmieder, 2017) as one of the shortcomings of Dube and Kaplan's (Dube and Kaplan, 2010) methodology. They recognised that

the identification strategy applied by Dube and Kaplan provides a more general scope than event studies, but they argue that not including job characteristics indicating the type of tasks performed by outsourced workers – and therefore impacting on wage differentials – could lead to biased estimates:

Although the Dube-Kaplan approach likely covers the effect of outsourcing more generally and offers higher external validity than the on-site outsourcing estimates, the downside is that ... in this type of estimation we have no information about job or workplace characteristics. To the extent that job characteristics are worse at business service firms, this could lead to an underestimate of the true loss in compensation or utility (Goldschmidt and Schmieder, 2017, p. 1194).

As will be discussed further below, our paper tackles precisely this issue. Given the richness of our database, we are able to consider the job characteristics (i.e. organisational methods) for the workers, which helps to eliminate potential biases in the estimations of the compensation differentials.

As can be appreciated, the existing literature mostly focuses on the outsourcing of jobs and occupations at the bottom of the job pyramid. Although it is true that these are the occupational profiles most affected by outsourcing, in recent times, other categories of workers (e.g. IT engineers or technicians) have also been experiencing this. In this vein, the already mentioned Goldschmidt and Schmieder (2017) include – in the supplementary material to the main paper – workers in accounting, IT, advertising, office, assistant and consulting occupations employed by business services firms and find heterogeneous effects depending on the group of workers at the top or bottom of the occupational distribution. Although the authors did not provide a detailed explanation for such heterogeneity, some interpretations may be put forward. For example, the incentive to subcontract high-tech or high-value administrative services may differ from that related to the outsourcing of cleaning activities. In the former case, it could be that firms may find it convenient to contract out in order not to incur conspicuous investments, i.e. software or other types of infrastructures to expand internal capabilities. On the contrary, in the second case, labour cost reduction may dominate the set of incentives. In other cases, the discontinuity or unpredictability of some operations may induce firms to outsource them. This may be the case for legal activities, whose demand is restricted to special or unpredicted circumstances.

These examples show that different mechanisms can justify the choice of outsourcing. Hence, the effect on wages may differ across outsourced jobs. This paper contributes to this issue, establishing the extent to which a different wage penalty exists within the job pyramid and therefore wage distributions, which are highly correlated with the former.

So far, we have dealt with the outsourcing wage penalty without explicitly considering the role played by gender. Nevertheless, the gender dimension has been widely explored in the labour market literature, and there is vast evidence that shows that gender is an important element in shaping labour relations. For example, women often suffer from worse working conditions in several indicators, such as pay (Fortin and Huberman, 2002; Perugini, Rakić and Vladisavljević, 2019), tasks (Piasna and Drahokoupil, 2017; Fana et al., 2021), participation in involuntary part-time (OECD, 2022) and pay premiums (Card et al., 2016). We expand this area of inquiry and investigate whether outsourced women suffer a bigger wage penalty compared to outsourced men. Should this be the case, outsourcing would act as an additional mechanism that widens the gender (pay) gap in the labour market. Hence, it is extremely relevant to assess the extent to which there are significant differences in the outsourcing pay gap between men and women.

Somehow surprisingly, the contributions on gender and outsourcing are rather scant. Some works have dealt with the process of international outsourcing (especially in developing countries) and how this may be associated with different gender relations. For example, Morgan, Heeks and Arun (2004) argue that the process of international outsourcing (facilitated by the rise in ICT technologies) offers opportunities for women in developing countries to participate in the labour market and be involved in enterprise. Other authors offer a more cautious view, as outsourced women may be exposed to discrimination and other penalisation mechanisms (Howcroft and Richardson, 2008).

These studies offer valuable insights to motivate our inquiry, especially because they make it possible to identify some criticalities related to the process of offshoring and its gender dimension. However, they say little about the focus of this paper, that is, the wage penalty arising from domestic outsourcing and whether this affects men and women differently. This issue is addressed only marginally by Dube and

Kaplan (2010), who find that the wage penalty is slightly larger among men for janitors, while women are more penalised in the case of guards. Besides this evidence, to the best of our knowledge there is a lack of contributions that systematically explore the potential gender differences in the wage penalty for outsourced workers. Establishing whether outsourced women suffer different wage penalties than outsourced men within the same job is one of the contributions of the present paper.

In conclusion to this section, the main contributions of this paper to the literature on outsourcing can be summed up as follows. First, we map a larger number of outsourced jobs. In contrast to most of the existing literature, the outsourced jobs do not exclusively include the bottom of the occupational pyramid. We hence map a broader range of outsourced jobs and workers to establish whether the penalty gap operates uniformly across the distribution of wages. Second, we study the outsourcing wage penalty, considering the individual tasks performed by workers within the same job. This allows us to address one of the main criticisms by Goldschmidt and Schmieder (2017) of Dube of Kaplan's (2010) work. If the wage penalty persists once controlling for individual jobs' characteristics, then it is to exclude job's characteristics as responsible for the wage gap. Finally, this analysis explicitly considers the gender dimension. We therefore assess whether a wage penalty associated with an outsourced status exists and the extent to which this penalty acts as a booster for gender (pay) gaps in France.

### **3 Data and methodology**

Our data source is the French Enquête Complémentaire Emploi: Conditions de travail (Complementary Survey of Employment: Working Conditions, EC hereafter), which is representative of the entire working population (employees or not) and has been developed since 1978 by the Direction de l'Animation de la Recherche, des Études et des Statistiques (Directorate for Research Animation, Studies and Statistics – DARES) of the French Ministry of Labour. The EC collects information at worker level on several dimensions: tasks performed; organisational methods; socio-demographic characteristics; contractual arrangements; and wages. The main building blocks and questions of the EC have been maintained almost unaltered for all socio-demographic characteristics, wages and for organisational practices prevailing at the workplace. A detailed section on health and safety was introduced in 2013 but will not be covered since it is beyond the scope of our study. To classify workers within the employment structure, the survey details both the occupation and sector of employment at a very granular level. More specifically, it covers almost the entire spectrum of 4-digit occupations and economic sectors at 2-digit level, depending on the wave. For the sake of dynamic consistency in terms of the survey structure and available information, we restrict the analysis using four main waves: 2005, 2013, 2016 and 2019, the latest available wave. In the empirical analysis we use all waves cross-sectionally and explore the panel dimension of the last three for a complementary analysis.

The final database counts around 17,000 observations for each year, with 2013 reaching more than 26,000 observations. To build it we only excluded workers employed in the primary sector.

To characterise the outsourced status, we use the definition of jobs (Wright and Dwyer, 2003), that is, the combination of occupations within economic sectors. This definition bundles together the two main dimensions characterising the employment structure, namely the hierarchical/vertical division of labour (occupations) and the horizontal productive specialisation (economic sectors). As an example, a worker employed as a numerical clerk in the manufacturing of plastic goods has a different job than another employed as a numerical clerk in the insurance sector. Our final database counts 3 450 jobs in 2005 and 3 061 in 2019.

#### **3.1 Measures of outsourcing**

In this paper we define 'outsourced jobs' as those structurally providing labour services as intermediate inputs to other firms (for example, computer science engineer providing labour services in the health sector).

To classify jobs into outsourced and non-outsourced, we follow the list of outsourced jobs used in both the main text and the supplementary material to the paper by Goldschmidt and Schmieder (2017). Even though the main analysis of the paper only focused on a subset of outsourced jobs (concentrated at the

bottom of the wage distribution, i.e. logistics, services to building and landscape, food and cleaning services), the supplementary material recognises that outsourcing can affect the whole spectrum of jobs and occupations. Therefore, our classification includes all those jobs that have been identified as providers of services to other industries. As a result, this list also covers occupations within professional services like accounting, IT, advertising, consultancy. An advantage of this approach is that it deepens the understanding of the phenomenon, not constraining it to low-paid jobs. A detailed list of all jobs identified as outsourced is presented in Table A 1.

As mentioned, each outsourced job is the intersection between a specific occupation and a specific sector. From this definition it is possible to identify the 'outsourced sectors' (forth column of Table A1) as those activities structurally providing intermediate inputs to other sectors rather than producing final demand (Berlingieri, 2013) and 'potentially outsourced occupations' as those occupations that can more likely be contracted out by leading firms and be employed in outsourced sectors as just defined (second column of Table A1). As discussed below, these categories are useful as they allow an assessment of the extent to which the wage penalty associated with workers employed in a given occupation is driven by the sector of employment.

