

Recruitment Difficulties Anticipated by Companies: What Are the Explanatory Factors in France?

Thomas Bézy*, Catherine Bruneau**, Cédric Crofils***, Étienne Lavenant**** and Dimitris Mavridis*****

Abstract – This article examines the difficulties anticipated by companies in France when it comes to recruiting staff. We match data from the 2018 and 2019 *Besoins en Main-d'Œuvre* surveys on workforce needs with company data from the FARE annual structural statistics of companies from the ESANE scheme and the DADS (*Déclaration annuelle de données sociales* – Annual Declaration of Social Data) to examine how recruitment difficulties are distributed by sector, location and size of the establishment and employment area characteristics. Together, these factors explain around 6% of the total variation in recruitment challenges, increasing to 14% when incorporating recruitment difficulties reported in the previous year. Most of the recruitment difficulties anticipated thus result from factors not observed in the data used in this article, potentially linked to the internal characteristics of each establishment, such as the quality of management and specific recruitment processes.

JEL: C01, J23, J63

Keywords: recruitment difficulties, company data, Probit

*École d'Économie de Paris; **Université Paris 1 Panthéon Sorbonne; ***Université Paris Dauphine PSL (LEDa) and Aix-Marseille School of Economics; ****Banque de France; *****OECD. Correspondence: thomas.bezy@psemail.eu

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The difficulties companies face when it comes to recruiting staff reveal frictions in how the labour market operates. Such difficulties decrease the efficiency of work allocation. Even though most job vacancies are filled (only 5% of vacancy listings were discontinued at the Pôle emploi employment agency due to a lack of qualified candidates over the last decade according to Gaumont, 2020), recruitment difficulties generate additional costs and increase the time needed to fill vacancies (Lhommeau & Rémy, 2019). According to INSEE, in July 2022, 67% of industrial companies reported experiencing recruitment difficulties, a level that was unparalleled since 1991 (INSEE, 2022). Identifying the factors that are at the root of these difficulties is therefore essential in order to guide public interventions and attempt to make the labour market more efficient.

The aim of this study is to identify the main factors that cause recruitment difficulties by focusing on the characteristics of the establishments and their environment. The data used, taken from the *Besoins en Main-d'Œuvre* (BMO) survey on workforce requirements by Pôle emploi (known as France Travail since 01/01/2024), describe the difficulties recruiters anticipate facing in the coming year. Studying anticipated rather than actual difficulties is interesting for several reasons. First, frictions, even if only anticipated but not ultimately experienced, can have actual consequences on the activity of the companies concerned. Indeed, recruiters who anticipate experiencing difficulties could reduce the number of hires or postpone them to a later date (Lhommeau & Rémy, 2020). According to the survey carried out to supplement the BMO survey by Pôle emploi, 27% of establishments that did not recruit in 2018 attributed that lack of recruitment to the anticipation of too many difficulties. Finally, anticipated difficulties reflect the point of view of recruiters. Comparing them with the actual difficulties experienced allows us to assess whether these anticipations become reality.

This study is innovative for two reasons. The first relies on the use of an original dataset combining many data sources. We first use the BMO survey from Pôle emploi. We then use the DADS social declaration data, which describe the characteristics of the workforce and wages of establishments, and the FARE tax data, as well as aggregated administrative data. This study is the first to use not only data on the establishment or company, via tax and social data, but also local geographical characteristics

and granular characteristics of the occupations for which candidates are sought in recruitment processes. The second reason is that the study covers a large number of sectors and provides an establishment-level perspective, rather than using a sector- or occupation-focused approach (Niang & Vroylandt, 2020; Niang *et al.*, 2021; Arik *et al.*, 2021).

The main finding of the study is that the observed characteristics of the establishments explain only a limited part of the anticipated recruitment difficulties (approximately 3% of the total variance). Incorporating the characteristics of the occupations open for recruitment into the analysis still explains a small part of the variance (about 6% of the total variance regardless of the model and 14% if we also take into account the existence of difficulties in the past).

The rest of this article begins with a literature review concerning the factors that may explain recruitment difficulties (Section 1), then we present the data used, the sample selected and our methodology (Section 2). We set out descriptive statistics (Section 3), followed by our findings, discussing them in relation to the existing literature (Section 4). We conclude by summarising the main lessons learned from our study and suggest avenues for further exploration for researchers and policy makers.

1. Explanatory Factors Behind Recruitment Difficulties

1.1. Theoretical and Empirical References

In the economic literature, recruitment difficulties can be seen as symptomatic of a difficult match between jobseekers and companies. The theoretical framework that explains the matching mechanisms at play in the labour market was developed in the works of Diamond (1982) and Mortensen & Pissarides (1994).¹ The models introduce frictions that thus explain the coexistence of vacancies and jobseekers. This difficult matching process may be due to an excess in labour demand (excess of vacancies) or an inadequate supply of labour (few individuals looking for work). Search efforts by recruiters or jobseekers can also impact the effectiveness of finding a match. As such efforts increase, the number of matches (or the number of hires) achieved for a given number of jobseekers and job vacancies also increases (Lazear, 2014; Rémy, 2022). This study aims to

1. See Rogerson *et al.* (2005) for a literature review on this issue.

better understand frictions due to demand for labour by incorporating not only establishment characteristics, such as size; but also, rigidities due to the labour supply by considering variables characterising the environment, such as local population density.

Fabling & Maré (2016) use panel data on New Zealand companies to determine the factors that explain recruitment difficulties. They find a high degree of persistence across years: more than 60% of the companies that reported recruitment difficulties in 2009 were already doing so in 2008. In our study, we also find a high level of persistence. Fabling & Maré (2016) find that companies with high financial turnover report more recruitment difficulties than those with low financial turnover, even though they offer better wages on average. The authors explain this result by referring to the work of Haskel & Martin (2001), which links skills shortages with technical progress. To keep innovating and remain competitive, large companies would be those that need a more skilled workforce, which is more difficult to recruit. The findings reached in this study are different: the recruitment difficulties anticipated are lower in companies with high financial turnover and a large workforce, which is rather indicative of a learning effect over the course of recruitment campaigns, resulting in less difficulty in recruiting for large companies, which are able to establish a better quality of human resources department.