From a methodological point of view, considering the changes occurring in both occupation and sector classifications during the period analysed, we want to ensure that they do not affect the chosen definition of outsourced status. For this reason and to prevent a loss in the degree of granularity, we employ the original French occupational classifications (Professions et catégories socioprofessionnelles 2003) reported in all waves at 4-digit level. As regards industries, we use the Nomenclature d'activités française (NAF Rev. 2) that is equivalent to the international NACE Rev. 2 classification.<sup>3</sup> Since NAF Rev. 2 and NACE Rev. 2 coincide, in what follows we will refer to the international classification when discussing economic activities.

### **3.2 Wage measures**

Our main outcome variable is monthly wage. Although hourly wages are often used for similar studies, the EC does not allow the hourly rate to be computed from monthly wages. Nevertheless, we conceptually prefer monthly wages as they best capture workers' living standards. This measure accounts for the fact that part-time workers are often linked to lower standards of living (Franzini and Raitano, 2019). In particular, working hours should be understood as a mechanism for firms to adjust the quantity labour input, especially when the price of labour (hourly wages) cannot be modified, such as in the case of a mandatory minimum wage or collective agreements.

All data are reported at 2015 constant prices using the GDP deflator provided by Eurostat.

### **3.3 Measures of methods of work**

We use four task indicators to address the inclusion of job characteristics. As discussed above, a common critique of Dube and Kaplan's approach is that they do not include the tasks performed by the workers and this job characteristic may have a substantial effect on wages. Therefore, controlling for these factors is relevant to get rid of potential heterogeneity not already accounted for.

More specifically, the task indicators employed in this paper capture the methods of work (or organisational practices), that is, the way work is organised in terms of techno-social relations at workplace/establishment level. As shown in the literature (Freeman, Ganguli and Handel, 2020), the way in which tasks are performed are key attributes that need to be considered to control for heterogeneity characterising different types of jobs. Considering the methods of work is important as there may be relevant differences in the way work is performed, even within the same job (Bisello et al., 2021). For example, organisational practices like the repetitiveness of tasks, the forms of control may vary

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<sup>3</sup> In the 2005 edition of the EC, economic activities are listed following the NAF Rev. 1 classification. To ensure consistency across waves, we use the conversion tables between NAF Rev. 2 and NAF Rev. 1 at 4-digit to establish which sector overlaps in 2005 with those chosen for 2016.

depending on technological factors as well as social relations prevailing at the workplace. This heterogeneity can be accentuated even more between sectors for identical occupations, e.g. cleaners in automotive manufacturing compared to cleaners employed in the wholesale retail (Bisello et al., 2021). For this reason, a jobs-based approach is preferable to a broader occupational perspective which would not capture these potential differences between industries. Finally, in contrast with that assumed by a large strand of empirical contributions dealing with structural change and outsourcing, methods of work change over time as shown by some recent studies (Bisello et al., 2019; Fana and Giangregorio, 2021). Unlike most of the task literature (Autor and Handel, 2013), the structure of the EC makes it possible to capture the evolution of the organisational practices (and the other variables of interest) over time so as to explore its time variability.

In our setting, methods of work are operationalised using four main variables. Three of them relate to the concept of routine and refer 'to the degree of repetitiveness and standardisation of the work processes' (Fernández-Macías and Bisello, 2022). The first indicator – repetitiveness – captures the extent to which the execution of one's work implies the continuous repetition of gestures or operations. Standardisation measures are then the extent to which work execution follows pre-codified standards and procedures (Braverman, 1974; Edwards, 1982). Using the information provided in the EC and following Fana et al. (2021) and Fana and Giangregorio (2021), it is possible to build two indicators that capture the degree of labour-process standardisation: the first is technical control, which measures whether the pace and rhythm of work are manipulated by the automatic cadence of a part or movement of a machine; the second is digital control, encompassing digital monitoring, that is, whether the pace of work is imposed on workers by computerised tracking and monitoring systems and whether the worker has to achieve specified quantifiable objectives. The fourth variable is a dummy, which grasps whether the worker is endowed with managing and coordinating roles, that is whether he/she supervises and/or gives orders to other employees. This indicator makes it possible to capture potential wage differentials related to the performance of coordinating and managerial roles.

#### **4 Descriptive statistics**

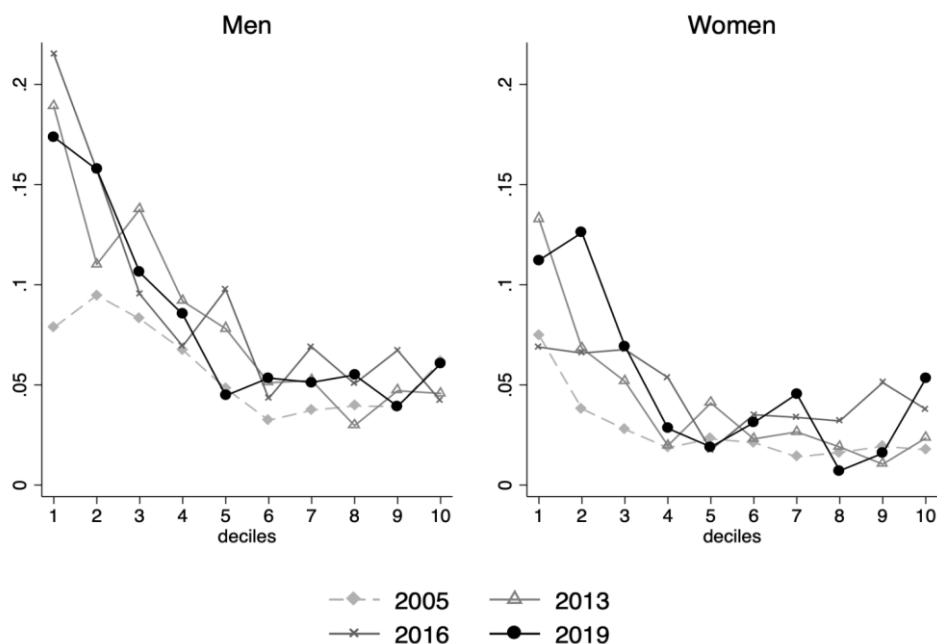
This section presents some descriptive statistics related to the main variables of interest used in the empirical exercise. First, during the period 2005–2019, the share of outsourced jobs over total employment increased from 4.4% in 2005 to 6.6% in 2019. The same trend is confirmed from a gender perspective: men employed in outsourced jobs increased from 5.5% to 7.3%, while women almost doubled from 3.2% in 2005 to 5.9% in 2019.

In turn, although our operationalisation of outsourcing covers jobs throughout the entire job matrix, it is likely that we underestimate the actual outsourced employment share. This is because we only consider specific occupations rather than the entire occupational structure belonging to that given sector. This means that, for example, a numerical clerk employed in warehouse activities is not considered an outsourced worker despite being employed in a sector considered as outsourced. In this case, the worker may provide labour services to the leading firm or may contribute to the needs of their employer's firm or establishment. Instead, if we consider all employment in sectors defined as providers of labour services as outsourced, a second measure discussed in the methodological section, the share of outsourced employment ranges between 10% and almost 12% during the period under investigation, compared to 6.64% for our main measure (outsourced job). Similarly, when we classify those occupations that are typically affected by the outsourcing process (e.g. cleaners) as potentially outsourced independent of the sector of occupation, for example, the share of outsourced workers ranges between 29% and 31%.

Looking at the dynamic picture (Figure 1), the increase in employment referring to outsourced jobs over time is heterogeneously distributed along wage percentiles. However, although the expansion of outsourced jobs involves all percentiles, most of this increase is concentrated at the bottom of the wage distribution: around 13% of total employment in the 1st decile is represented by outsourced jobs during the last period, while it was 7% in 2005. As emerges from Figure 1, the share of outsourced jobs along the first six wage deciles is quite low, while it increases slightly above this threshold.

The analysis by gender highlights a similar qualitative trend, but female workers tend to be less likely employed in outsourced jobs than men. The share of outsourced workers in the 1st decile among men is around 17% in 2019 compared to 11% of women.

Figure 1. Share of outsourced jobs by deciles of wages and years



Source: Authors' elaboration on EC 2005, 2013, 2016 and 2019 data.

Table 1 shows that there are significant differences in the gender composition between wage deciles over time. Men tend to increase in relevance as we move towards the top of the distribution of wages regardless of the outsourced status. This trend reflects the fact that men have, on average, higher pay than women. Interestingly, moving to higher deciles, the predominance of male workers in outsourced occupations is stronger than in non-outsourced jobs, suggesting that men have a higher propensity to be employed in outsourced jobs than women, especially in highly paid jobs.

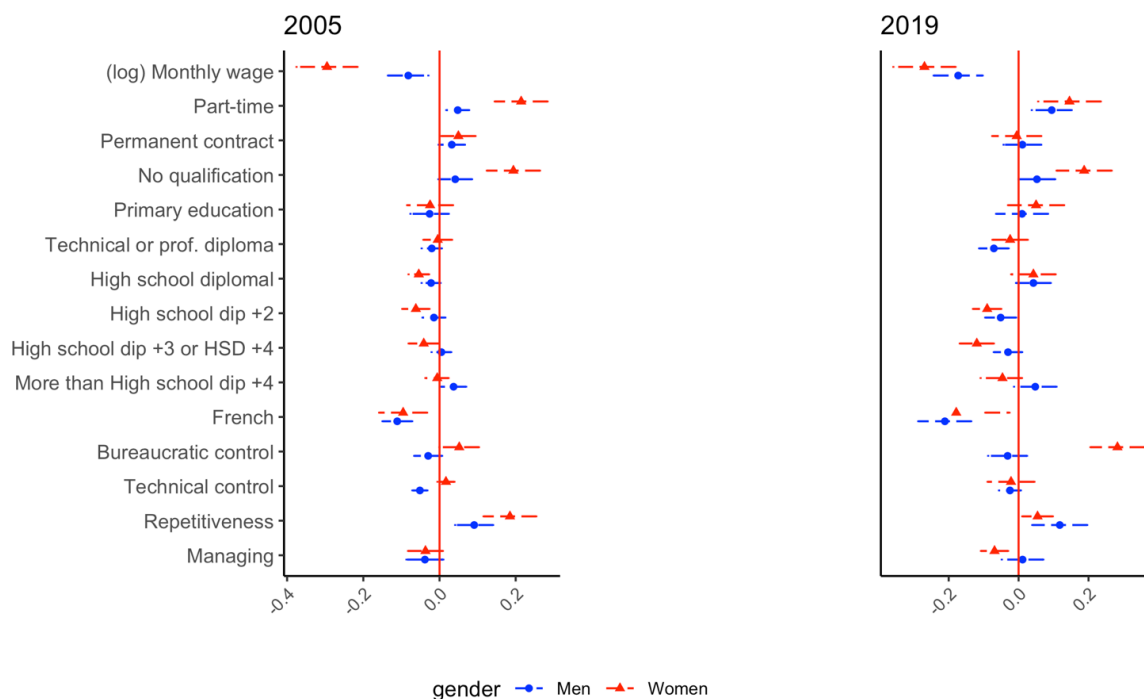
Table 1. Share of men by year and outsourced status across wage deciles, 2005–2019

decile	2005		2013		2016		2019	
	Non-outsourced	Outsourced	Non-outsourced	Outsourced	Non-outsourced	Outsourced	Non-outsourced	Outsourced
1	28%	29%	21%	29%	18%	45%	24%	34%
2	28%	50%	27%	38%	30%	54%	37%	43%
3	44%	72%	40%	66%	43%	53%	42%	53%
4	52%	81%	50%	83%	45%	52%	44%	72%
5	57%	74%	52%	68%	46%	84%	49%	70%
6	58%	68%	53%	72%	55%	60%	52%	66%
7	58%	79%	54%	71%	59%	75%	60%	63%
8	58%	78%	56%	67%	61%	72%	58%	92%
9	63%	77%	59%	87%	59%	63%	63%	81%
10	72%	90%	69%	82%	67%	74%	69%	72%

To approach the differences between outsourced and non-outsourced jobs by gender, Figure 2 presents the gap in terms of wage (in logs), socio-demographic characteristics and work organisation between the two groups at two different points in time and by gender.

As expected, outsourced workers earn, on average, significantly lower wages than in-house peers. Notably, while women were strongly penalised compared to men in 2005, (-29 pp versus -8 pp, respectively), in 2019 the wage penalty worsened for outsourced male workers – getting closer to the female counterpart – while remaining substantially unchanged for women (-17 pp and -27 pp respectively).

Figure 2. Differences between in-house and outsourced jobs in 2005 and 2016 by gender



Note: Coefficients above (below) the zero line show a positive (negative) difference in the mean between outsourced and non-outsourced jobs. Dashed lines capture the confidence intervals at the 95% significance level. Source: Authors' elaboration on EC 2005 and 2019 data. T-test coefficients and confidence intervals at 95% statistical significance.

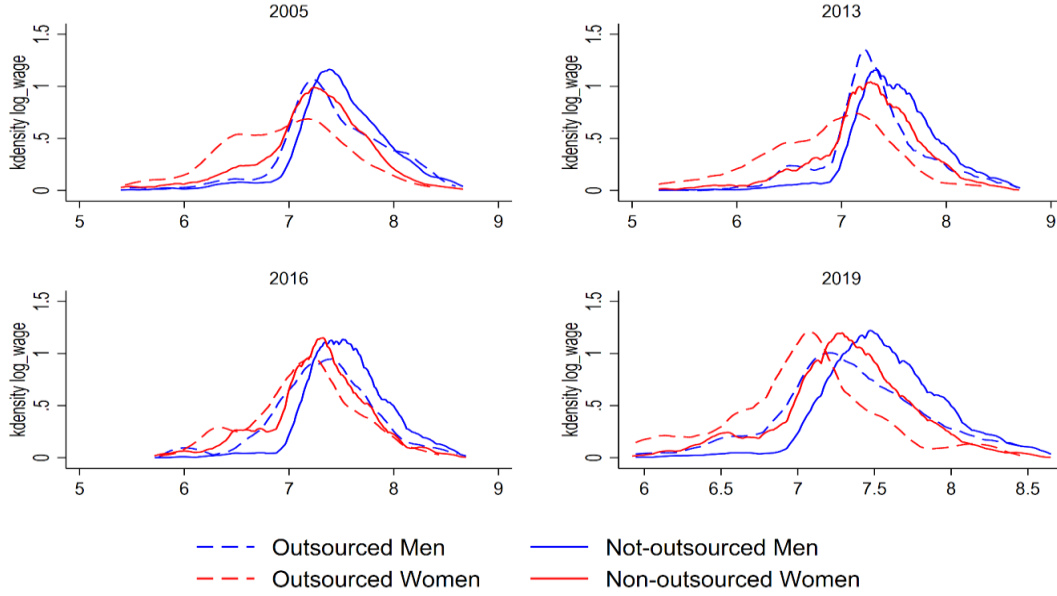
Furthermore, outsourced workers are more often employed in part-time work arrangements. Interestingly but somehow unexpectedly, outsourced workers – independently of gender – are not significantly characterised by less permanent contracts compared to the in-house workers in both 2005 and 2019. Regardless of the period and with minor gender differences, French workers are less likely to be outsourced as the share of foreigners is significantly higher among the outsourced compared to the in-house workers. This aspect may reflect a further mechanism of labour market segmentation, as discussed in Piro and Sacchetto (2021). Since foreign workers are often segregated in the less rewarding employments, their increased presence in outsourced jobs is understandable. In terms of education, the share of unqualified outsourced workers tended to be significantly higher compared to in-house workers, especially for women: in 2005, the share of outsourced workers without any qualifications was 20 pp (5 pp for men) more than in-house counterparts.

Considering organisational methods, both male and female outsourced workers are characterised by significantly higher levels of job repetitiveness in both periods. Outsourced female workers are also characterised by significantly higher rates of digital control compared to in-house peers, suggesting that outsourced female workers also tend to be highly standardised. Theoretically, one potential reason why outsourced workers earn lower wages is because the organisation of work characterising firms providing labour services to other entities is more repetitive and standardised than firms producing in-house. Within this framework, coherent with the standard tasks approach (but not only), more repetitive jobs may be more likely to be outsourced in firms operating within low-rent sectors.