While Fabling & Maré (2016) do not find any specific effect related to local labour markets, Blanc *et al.* (2008) show that population density has an impact on recruitment difficulties. Using French data from the Midi-Pyrénées region, they find that companies recruiting in areas with low population density are likely to be more exposed to recruitment difficulties. This is due to the lack of available labour in low-density areas, and the resulting low labour supply.

Davis *et al.* (2013) look at the dynamics around the number of vacancies and the vacancy fill rate at establishment level in the United States. They find that the vacancy fill rate increases sharply with staff turnover. They explain this phenomenon by the fact that companies more accustomed to recruitment processes experience less difficulty in hiring. The authors also highlight the role of human resources structures in recruitment processes, making it easier to circulate vacancy advertisements, select candidates and negotiate wages and benefits. We also find that the higher the staff turnover rate, the fewer the recruitment difficulties, suggesting

that the above-mentioned factors related to the internal organisation of companies are likely to influence the level of anticipated recruitment difficulties.

Carrillo-Tudela *et al.* (2020) show that wages at the time of hiring have an impact on the proportion of vacancies advertised by companies that are filled. Mueller *et al.* (2018) also show that job vacancies are filled quicker when the wage offered is high. We complement this earlier work and find that the establishments offering higher salaries report facing fewer recruitment difficulties.

Arik *et al.* (2021) seek to assess how, in the manufacturing sector, the characteristics of companies, their environment and the occupations for which they are recruiting affect the recruitment difficulties they face. They find that difficulties decrease with the size of the establishment and with financial turnover, suggesting that companies that have more resources and specialised recruitment departments face fewer difficulties. They also find that the higher the local unemployment rate and the local population density, the lower the anticipated difficulties, for the reasons of labour supply mentioned above. These results are very similar to those obtained in our study. The aim is to extend this work by taking into account other characteristics of companies² and by extending the analysis to other sectors.

1.2. Institutional Analyses of the French Labour Market

The issue of recruitment difficulties has been studied regularly by French administrative bodies such as the *Direction de l'animation de la recherche, des études et des statistiques* (DARES – the French Research, Studies and Statistics Directorate of the Ministry of Labour) or Pôle emploi (the French public employment operator). These studies aim to determine the occupations for which recruitment difficulties are the most important and why. Therefore, they focus on the characteristics of the occupations, which could explain recruitment difficulties.

The DARES studies are based on *Offre d'emploi et recrutement* (OFER) surveys on the recruitment processes of companies. Lhommeau & Rémy (2019) indicate that 17% of recruitment procedures were seen as difficult by recruiters who experienced them in 2016. Those procedures are analysed on an ex-post basis, that is

2. The variables we incorporate are staff turnover rate, pay gap, seasonal recruitment rate and being part of a group.

to say after the recruitment has taken place. The mismatch between the candidate profile and the company's expectations is the factor most frequently cited by companies to explain the difficulties encountered. Lhommeau & Rémy (2019) show that establishments located outside urban areas have more difficulty recruiting than others and that there are significant differences between activity sectors. This finding is also featured in the results of our study.

Lhommeau & Rémy (2020) reveal that the equipment and skills of recruiters play a role in the presence of recruitment difficulties. In particular, recruiters without a human resources department and who are less accustomed to recruiting report more difficulties. These results support the main conclusion of our study: recruitment difficulties mainly stem from the unobserved characteristics of companies, such as the quality of their human resources department.

The other main source of data on recruitment difficulties in France comes from the annual BMO survey on workforce requirements conducted by Pôle emploi. Covering all employers' establishments,³ the BMO survey provides information on recruitment plans for the following year (ex-ante analysis) and, where appropriate, on anticipated difficulties. This survey makes it possible to monitor the way in which recruitment develops in France over the years. Together with the BMO survey, Pôle emploi also conducts an additional survey seeking to better understand past recruitment difficulties and anticipated recruitment difficulties, among other things. Just like the OFER survey, this survey highlights the unsuitability of candidate profiles for positions open for recruitment and an insufficient number of candidates as the major factors leading to recruitment difficulties. Factors related to the difficulty of the work, the image of the company or the occupation, the nature or term of the contract and the number of simultaneous recruitment processes to be carried out may also come into play (Blache & Gaumont, 2016; Gaumont *et al.*, 2020).

The surveys conducted by the Banque de France and INSEE, which are more frequent than those conducted by Pôle emploi and DARES, also measure difficulties on an ex-ante basis. The Banque de France's economic outlook update of November 2022 reveals an increase in anticipated recruitment difficulties in all sectors between May and October 2021, which can be interpreted as a symptom of the post-COVID economic recovery and a fall in the unemployment rate.

2. Data

2.1. The BMO Surveys on Workforce Needs

This study draws on the 2018 and 2019 BMO surveys on workforce needs conducted by Pôle emploi. These surveys were conducted between October and December and focused on workforce needs for the following year. The BMO surveys on workforce needs cover the private sector, including the agricultural sector, and the public sector under the jurisdiction of local authorities and publicly-owned administrative establishments. The coverage of the survey does not include administrative bodies of the state and certain publicly-owned companies, such as the Banque de France. The survey covers the 13 metropolitan regions and the five overseas regions of France. The units surveyed are establishments.

In these surveys, a recruitment plan corresponds to the desire to recruit a person for a specific position within the following year. Establishments are asked to indicate, for each category of occupations (82 categories of profession families), their total number of recruitment plans, whether or not they believe that such recruitments will be difficult and, finally, to specify the number of seasonal worker recruitments among the total number of recruitments. The study thus focuses on the anticipated difficulties related to recruitments planned.