Finally, we plot the wage density for in-house and outsourced workers by gender – Figure 3 – observing how the wage penalty between in-house and outsourced workers and gender increases over time. The distance between the outsourced and in-house curves for men at the lowest tail starts widening in 2013,

which may suggest that one mechanism firms adopted to reduce labour costs is subcontracting, which allowed them to restructure the labour force by compressing labour costs to better deal with the economic crisis. This pattern continues to worsen until 2019, where the outsourced workers' distribution clearly lags behind that of the in-house, with outsourced female workers earning the lowest wages.

Figure 3. Kernel density log wage by gender and years



## 5 Econometric exercise

In this section we address the main research question of the paper econometrically, that is, whether being an outsourced workers is associated with lower wages and whether this effect varies by gender. The decision to look at this relationship distinguished by gender is mostly motivated by the asymmetric distribution of genders across jobs and the concentration of female workers in low-paid ones (Coudin, Maillard and Tô, 2018; Fana, Villani and Bisello, 2021). As shown in the previous section, this is the case in France, where women prevail in the lowest two deciles of the wage distribution.

To look at this relationship, we estimate the effect of interest conditional on a set of explanatory variables capturing individual characteristics and contractual arrangement and organisational practices prevailing at the workplace of employment.

Formally, in our baseline estimate we use the following wage regression:

$$\begin{aligned} \text{Log Wage}_i = & \alpha_i + \beta_1 \text{Outsourced Job}_i + \beta_2 X_i + \beta_3 \text{Part Time}_i + \beta_4 \text{Contract}_i + \gamma_1 \text{Work Org}_i \\ & + \mu_1 \text{Sector}_i + \mu_2 \text{Year} + \mu_3 \text{Region} + \varepsilon_i \end{aligned}$$

The coefficient of main interest is  $\beta_1$  associated with the dummy variable capturing whether individual  $i$  is employed in an outsourced job or not, as defined in Section 3. This term accounts for the wage penalty for being a worker employed in an outsourced job, compared to a worker employed in-house. As regards the other explanatory variables,  $X_i$  includes nationality and education level as the main supply-side controls, while  $\beta_3$  and  $\beta_4$  capture the effect of being a part-time worker and being employed under a fixed-term contract, respectively. The term  $\text{WorkOrg}_i$  accounts for the vectors of tasks related to the work organisation at the workplace, namely repetitiveness, digital and technical control and whether the worker has a supervisory role. As discussed above, the inclusion of organisational methods as independent variables in our econometric specification is one of the main original contributions by our paper to the



strand of literature spurring from the seminal work by Dube and Kaplan (2010). In doing so, we consider an important source of heterogeneity between outsourced and non-outsourced workers whose exclusion has been considered a limitation of this strand of studies, as discussed in Goldschmidt and Schmieder (2017).

The outsourcing effect can be heterogeneous across sectors. This heterogeneity stems from the different incentives to subcontract services, but also from the different activities and functions that can be contracted out, which can vary between sectors. For example, a given firm may decide to contract out because it lacks internal capabilities for highly technical functions (e.g. programming, advertising, data storage, etc.), while another one may outsource ancillary processes because of cost compression. To account for differences between economic activities, we include sectors' fixed effects using NACE Rev. 2 two-digit level.<sup>4</sup> To control for the temporal effects in the pooled model, we add years' fixed effects. Finally, we control for territorial economic differences which may affect both labour supply and economic activity, including regional fixed effects.

The full outcomes from the stepwise regression by gender are reported in Table A 2 and Table A 3 in the Appendix, while Table 2Table 1 reports the full baseline specification. According to the stepwise results, male workers employed in outsourced jobs suffer a significant wage penalty ranging from 16.6% to 9.6% once all regressors are included. The values of the  $\beta_1$  coefficient for women is equally significant and even more pronounced than that of male workers, ranging from -27.5% without any control to -11.7% in the full specification.

The gender difference in wage penalty associated with the outsourced status is the first relevant finding of our study. A possible interpretation spurs from the heterogeneous gender composition across the wage distribution and the association between low-paid gendered jobs and outsourcing. From Table 1 in Section 4, we know that the share of female workers in low-paid outsourced jobs is higher than the average share of female employment. This evidence may explain why the wage penalty for women is higher. Therefore, the outsourcing process is an additional mechanism perpetrating the gender pay gap originating in the horizontal (and vertical) segregation in the labour market.

The reduction in magnitude of the wage penalty as long as other explanatory variables are added highlights the importance of accounting for different sources of heterogeneity related to the individual and contractual characteristics as well as organisational methods prevailing at the workplace of employment. The sign of other explanatory variables is the same for both male and female workers, although their contribution differs, even substantially, in magnitude. As expected, being a part-time worker has a strong negative effect on the wage level and the same applies for those employed under contractual arrangements other than open-ended ones. Coefficients associated with organisational methods are mostly statistically significant, although their effect is diverse. As expected, we find that performing repetitive tasks is associated with lower wages. In particular, workers carrying out their duties in a more repetitive way suffer a significant wage penalty of around 11% in the case of male – against an average penalty of 8.4% for female – peers. Furthermore, the level of digital control is positively associated with monthly wages, while being subject to higher levels of technical control, resulting in a mildly negative wage effect but only in the case of male workers. Lastly, and in accordance with the hierarchical stratification within organisations, workers exercising supervisory roles earn, on average, more than their peers in a more subordinate position, without acknowledgeable differences by gender.

Regardless of the different magnitudes of the work organisation coefficients, it is important to highlight that the inclusion of these variables does not significantly alter the main results regarding the wage penalty for outsourced workers. This links to the paper's first contribution. The wage penalty persists even when controlling for individual tasks, contractual and organisational controls.

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<sup>4</sup> Conversion made on the 4-digit correspondence table. More specifically, from NACE Rev. 1 4-digit to NACE Rev. 2 2-digit, as explained in the methodological section.

*Table 2. OLS estimates of the wage penalty by gender, baseline specification*

	Men	Women
Outsourced job	-0.0959*** (0.0127)	-0.117*** (0.0158)
French=1	0.0260*** (0.00632)	0.0311*** (0.00650)
Part time=1	-0.531*** (0.0171)	-0.420*** (0.00763)
Temporary agency work	-0.104*** (0.0236)	-0.220*** (0.0306)
Apprenticeship contract	-0.744*** (0.0465)	-0.602*** (0.0330)
Other temporary	-0.263*** (0.0145)	-0.257*** (0.0108)
No contract	-0.522*** (0.0739)	-0.566*** (0.0574)
Repetitiveness	-0.110*** (0.00658)	-0.0844*** (0.00683)
Digital control	0.0957*** (0.00859)	0.102*** (0.00821)
Technical control	-0.0352*** (0.0118)	-0.00670 (0.0154)
Managing & coordinating	0.223*** (0.00729)	0.226*** (0.00872)
Education	Yes	Yes
Sector	Yes	Yes
Region	Yes	Yes
Year	Yes	Yes
Constant	6.301*** (1.091)	0.431 (1.163)
Observations	29,855	38,590
R-squared	0.463	0.510

*Note: Coefficients for supply-side controls, i.e. gender, education and nationality, are not reported. Regional fixed effects have been included at NUTS 1 level. Standard errors in parentheses \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

Taking stock of evidence from the baseline specification, we explore the joint effect of the outsourced status and three other major explanatory factors. The first is working time, which is a crucial determinant for monthly wages. At the same time, working-time arrangements are the most powerful and least regulated mechanism that firms can use to adjust labour costs (and work intensity), when needed under subcontracting regimes, in particular, so outsourced workers may have a higher propensity to be employed in part-time jobs (Lizé, 2021). Therefore, one possible mechanism explaining the outsourcing wage penalty may simply be the difference in working time between workers regardless of the outsourced

status. If this is true, then outsourcing will affect wages via working time and would not represent, in itself, a negative factor in the determination of wages.

We then test whether the wage penalty associated with outsourcing is driven by the degree of repetitiveness characterising the work organisation of a specific job at the individual level.

According to the task approach, the choice to ‘make or buy’ a certain service depends on the level of routine of job tasks needed to produce goods and services to be exchanged. Since repetitiveness is a necessary attribute of routine (Becker, 2005), the higher the repetitiveness the lower the transaction costs related to its contracting-out. An important consequence of this claim is that the degree of repetitiveness should be associated with lower wages because of the higher likelihood to contract out to reduce the wage bill.

The third mechanism that we consider is the sector of employment, as already investigated by Dube and Kaplan (2010). In fact, it could be that firms relying on outsourcing are concentrated in low-value-rent sectors which are already characterised by lower wages. If this is the case, the wage penalty should also apply to all occupations, defined as potentially outsourced and in-house, belonging to those specific sectors. In other words, if the wage penalty is associated with a low-rent characteristic of the outsourcing sectors, all employees should suffer a penalty regardless of their specific status and occupation (Dube and Kaplan, 2010). In our case, we cannot refer to low-rent sectors unless we include in this definition economic activities usually referred to as knowledge-intensive services like IT services, advertising, legal and accounting consultancy. We therefore explore the interaction between outsourced sectors (as defined in Section 3 and listed in column four of Table A2) and potentially outsourced occupations.

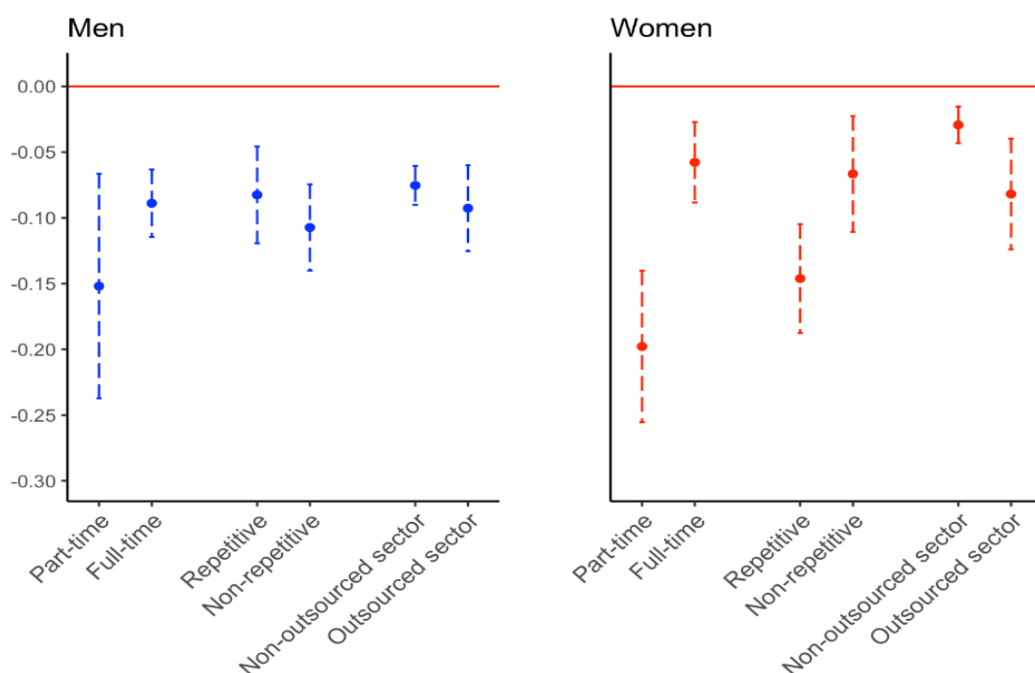
To test these hypotheses, we replicate – by gender – the full baseline model with specific interaction terms. First, we add an interaction between our dummy for outsourced jobs and a dummy capturing part-time contracts. Second, we interact the outsourced dummy with the repetitiveness indicator. Both specifications can be formally expressed as in equation 2 where the Variable of Interest may refer to part-time or repetitiveness. Third, we run an additional model testing the interaction between the dummy for employment in a potentially outsourced occupation (the second indicator for outsourced status, as outlined in Section 3) and the dummy for employment in an outsourced sector (eq. 3).

$$\text{LogWage}_i = \alpha_i + \beta_1 \text{Outsourced Job}_i * \text{Variable of Interest}_i + \beta_2 X_i + \beta_3 \text{Contract}_i + \gamma_1 \text{Work Org}_i + \mu_1 \text{Occ}_i + \eta \text{Year} + \theta \text{Reg} + \varepsilon_i \quad (\text{eq. 2})$$

$$\text{Log Wage}_i = \alpha_i + \theta_1 \text{Outsourced Occ}_i + \theta_2 \text{Outsourced Sector}_i + \theta_3 \text{Outsourced Sector}_i * \text{Outsourced Occ}_i + \beta_2 X_i + \beta_3 \text{Part Time}_i + \beta_4 \text{Contract}_i + \gamma_1 \text{Work Org}_i + \eta \text{Year}_i + \varepsilon_i \quad (\text{eq. 3})$$

Figure 4 reports contrasted margins for the interaction coefficients of equations 2 and 3. More specifically, the graph reports for each interaction the difference in log wage between outsourced workers and in-house ones. The full models and coefficients are reported in Table A 4 in the Appendix. In line with Dube and Kaplan (2010), our findings reject the hypothesis that working time is a driver of wage differences between in-house and outsourced male workers. Indeed, the wage penalty associated with the outsourced male workers (point estimate below the zero line) does not depend on their working hours, as the part-time and full-time estimates for the outsourced workers are both significantly below the zero line and not statistically different, as confirmed by the Wald test on the marginal estimates. On the other hand, the marginal effects for women suggest that working time further contributes to the wage penalty. In quantitative terms, outsourced female workers under a part-time scheme earn, on average, around 20% less compared to in-house, part-time workers, while outsourced female workers with full-time contracts experience a wage penalty of around 6% compared to their in-house peers. The Wald test on the difference between the two working-time arrangements is in this case statistically significant.

Figure 4. Average marginal effects for hypotheses testing by gender. In-house workers (baseline) vs outsourced workers



Note: Negative estimates mean that outsourced workers suffer a wage penalty compared to in-house workers. Non-significant differences for the driver under analysis (part-time, repetitiveness and sector) imply that such driver does not provide additional penalties to outsourcing. T-test for males estimates all reported non-significant differences between point estimates. The opposite applies for women.

A possible interpretation of these results is that, for men, there is a severe wage penalty spurring from outsourced status compared to average wages associated with jobs they are employed in, while the average pay for women is already low (also because they are more likely to be employed in low-paid jobs). In this context, being part-time workers produces an amplifier effect on the wage penalty.

As for the repetitiveness indicator, women performing repetitive tasks suffer a wage penalty of around 15% compared to in-house peers. On the contrary, the outsourced wage penalty for women employed in non-repetitive occupations is around 7% (compared to in-house workers). Furthermore, in this case, women performing repetitive tasks suffer an extra wage penalty on top of that associated with the outsourced status, with the t-test confirming the significance of such a difference. This is not the case for men, whose outsourcing wage penalty does not differ between repetitive and non-repetitive tasks.

Again, the gender heterogeneity can be due to how outsourced men and women are spread along the occupational distribution but also to forms of discrimination segregating women into more repetitive tasks, even within similar jobs, as already proved by Fana et al. (2021). We will later explore whether the gender difference still holds true along the entire wage distribution.

Lastly, we check if the wage penalty is associated with a specific feature of the outsourcing sectors to test whether firms providing outsourced services distribute lower rents in terms of wages despite being low-rent or knowledge intensive services. According to our results, men employed in a potentially outsourced occupation suffer a wage penalty regardless of the industry, in line with Dube and Kaplan's (2010) findings. On the contrary, there is a significant difference between outsourced and non-outsourced sectors for women, as confirmed by the Wald test and interaction estimate in Table A4. As in the case of part-time and repetitiveness, potentially outsourced female workers employed in an outsourced sector earn less than women employed in a potentially outsourced occupation in sectors not providing services to other industries as main mission. The sector in which outsourced women are employed adds to the direct wage penalty for outsourcing.

Overall, adding these three dimensions does not alter the overall results. The wage penalty is not the result of time arrangements, the repetitive content or the involvement in sectors more likely providing intermediaries to other firms. At best, these factors can amplify the wage penalty (especially for women), but do not represent the driving factor for the wage penalty.