Of the 2,410,306 establishments surveyed (i.e., establishments excluding administrative bodies of the state and publicly-owned companies), 436,608 responded to the 2018 survey (difficulties expressed at the end of 2018 for recruitments planned for 2019). In the 2019 survey (difficulties expressed at the end of 2019 for recruitments planned for 2020), 2,408,179 establishments were interviewed and 440,052 responded. We stack the 2018 and 2019 surveys and thus have 876,660 responses from establishments. We exclude establishments in the agricultural sector and those in the financial and insurance services sector, as the sources with which we will match this data do not cover those sectors. We thus start off with a sample of 760,544 observations at establishment level. Of these establishments, 26% (or 199,192 establishments) reported having recruitment plans for the following year. Our analysis focuses only on establishments that reported having recruitment plans. We use weights calculated by Pôle emploi, which ensure that the weighted sample is representative of the

3. Excluding administrative bodies of the state and publicly-owned companies.

size and activity sectors of the economic fabric at regional level. As variables of interest, we use the number of planned recruitments – including seasonal recruitments, the presence of recruitment difficulties, the activity sector (using 8 categories⁴) and the size of the establishments (using 8 categories).

2.2. Data on the Characteristics of Establishments and of their Environments

First, we supplement the BMO data with characteristics of the establishments taken from data provided by the 2015 DADS⁵ annual social data declarations, in particular the number of employees by socio-professional category (we distinguish between five categories: tradespeople, merchants and entrepreneurs; executives and higher-level professions; middle-management professions; white-collar workers; blue-collar workers). This information makes it possible to calculate, for each establishment, the staff turnover rate and the pay gap between the establishment concerned and establishments of the same size in its geographical department for its structure, by socio-professional category of the recruitment. We also supplement the data with information from the 2017 FARE tax data regarding the company to which the establishment belongs: financial turnover, being part of a group and the date of creation of the company.

Next, the datasets of the *Agence Nationale de la Cohésion des Territoires* (ANCT), the French National Agency for Territorial Cohesion, provide information on the population and population density of the municipality in which the establishment is located. We also use INSEE's 2010 urban areas database (*Base des aires urbaines*) at 1st January 2018, which indicates for each municipality the urban area zoning category (large urban centre, periphery of a large urban area, etc.). Using data from the 2019 census, carried out by INSEE, we calculate unemployment rates by geographical department and socio-professional category. First, we link each recruitment plan with the geographic departmental unemployment rate for the plan's socio-professional category. We then aggregate these rates at establishment level, weighting them by the number of anticipated recruitments.⁶ This variable aims to assess the level of unemployment faced by the establishment when it plans to recruit. We weight it by the structure of the recruitments planned and by socio-professional category, in order to account for the local labour supply in the labour segments in which the establishment is recruiting.

Approximately 45% of the 199,192 establishments with recruitment plans can be matched with the 2015 DADS and 2017 FARE data, resulting in a final sample of 89,139 observations. The main reason for the loss of data is the time difference between these databases and the 2018 and 2019 BMO surveys. By definition, only establishments that already existed in 2015 can be matched to 2015 DADS and 2017 FARE data, meaning they are at least three or four years old.⁷ Table A1 in the Appendix shows that the unmatched establishments are mainly small establishments without employees or with fewer than five employees. Since the data on population, population density and unemployment rate are compiled at municipality or geographical department level, we do not lose any observations when they are matched with our database.

Establishments with a recruitment plan included in the final sample are therefore mainly medium or large in size and belong to a company that has already been in existence for several years. After the matching has been performed, public administrative bodies are under-represented and, conversely, establishments in the construction, industry, commerce, transport and hospitality sectors are over-represented. In our final sample, the proportion of seasonal recruitments among all recruitments is lower than in the sample of establishments planning to recruit. In contrast, the proportion of establishments anticipating recruitment difficulties for at least one recruitment plan is higher (66% compared with 52%). This difference can be explained by the over-representation of some sectors, such as construction, in which recruitment difficulties are high (see Table S1-4 of the Online Appendix – the link to the Online Appendix is at the end of the article).

4. These categories correspond to the way in which activity sectors are set out at level A10 of version 2 of the Nomenclature française d'activité (NAF), French classification of activities, from which we remove the "Agriculture, forestry and fishing" and "financial and insurance activities" sector, as explained above.

5. At the time of us carrying out this work, the most recent DADS data available were for 2018, but the most recent DADS data aggregated by establishment were for 2015, so the 2015 data were used in this study.

6. Appendix A2 sets out the methodology used to calculate this variable in detail.

7. Table S1-2 in the Online Appendix shows the breakdown of establishments in our final sample by the date on which their company was established. We do not observe the company creation date for establishments excluded from the final sample.

3. Descriptive Statistics

3.1. Characteristics of Establishments Anticipating Recruitment Difficulties

We begin by describing the characteristics of establishments recruiting and expressing recruitment difficulties, in terms of size, industry and length of time in existence.⁸ 66% of the establishments in our sample anticipate difficulties in recruiting. Tables S1-1 to S1-10 in the Online Appendix set out the proportion of establishments with recruitment difficulties among those anticipating to recruit, broken down by the main characteristics studied in this article: size, the company's financial turnover, its length of time in existence, its staff turnover rate, etc.