### 5.1 Outsourcing effects along the wage distribution

As discussed in Section 3, the operationalisation of the outsourced status covers jobs along the entire wage distribution. It is reasonable to expect different wage effects depending on where a specific worker is located along the wage distribution. The qualitative and quantitative consequences of outsourcing may differ between cargo handlers and engineers and managers in the logistics sector. These differences are likely related to the different outsourced functions and incentives associated with the contracting-out of specific jobs. Workers at the bottom of the wage distribution are mostly linked to subcontracted ancillary functions with the aim of labour cost reduction. On the contrary, high-paid jobs may be contracted out for reasons such as the lack of capabilities, which are pivotal to competitiveness and the firm's performance. This would imply that workers in this position have stronger bargaining power, therefore avoiding wage penalties or even increasing their wage compared to in-house workers.

Thus, we explore whether and to what extent the coefficient associated with outsourced status differs between jobs located at different percentiles using the recentred influence function (RIF) approach (Firpo, Fortin and Lemieux, 2009, 2018). This econometric method allows us to understand how the outsourcing process affects monthly wages at different points of the wage distribution without conditioning on other covariates (for further details, refer to Firpo et al., 2009, 2018). We rely on the full-control baseline model and estimate the coefficients at the 10th, 50th and 90th percentiles; formally:

$$v(Fy) = E[RIF(y; v, Fy)] = E(\beta_1 \text{ Outsourced Job}) + E(\beta_2 X) + E(\beta_3 \text{ Labour}) + E(\gamma \text{ Work Org}) + E(\mu_1 \text{ Sector}) + E(\mu_2 \text{ Year}) + E(\mu_3 \text{ Region}) + E(\varepsilon) \quad (\text{eq. 4})$$

Where  $v(Fy)$  will be the 10th, 50th, and 90th percentiles and all other predictors are the same as the previous analysis.

The results, reported in Table 3, show that the coefficient associated with the outsourced status is monotonically decreasing along the wage distribution for both men and women, although women experience a stronger penalty at the bottom. More specifically, if the share of outsourced jobs for men doubles (increased by 100%), then the wage penalty will be -1.8% in the bottom 10th percentile. This penalty will be around -4% for women.<sup>5</sup> This stronger penalty for women in the bottom 10th percentile is likely explained by the occupational structure and outsourcing distribution, with a stronger concentration of women in the 1st decile of outsourced workers (Table 1). If women are employed in jobs with a higher likelihood of being outsourced compared to men, this may explain the stronger wage penalty at the bottom.

The results confirm that low-paid jobs are those most penalised by the outsourcing process. One potential reason could be due to the fact that these jobs are more likely to be less protected and unionised, such that they cannot be protected from wage downward pressures. On the contrary, high-paid jobs – mostly IT, consultants, law, accountants, etc. – are potentially able to exploit their higher bargaining power to capture some of the increased profits obtained by the outsourcing firms and avoid any wage penalty (Bergeaud et al., 2021).

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<sup>5</sup> In order to get the magnitude of the effect, it suffices to take the ratio between the estimated coefficient and the average RIF, which is  $(-0.128 / 7.056) * 1$  and  $(-0.264 / 6.561) * 1$  for men and women, respectively.

Table 3. RIF by gender. 10<sup>th</sup> 50<sup>th</sup> and 90<sup>th</sup> percentiles of the wage distribution

	Male			Female		
	10 <sup>th</sup>	50 <sup>th</sup>	90 <sup>th</sup>	10 <sup>th</sup>	50 <sup>th</sup>	90 <sup>th</sup>
Outsourced job	-0.128***	-0.096***	-0.029	-0.264***	-0.084***	-0.026
French=1	0.091**	0.080***	0.133***	0.263***	0.099***	0.017
Part-time	-1.077***	-0.201***	-0.071***	-0.868***	-0.292***	-0.112***
Temporary agency work	-0.175***	-0.054	-0.038	-0.358***	-0.132**	-0.143***
Apprenticeship contract	-1.358***	-0.384***	-0.162**	-1.259***	-0.435***	-0.221***
Other temporary	-0.367***	-0.236***	-0.155***	-0.580***	-0.223***	-0.145***
No contract	-0.811***	-0.226***	-0.173***	-1.412***	-0.257***	-0.159**
Repetitiveness	-0.047***	-0.126***	-0.132***	0.007	-0.102***	-0.114***
Digital control	0.058***	0.093***	0.115***	0.194***	0.096***	0.059**
Technical control	0.041	-0.021	-0.129***	0.170***	-0.035	-0.112***
Managing coordinating	0.095***	0.220***	0.328***	0.110***	0.150***	0.436***
Sector	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.996***	7.407***	8.020***	6.363***	7.156***	7.983***
R-squared	0.363	0.270	0.180	0.247	0.367	0.196
N	29,855	29,855	29,855	38,590	38,590	38,590
RIF mean	7.056	7.475	8.047	6.561	7.274	7.826

## 5.2 Longitudinal analysis

One main limitation of the previous cross-sectional approach is that it does not consider workers' unobserved heterogeneity that could bias estimates of the outsourcing wage penalty. To address this issue, we use the last three waves of the Enquête Complémentaire Emploi: Condition de Travail (2013, 2016 and 2019), which have a panel structure.

Data are hierarchically structured at different points in time (level 1) and nested within different individuals (level 2), so that we can apply panel data techniques to decompose the between and within effect. More specifically, we decompose by how much the effect associated with an outsourced status is a consequence of individual changes over time (within effect) – e.g. an individual worker moving from a part-time to full-time job, or changing occupation/sector over the observed time period – or due to differences between workers over time (between effect), for example, the differences in the part-time to full-time patterns among workers over time, but also time-invariant cross-worker differences like education. Consequently, the within effect refers to how changes over time for the same worker influence log wages, whereas between effects refer to how the log wages respond to differences between groups of workers.

The within-between random effect model (REWB, Bell et al., 2019) makes it possible to estimate both the within and the between effect at once by demeaning the time-varying covariates and adding back their mean as additional covariate. The demeaned controls represent the within effect, while the covariate's mean captures the between component. Furthermore, time-invariant controls can be included as in a standard random effect model. Logically, we are considering that individuals are measured at three different points in time.<sup>6</sup>

<sup>6</sup> In a context of longitudinal analysis, we have variations – by data structure – within and between statistical units. While the fixed-effects estimation removes the unobserved heterogeneity using only the within variation, the random-effect (RE) estimation is a weighted average of the within and between effects present in the data: if the two are equal then the RE is the most efficient model. However, if the two effects differ, the weighted average is meaningless in substantive terms.

Applying such an econometric approach to our case, we have the following specification by gender:

$$\text{Log Wage}_{it} = \gamma_{00} + \beta_{1W}(X_{it} - \bar{X}_i) + \beta_{2B}\bar{X}_i + \beta_3 Z_i + (v_i + \varepsilon_{it}) \quad (\text{eq. 5})$$

Where  $\gamma_{00}$  is the global mean,  $X_{it}$  is the matrix of our time-varying covariates for being employed in outsourced jobs or not, being part-time workers or not, type of contract and organisational methods variables. Therefore,  $\bar{X}_i$  represents the overall mean of these time-varying variables at individual-worker level.

On the contrary,  $Z_i$  represents time-invariant characteristics like education and nationality. Finally,  $v_i$  are the (homogenous) random effects at individual level, i.e. the average distance of each individual from the overall mean. This implies that we have random intercepts but an identical slope for each individual. The  $\varepsilon_{it}$  are the residuals of the model measured at level 1.

Table 4. RWEB model by gender

	Men	Women
<i>Between</i>		
Part-time	-0.462***	-0.371***
Outsourced job	-0.116**	-0.173***
Temporary agency work	-0.046	-0.455**
Apprenticeship contract	-0.921***	-0.660**
Other temporary	-0.469***	-0.465***
No contract	-0.106	-0.288
Repetitiveness	-0.119	-0.167***
Indirect control	0.127*	0.136***
Technical control	-0.032	-0.086*
Managing coordinating	0.260***	0.257***
<i>Within</i>		
Part-time	-0.298**	-0.275***
Outsourced job	-0.024	0.023
Temporary agency work	0.061	-0.094
Apprenticeship contract	-0.377**	-0.225***
Other temporary	-0.105**	-0.038
No contract	-0.064	-0.116
Repetitiveness	0.007	-0.014
Indirect control	0.009	0.022
Technical control	0.028	0.005
Managing coordinating	0.057***	0.043**
<i>Time-invariant</i>		
French	0.011	0.000
Education	Yes	Yes
Sector	Yes	Yes
Region	Yes	Yes
Year	Yes	Yes
$v_i$	0.0850279	0.0757413
$\varepsilon_{it}$	0.0151627	0.019187
Constant	7.675***	7.351***
N	9,474	13,542

This model implies random intercepts but identical slopes in outsourcing for each worker. The idea of having the same outsourcing effect on wages among workers is reasonable since, according to the French industrial relations scheme, wages are set at sectorial level depending on the occupational hierarchy, considering the minimum wage as the lower bound. Therefore, given the French institutional framework, it is likely to have the same outsourcing effect among workers with the same observable characteristics.

Results in Table 4 show that the between-effect coefficients dominate the within effect for all of the time-varying covariates for both men and women. Focusing on outsourced jobs, the between-wage penalty for men (women) is about 11.6% (17.3%), while the within effect is in line with the traditional FE estimates. These results are in line with the cross-sectional estimates in Table 2, with women experiencing a stronger wage penalty from the outsourcing process.

Furthermore, the longitudinal estimates suggest that the outsourcing wage penalty is not due to changes over time within the same workers but is given by the differences in the job status and time-invariant characteristics between workers. In other words, the cross-workers' heterogeneity plays a key role in explaining the evolution of the outsourcing penalty over time, while changes occurring at individual-worker level – for example, changing employment contracts, or jobs – are less relevant in explaining the association between outsourcing and wages. In a context where wages are set by collective agreements at industry level, and outsourcing is a macro-process beyond individuals' control, it is reasonable to obtain a stronger role of the between component in explaining our outcome variation. This is also confirmed by the intra-class correlation coefficient of around 0.80 – for both men and women – which is the proportion of variance in the log wages due to differences between workers (over time).<sup>7</sup>

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<sup>7</sup> More technically, it is the ratio between the variance of the random component (i.e. the variation between workers) and the total variance:  $ICC = \sigma_{vi}^2 / (\sigma_{vi}^2 + \sigma_{ei}^2)$ .



## 6 Conclusions

The outsourcing of part of the production process has become a structural feature of our economies. Our analysis has showed that a growing share of the French labour force (which, according to our conservative analysis, amounted to around 6.6% in 2019) is outsourced.

Coherent with the existing studies, we find that outsourced workers earn significantly less than in-house peers: on average, outsourced male workers suffer a wage penalty of 9.6%, while for outsourced female workers this penalty increases to 11.8%.

Notably, the wage penalty does not uniformly affect workers along the distribution of wages. The wage penalty is much more conspicuous at the bottom than at the top of the distribution. One possible interpretation of this outcome relates to the different bargaining power of these groups of workers. Outsourced workers in the upper part of the distribution tend to be professionals who have increased bargaining power, also considering the specialised service that they offer. Note, however, that outsourced workers at the top of the distribution are not better off than in-house workers. This implies that this category of professional does not necessarily benefit from being hired outside of the firm.

In addition, the gender differences broaden considerably between the poorest workers. Outsourced male workers record a wage penalty of 12.8%, while for women this is approximately twice as high, 26%. Hence, outsourcing operates as an amplifier of the gender gap, especially among poorer workers. As we move towards the top of the distribution of wages, the wage penalty and the gender differences tend to disappear. In fact, outsourced workers at the top of the distribution do not suffer any wage penalty.

Another important contribution emerging from the analysis is that these findings do not depend on the repetitive nature of the working activities performed by outsourced workers compared to in-house ones. This finding contributes to the literature on outsourcing and specifically to overcoming some criticisms regarding previous estimations that have been raised in the literature (Goldschmidt and Schmieder, 2017). The wage penalty persists once we consider the degree of repetitiveness, forms of control and managing and coordinating roles deployed by the workers. This implies that the *raison d'être* of the wage penalty are not the different job characteristics between outsourced and in-house workers.

Overall, outsourcing operates as a mechanism that worsens the working conditions of the more vulnerable workers: those at the bottom of the distribution of wages, women, foreign and part-time. These findings pose some important policy issues. The expansion of outsourcing, especially for jobs at the bottom of the distribution, can be interpreted as an amplifier of wage dispersion and relative impoverishment of the more vulnerable groups of the population. The promotion of in-house hiring may revert this tendency, contributing to the improvement in the living conditions of these workers and reducing the overall wage heterogeneity. Moreover, since the wage penalty is not justified by the different tasks between types of workers, it cannot be claimed that the wage penalty suffered by outsourced workers is not the 'natural' outcome for their job. Instead, the process of outsourcing is strictly connected to the institutional and policy framework prevailing in a certain context. It is here that the policy makers should operate to revert the penalties for outsourced workers.

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## Annexes

Table A 1: Outsourced job - List of occupations by sector codes

Occupations		Sectors	
Code	Label	Code	Label
387b	Engineers and managers in logistics, planning and scheduling		
487b	Sorting, Packaging, Shipping and Other Material Handlers		
643a	Delivery drivers, couriers (employees)		
652a	Skilled material handlers, forklift operators, forklift operators	52	Warehousing and support activities for transportation
653a	Qualified storekeepers		
676a	Unskilled Cargo Handlers		
676c	Sorting, packing, shipping workers, unskilled		
543a	Employees in accounting or financial services		
543d	Miscellaneous business administrative staff	53	Postal and courier activities
676c	Sorting, packing, shipping workers, unskilled		
377a	Hotel and catering executives		
468a	Master of catering: room and service		
488a	Master of Catering: Kitchen/Production		
543d	Miscellaneous business administrative staff	56	Food and beverage service activities
561a	Waiters, restaurant clerks, boys (bar, brasserie, café or restaurant)		
561d	Kitchen helpers, kitchen apprentices and multi-purpose food service workers		
636d	Cooks and Kitchen Clerks		
374d	Business executives of small and medium-sized enterprises (excluding retail)		
388a	Computer science engineers and executives, research and development		
388b	Engineers and executives in IT administration, maintenance, support and user services	62	Computer programming, consultancy and related activities
388c	IT project managers, IT managers		
478a	IT Development and Study Technicians		
373d	Managers in other administrative departments of small and medium-sized enterprises		
374c	Commercial executives of large companies (excluding retail trade)		
374d	Business executives of small and medium-sized enterprises (excluding retail)	73	Advertising and market research
388a	Computer science engineers and executives, research and development		

The outsourcing wage penalty along the wage distribution by gender

463d	Sales technicians, service representatives to companies or professionals (excluding banking, insurance, IT)		
465a	Designers and technical assistants in graphic arts, fashion and decoration (self-employed and salaried)		
478a	IT Development and Study Technicians		
543d	Miscellaneous business administrative staff		
643a	Delivery drivers, couriers (employees)		
676c	Sorting, packing, shipping workers, unskilled		
372e	lawyers		
374c	Commercial executives of large companies (excluding retail trade)	74	Other professional, scientific and technical activities
388a	Computer science engineers and executives, research and development		
545c	Insurance Technical Services Employees		
461f	Middle managers and administrative technicians from other administrative services		
534a	Civilian Security and Oversight Officers	80	Security and investigation activities
534b	Fund conveyors, bodyguards, private investigators and similar occupations (employees)		
631a	gardeners		
684a	cleaners	81	Services to buildings and landscape activities
691c	Agricultural or forestry operators		
372d	Training management specialists		
373d	Managers in other administrative departments of small and medium-sized enterprises		
461a	Senior secretarial staff, executive secretaries (non-executive)		
463d	Sales technicians, service representatives to companies or professionals (excluding banking, insurance, IT)		
483a	Supervisors, Mechanical Engineering, Metalworking	82	Office administrative, office support and other business support activities
523a	Public Service Administrative Assistants (incl. teaching)		
534a	Civilian Security and Oversight Officers		
555a	Mail order sellers, telemarketers		
543d	Miscellaneous business administrative staff		
525c	Public service employees (except schools, hospitals)		
563b	Home helpers, home helpers, family workers		
564b	Household employees and household staff	96	Other personal service activities
676e	Miscellaneous unskilled industrial workers		
684a	cleaners		