Figures I-A et I-B provide a visual representation of the results in Tables S1-1 and S1-3 in the Online Appendix. Figure I-A shows an inverted U-shaped relationship between establishment size and the proportion of recruitment plans anticipated to be difficult. The same inverted U-shaped profile is observed between deciles of financial turnover and the proportion of recruitment plans anticipated to be difficult (Figure I-B). For those with the lowest financial turnover, difficulties increase as financial turnover rises and then, beyond a certain amount, the relationship is inverted. The finding that establishments with higher financial turnover anticipate less difficulties could be explained

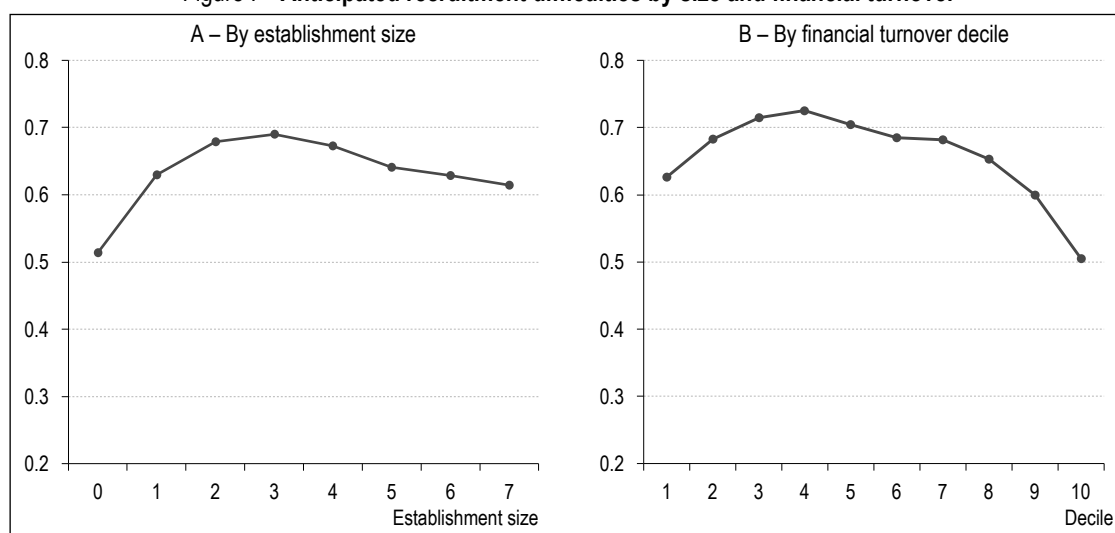
by the fact that smaller establishments manage recruitment processes poorly, perhaps due to a lack of experience. After reaching a certain size, establishments invest in human resources departments that gain experience over time, which would decrease the rate of anticipated difficulties (Davis *et al.*, 2013). In the Online Appendix, this figure is broken down according to whether or not the establishment is part of a group (see Figure S1-I of the Online Appendix). Differences in recruitment difficulties according to financial turnover decile are largely the same, regardless of whether or not the establishments are part of a group.

Figures II et III show these analyses according to establishment size and financial turnover by activity sector. In manufacturing and construction, we observe the same inverted U-shaped curve as in the economy as a whole. However, that shape is not found in all activity sectors. For example, this is not the case in real estate activities, or in trade, transport and hospitality in relation to staffing.

Figure IV shows that there are fewer anticipated recruitment difficulties when staff turnover is high. This could be explained by the fact that establishments recruiting often and having therefore a high staff turnover rate, being thus

8. The source of each of these variables of interest can be found in Appendix A2-1.

Figure I – Anticipated recruitment difficulties by size and financial turnover



Notes: In Figure I-A, establishment size 0 corresponds to establishments without employees, size 1 corresponds to those with 1 to 4 employees, size 2 corresponds to those with 5 to 9 employees, size 3 corresponds to those with 10 to 19 employees, size 4 corresponds to those with 20 to 49 employees, size 5 corresponds to those with 50 to 99 employees, size 6 corresponds to those with 100 to 199 employees and size 7 corresponds to those with 200 or more employees. In Figure I-B, the x-axis indicates the financial turnover decile of the company (see Table S1-3 of the Online Appendix for the amounts associated with each decile).

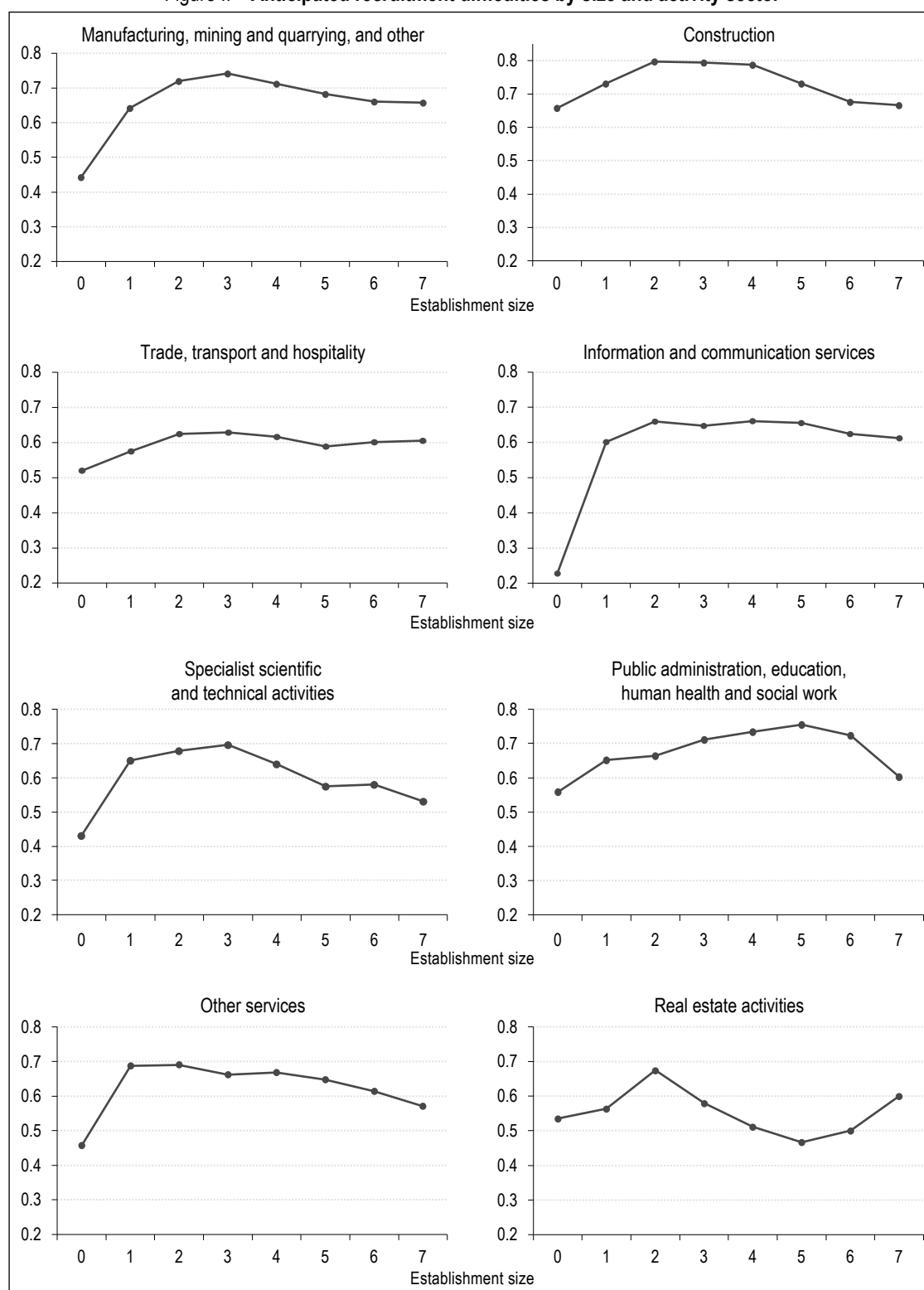
Reading note: Among establishments with 1 to 4 employees that anticipate recruiting, 63% anticipate at least one difficult recruitment. Among the 10% of establishments anticipating recruiting that have the lowest financial turnover, 63% anticipate at least one difficult recruitment.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