The outsourcing wage penalty along the wage distribution by gender

Table A 2: Baseline specification, Female, 2005-2019

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outsourced job	-0.275*** (0.0243)	-0.174*** (0.0213)	-0.122*** (0.0171)	-0.129*** (0.0168)	-0.116*** (0.0166)	-0.116*** (0.0164)	-0.116*** (0.0164)	-0.119*** (0.0160)	-0.119*** (0.0161)	-0.117*** (0.0158)
French=1		0.0602*** (0.00846)	0.0437*** (0.00707)	0.0286*** (0.00671)	0.0241*** (0.00668)	0.0224*** (0.00659)	0.0224*** (0.00659)	0.0232*** (0.00643)	0.0217*** (0.00644)	0.0311*** (0.00650)
Part-time=1			-0.474*** (0.00834)	-0.464*** (0.00785)	-0.464*** (0.00782)	-0.452*** (0.00765)	-0.451*** (0.00763)	-0.435*** (0.00751)	-0.432*** (0.00752)	-0.420*** (0.00763)
Temporary agency work				-0.233*** (0.0305)	-0.216*** (0.0307)	-0.226*** (0.0287)	-0.228*** (0.0287)	-0.203*** (0.0291)	-0.217*** (0.0292)	-0.221*** (0.0306)
Apprenticeship contract				-0.630*** (0.0343)	-0.631*** (0.0337)	-0.621*** (0.0339)	-0.621*** (0.0339)	-0.592*** (0.0343)	-0.599*** (0.0344)	-0.599*** (0.0334)
Other temporary				-0.302*** (0.0110)	-0.299*** (0.0111)	-0.284*** (0.0110)	-0.284*** (0.0110)	-0.265*** (0.0107)	-0.261*** (0.0108)	-0.257*** (0.0109)
No contract				-0.618*** (0.0551)	-0.620*** (0.0548)	-0.593*** (0.0545)	-0.592*** (0.0545)	-0.582*** (0.0541)	-0.572*** (0.0543)	-0.566*** (0.0573)
repetitiveness					-0.0841*** (0.00674)	-0.0969*** (0.00674)	-0.0980*** (0.00689)	-0.0887*** (0.00677)	-0.0896*** (0.00677)	-0.0844*** (0.00684)
digital control						0.135*** (0.00817)	0.134*** (0.00830)	0.108*** (0.00818)	0.101*** (0.00819)	0.102*** (0.00821)
technical control							0.0131 (0.0151)	0.00189 (0.0151)	-0.0152 (0.0152)	-0.00712 (0.0154)
managing coordinating								0.229*** (0.00871)	0.226*** (0.00877)	0.226*** (0.00873)
Sector									Yes	Yes
Education		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region									Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.240** (1.464)	10.61*** (1.365)	10.54*** (1.142)	3.737*** (1.171)	1.023 (1.183)	1.323 (1.170)	1.315 (1.171)	1.026 (1.150)	0.428 (1.164)	0.431 (1.163)
Observations	43,519	43,490	43,490	41,368	41,322	41,319	41,319	41,316	41,256	38,590
R-squared	0.016	0.210	0.400	0.466	0.472	0.481	0.481	0.502	0.503	0.510

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The outsourcing wage penalty along the wage distribution by gender

Table A 3: Baseline specification, Male, 2005-2019.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outsourced job	-0.166*** (0.0183)	-0.155*** (0.0164)	-0.107*** (0.0135)	-0.110*** (0.0126)	-0.0990*** (0.0126)	-0.0969*** (0.0128)	-0.0976*** (0.0128)	-0.0998*** (0.0123)	-0.0871*** (0.0125)	-0.0959*** (0.0127)
French=1		0.0330*** (0.00743)	0.0269*** (0.00691)	0.0228*** (0.00663)	0.0169*** (0.00654)	0.0155** (0.00649)	0.0154** (0.00648)	0.0139** (0.00630)	0.0136** (0.00630)	0.0260*** (0.00632)
Part-time=1			-0.669*** (0.0171)	-0.585*** (0.0179)	-0.584*** (0.0175)	-0.569*** (0.0173)	-0.569*** (0.0173)	-0.543*** (0.0168)	-0.533*** (0.0169)	-0.531*** (0.0171)
Temporary agency work				-0.171*** (0.0246)	-0.142*** (0.0238)	-0.145*** (0.0232)	-0.144*** (0.0231)	-0.104*** (0.0240)	-0.115*** (0.0241)	-0.104*** (0.0236)
Apprenticeship contract				-0.799*** (0.0400)	-0.801*** (0.0431)	-0.793*** (0.0430)	-0.792*** (0.0430)	-0.746*** (0.0448)	-0.753*** (0.0455)	-0.744*** (0.0465)
Other temporary				-0.339*** (0.0138)	-0.328*** (0.0140)	-0.311*** (0.0139)	-0.311*** (0.0139)	-0.274*** (0.0139)	-0.266*** (0.0141)	-0.263*** (0.0145)
No contract				-0.572*** (0.0675)	-0.575*** (0.0674)	-0.552*** (0.0673)	-0.553*** (0.0673)	-0.514*** (0.0667)	-0.499*** (0.0671)	-0.522*** (0.0739)
repetitiveness					-0.124*** (0.00656)	-0.133*** (0.00651)	-0.131*** (0.00661)	-0.110*** (0.00650)	-0.111*** (0.00649)	-0.110*** (0.00658)
digital control						0.124*** (0.00854)	0.126*** (0.00864)	0.102*** (0.00857)	0.0951*** (0.00859)	0.0957*** (0.00859)
technical control							-0.0190 (0.0118)	-0.0236** (0.0117)	-0.0396*** (0.0119)	-0.0352*** (0.0118)
managing coordinating								0.222*** (0.00735)	0.220*** (0.00736)	0.223*** (0.00729)
Sector									Yes	Yes
Education		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region									Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.477*** (1.327)	13.06*** (1.251)	13.13*** (1.177)	11.39*** (1.143)	7.839*** (1.138)	8.064*** (1.124)	8.120*** (1.124)	6.933*** (1.089)	6.482*** (1.094)	6.301*** (1.091)
Observations	33,631	33,595	33,595	32,124	32,098	32,096	32,096	32,093	31,951	29,855
R-squared	0.010	0.175	0.295	0.384	0.400	0.411	0.411	0.449	0.451	0.463

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



The outsourcing wage penalty along the wage distribution by gender

Table A 4: Estimates on log wage interaction by gender.

	Male			Female		
	Part-Time	Repetitiveness	Outsourced occupation*Outsourced Sector	Part-Time	Repetitiveness	Outsourced occupation*Outsourced Sector
Outsourced job	-	-0.107***		-0.0577***	-0.0666***	
	0.0890***					
	-0.0131	-0.0168		-0.0156	-0.0225	
Part-Time	-0.522***	-0.532***	-0.542***	-0.412***	-0.420***	-0.423***
	-0.0185	-0.017	-0.017	-0.0078	-0.0077	-0.00765
Outsourced job#Part-Time	-0.063			-0.140***		
	-0.0454			-0.0332		
Repetitiveness	-0.109***	-0.112***	-0.105***	-0.083***	-0.0807***	-0.0833***
	-0.00657	-0.0068	-0.00658	-0.0068	-0.0069	-0.00684
Outsourced job#Repetitiveness		0.0248			-0.0796**	
		-0.0249			-0.0308	
Outsourced occupation			-0.0753***			-0.0293***
			-0.00754			-0.00709
Outsourced sector			-0.0305**			-0.0258
			-0.0127			-0.0174
Outsourced occupation#Outsourced sector			-0.0174			-0.0526**
			-0.0183			-0.0225
Constant	6.274***	6.321***	7.027***	0.453	0.365***	1.378
	-1.091	-1.091	-1.084	-1.163	-1.163	-1.154
Observations	29,855	29,855	29,997	38,590	38,590	38,650
R-squared	0.463	0.463	0.464	0.511	0.511	0.51

## **GETTING IN TOUCH WITH THE EU**

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