accustomed to recruiting, are also better prepared for this task, and may therefore anticipate fewer

difficulties. Regarding the pay gap compared to similar establishments in the same geographical

Figure II – Anticipated recruitment difficulties by size and activity sector

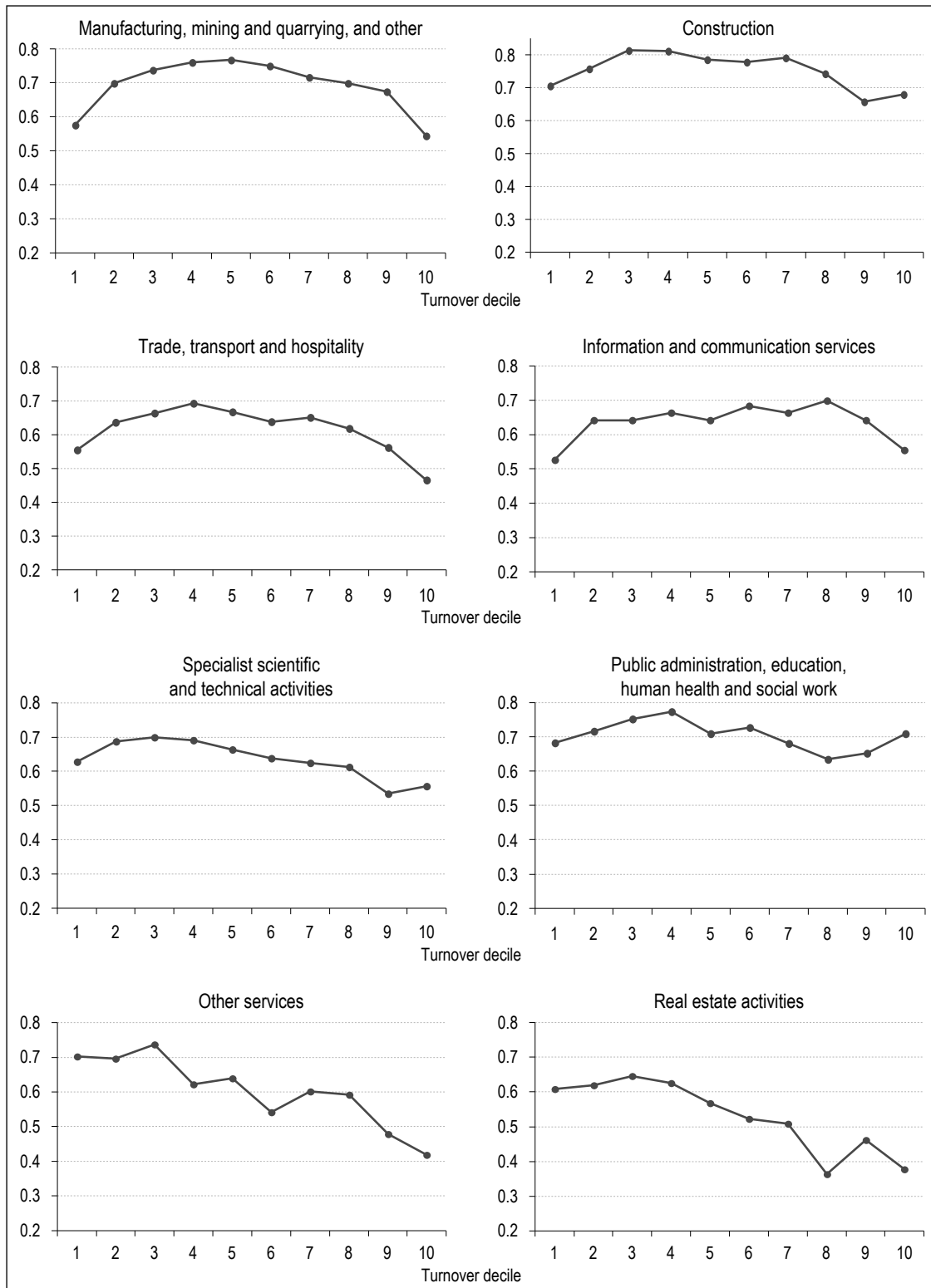


Notes: Establishment size 0 corresponds to establishments without employees, size 1 corresponds to those with 1 to 4 employees, size 2 corresponds to those with 5 to 9 employees, size 3 corresponds to those with 10 to 19 employees, size 4 corresponds to those with 20 to 49 employees, size 5 corresponds to those with 50 to 99 employees, size 6 corresponds to those with 100 to 199 employees and size 7 corresponds to those with over 200 employees.

Reading note: In the construction sector, 72% of establishments with 1 to 4 employees anticipate at least one difficult recruitment.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

Figure III – Anticipated recruitment difficulties by financial turnover and activity sector



Notes: See Table S1-3 in the Online Appendix for the amounts associated with each decile.

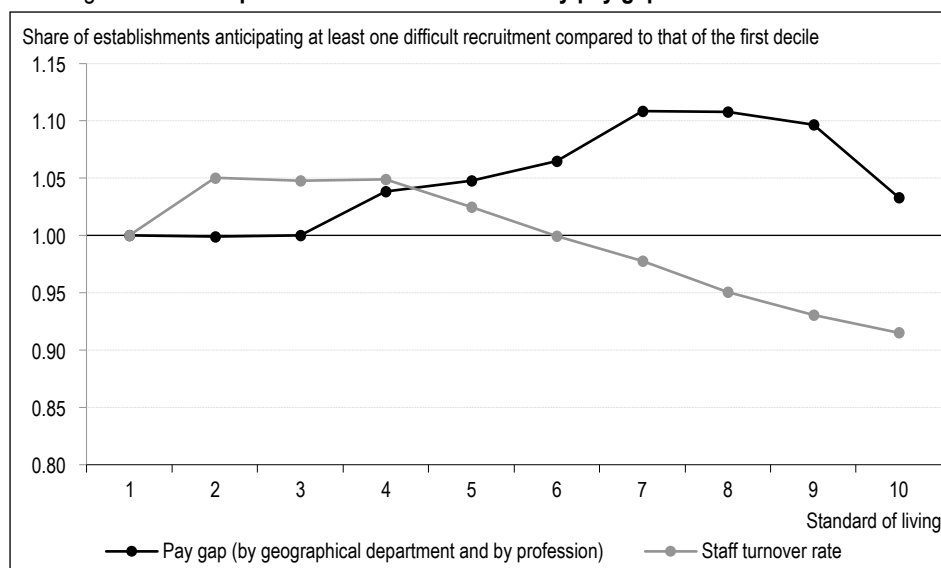
Reading note: In the construction sector, 70% of establishments with financial turnover among the lowest 10% anticipate at least one difficult recruitment.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

department, aside from the 10% of establishments where this gap is the highest, the higher the pay gap – i.e. the more the establishment

pays relatively high wages compared to its neighbours –, the higher the anticipated recruitment difficulties. This could be explained by

Figure IV – Anticipated recruitment difficulties by pay gap and staff turnover rate



Notes: On the x-axis, establishments are grouped together by pay gap decile (black curve) and by staff turnover rate decile (grey curve). On the y-axis, the share of establishments anticipating at least one difficult recruitment plan is shown in the form of an index. The values are normalised so that the first decile corresponds to a base of 1.

Interpretation: The 10% of establishments with the highest staff turnover rate are 0.9 times less likely to anticipate recruitment difficulties than the 10% of establishments with the lowest staff turnover rate.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

the fact that establishments that anticipate recruitment difficulties decide to increase their wages to make the jobs more attractive (Mueller *et al.*, 2018; Carrillo-Tudela *et al.*, 2020).

Figure S1-II of the Online Appendix shows the share of anticipated recruitment difficulties, distinguishing establishments with regard to seasonal recruitment. We observe that the proportion of establishments anticipating recruitment difficulties is lower in establishments recruiting (at least a few) seasonal workers, regardless of the total number of recruitments. This suggests that being in the habit of recruiting would help limit anticipated difficulties, as seasonal workers are often recruited on a regular basis. This may also be due to the fact that, in the case of seasonal recruitment, the same employees could be recalled from one year to the next, thereby limiting possible recruitment difficulties.⁹

Establishments that face recruitment difficulties are therefore mostly small- or medium-sized and are more often part of the manufacturing or construction sectors. Unsurprisingly, the higher the number of planned recruitments, the more frequently difficulties are anticipated for at least one recruitment: recruiting three or four people is more likely to expose the establishment to difficulties than recruiting a single employee. It is also establishments not accustomed to the process and rarely recruiting that report anticipating the most difficulties.

3.2. Geographical Disparities

Establishments in the Île-de-France region have the lowest level of recruitment difficulties in metropolitan France (60%, see Table S1-5 in the Online Appendix). The Brittany and Pays de la Loire regions have the highest proportion of establishments anticipating recruitment difficulties (71%).

Figure V shows that, regardless of the type of urban area, anticipated recruitment difficulties decrease as population density rises. The scale of the difficulties varies from one type of urban area to another, but the trend remains the same. The differences based on population density can be explained by a greater supply of labour in heavily populated municipalities and thus fewer difficulties for employers when recruiting labour. Typically, there is a low share of establishments anticipating recruitment difficulties in the city of Paris. In accordance with the findings in the literature (Blanc *et al.*, 2008), at the aggregate level, we observe that anticipated recruitment difficulties are negatively correlated

9. In addition, we observe an inverted U-shaped curve for establishments that do not recruit seasonal workers. This suggests that the more an establishment seeks to recruit individuals, the more complicated the task. However, once an establishment has completed a certain number of recruitments, fewer difficulties are anticipated. For establishments recruiting to fill more than 51 positions, the level of difficulties is the same regardless of whether or not they recruit seasonal workers. This can be explained by the fact that the large establishments that have recruitment structures and for which the process is well controlled are also those that recruit a lot.

with population, population density and unemployment rate (see Figure S1-III of the Online Appendix).¹⁰

4. Econometric Analysis

4.1. Presentation of the Model

The econometric analysis is based on a probit model. Unlike in linear approaches, in a probit model it is a latent – unobserved – variable Y_i^* that is specified as a linear function of the explanatory factors. The observed variable, Y_i , corresponds here to the presence of at least one recruitment plan anticipated to be difficult by the establishment. The model is written as follows, for each establishment i :

$$Y_i = \begin{cases} 1 & \text{if } i \text{ anticipates difficulties in recruiting} \\ 0 & \text{otherwise} \end{cases}$$

with the introduction of an unobservable latent variable Y_i^* (which could be the cost of recruitment difficulties in terms of time and money) such as:

$$Y_i = \begin{cases} 1 & \text{if } Y_i^* > C \\ 0 & \text{if } Y_i^* \leq C \end{cases}$$

where C denotes a threshold that can be set to 0 without loss of generality.

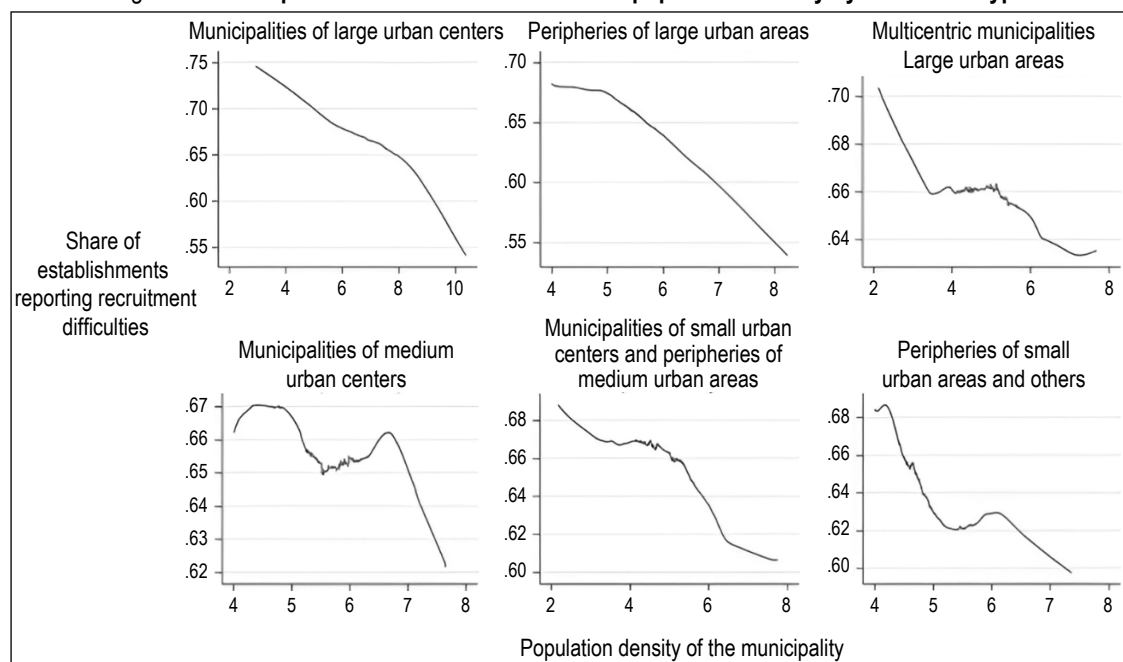
Two groups of explanatory variables can be distinguished. The first group includes economic indicators related to characteristics

of the establishment (turnover of the enterprise in log, being part of a group, staff turnover rate, proportion of seasonal workers in the establishment's recruitment and the pay gap by occupation, geographical department and size of the establishment). The second group describes the economic and geographic factors that may have an influence on the recruitment difficulties anticipated by the establishment. In particular, the population density of the municipality and the local unemployment rate are taken into account. In addition to these two groups of variables, we add dummy variables describing the occupation for which recruitment is being performed (21 categories) and the activity sector (10 categories).

Some variables could be endogenous, in particular the staff turnover rate and the pay gap. In order to take into account this potential endogeneity, the pay gap and the staff turnover rate are calculated for 2015, several years before any reported difficulties (in 2018 and 2019). As a precaution, we do not interpret the relationships between these variables and recruitment difficulties as causal.

10. Population and population density are calculated at municipality level. The unemployment rate is calculated by geographical department and occupation (see Appendix 2 for further detail).

Figure V – Anticipated recruitment difficulties and population density by urban area type



Notes: The figure represents the share of establishments reporting anticipating at least one difficult recruitment next year (y-axis) according to the population density of the municipality. The municipalities are divided into six categories of urban areas.
Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

The latent variable Y_i^* is described by the following linear regression model:

$$Y_i^* = c + X_i' \beta_1 + \sum_j S_{ij} \beta_{2j} + \sum_k \left(\frac{N_{ik}}{N_i} \right) M_{ik} \beta_{3k} + \varepsilon_i \quad (1)$$

where the vector X_i includes the two groups of characteristics mentioned above (characteristics of establishments and their environment) and S_{ij} is the dummy that has a value of 1 if the establishment is in sector j and 0 otherwise. M_{ik} is the dummy that has a value of 1 if the establishment is recruiting in occupation k and 0 otherwise. $\frac{N_{ik}}{N_i}$ is the ratio of recruitments by the establishment i in occupation k , compared with the total number of recruitments planned. This allows the dummy variables to be weighted by the number of recruitments in each occupation.

An alternative specification involves focussing on the persistence of recruitment difficulties from one year to the next. The aim is to determine whether there is inertia in the recruitment difficulties, i.e. whether establishments that reported difficulties in 2018 are more likely than others to report difficulties in 2019. Since only some of the establishments answer to the survey in two consecutive years, the sample size is reduced (18,498 observations, compared to 89,139 in the original database). In this specification, Y_i^* is a latent variable that corresponds to the anticipated difficulties reported in 2019 and takes the following form:

$$Y_i^* = c + X_i' \beta_1 + \sum_j S_{ij} \beta_{2j} + \sum_k \left(\frac{N_{ik}}{N_i} \right) M_{ik} \beta_{3k} + P_i \beta_4 + \varepsilon_i \quad (2)$$

where P_i is the dummy that equals 1 if establishment i reported anticipating difficulties in 2018. β_4 here captures the *persistence* of the difficulties from one year to the next.

For each of these specifications, regressions are run with and without weighting. As explained above, only 45% of the initial sample is retained in the final sample, after matching with the DADS and FARE data, which changes the representativeness of our sample (see Table A1 in the Appendix). For this reason, in the following section and in the Online Appendix, we present the results both with and without the weights calculated by Pôle emploi.

There are three objectives behind these specifications. First, studying the signs of the coefficients makes it possible to confirm the trends observed in the descriptive statistics and compare these findings with the literature. Second, we measure what amount of the variance is explained by the selected factors. If much of the variance remains

unexplained after including the characteristics of the establishments, their environment, their activity sector and the type of occupations for which they recruit, it suggests that other factors – such as the internal organisation of the establishment's activity or the mindset of the recruiters – may play a significant role in anticipating recruitment difficulties. If, on the contrary, the characteristics introduced as explanatory factors are dominant in explaining the anticipated difficulties, it will be possible to consider specific policies for establishments with the same characteristics. Third, in addition to assessing the overall amount of the explained variance, it is also interesting to compare the relative amount of the explained variance that can be attributed to the different types of explanatory factors: those that relate to the characteristics of the establishment, or its geographical or economic environment, or the occupations to which the recruitment plans relate.

4.2. Results

Table 1 presents the results of the estimation of equation (1), both unweighted (column 1) and weighted (column 2). We do not include the population of the municipality nor that of the urban area in which the municipality is located as control variables, as they are redundant with the population density variable.¹¹ The findings of the weighted and unweighted estimates are similar in terms of significance and sign.

The signs of the coefficients are consistent with the descriptive statistics for being part of a group, staff turnover rate, percentage of seasonal workers recruited, unemployment rate and population density: these variables are negatively correlated with anticipated recruitment difficulties. We note, however, that the coefficient associated with being part of a group is not significant, which was suggested in Figure S1-I in the Online Appendix.¹² The staff turnover rate is negatively correlated with anticipated difficulties, which can be interpreted by the fact that a high staff turnover rate probably results in a degree of familiarity with recruitment, but the coefficient is insignificant. The higher the unemployment rate and population density, the fewer recruitment difficulties there are: the greater the supply of labour, the easier

11. In Tables S2-2 and S2-3 of the Online Appendix, we set out the results with the population density replaced by the population of the municipality and the population of the urban area in which the municipality is located, yielding very similar findings.

12. The coefficient associated with being part of a group is, however, significant when the square of financial turnover is introduced into the regression (see Table S2-1 in the Online Appendix).

it is to recruit (Mortensen & Pissarides, 1994). Anticipated difficulties are positively correlated with the number of recruitments: when there are lots of positions to be filled, the task becomes more difficult for recruiters. The coefficient associated with the pay gap is insignificant.

The company's financial turnover is negatively correlated with recruitment difficulties. Table S2-1 in the Online Appendix introduces the square of financial turnover into the regression and the associated coefficient is negative. We therefore recover the convex shape shown in the descriptive statistics.

Table 2 shows the results for the estimation of equation (2). The signs of the coefficients associated with the variables already introduced in equation (1) remain unchanged for both the weighted and unweighted estimates. In all specifications, the persistence of difficulties is positive and largely significant. This suggests that there may be structural characteristics explaining recruitment difficulties, which would be unique to each establishment. For example, these could be characteristics related to the quality of the human resources department: in the absence of

a sufficiently effective recruitment department, difficulties can be repeated from year to year. The persistence can also reflect the mindset of the establishment's recruiters, their optimistic or pessimistic temperament, which, if they remain in the establishment, results in the persistence of the optimistic or pessimistic nature of the anticipations. Figures S1-IV and S1-V in the Online Appendix present additional descriptive statistics on the share of establishments anticipating difficulties in 2018 and 2019 by size of establishment and activity sector.

4.3. Amount of Variance Explained and the Ways the Explanatory Factors Contribute to the Variance

The various models estimated in Tables 1 and 2 result in a relatively low value of the pseudo-R², whether the data are weighted or not. Together, the variables explain a maximum of around 6% of the variance in anticipated difficulties (column 2 of Table 1). This finding is consistent with previous work: for example, Fabling & Maré (2016) and Arik *et al.* (2021) find pseudo-R² values not exceeding 0.15.

Table 1 – Estimation results – Existence of anticipated recruitment difficulties

	Unweighted (1)	Weighted (2)
Establishment characteristics		
Financial turnover (Log)	-0.0239*** (0.000955)	-0.0230*** (0.00117)
Being part of a group	-0.00194 (0.00429)	-0.00630 (0.00509)
Total number of recruitments	0.000201*** (0.000081)	0.000684*** (0.000113)
Staff turnover rate	-0.000588* (0.000331)	-0.000342 (0.000361)
Proportion of seasonal workers in recruitments	-0.131*** (0.00477)	-0.139*** (0.00579)
Pay gap (by occupation, geographical department and establishment size)	0.000215 (0.00184)	-0.000605 (0.00255)
Size dummies	Yes	Yes
Age dummies	Yes	Yes
Geographical characteristics		
Population density	-0.0128*** (0.00107)	-0.0109*** (0.00130)
Unemployment rate (by geographical department and occupation)	-0.715*** (0.0337)	-0.707*** (0.0412)
Occupation characteristics		
Occupation dummies	Yes	Yes
Activity sector dummies	Yes	Yes
Number of observations	89,139	89,139
Pseudo-R ²	0.0622	0.0632

Notes: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. The Probit regression covers all establishments that responded to the survey in 2018 or 2019. The explained variable is equal to 1 if the establishment reports anticipating at least one recruitment plan to be difficult, or 0 otherwise. The values shown correspond to marginal effects. Coefficients associated with establishment size and activity sector are available in Tables S2-4 and S2-5 in the Online Appendix.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

Table 2 – Estimation results – Persistence

	Unweighted (1)	Weighted (2)
Persistence effect	0.265*** (0.00745)	0.270*** (0.00924)
Establishment characteristics		
Financial turnover (Log)	-0.0309*** (0.00225)	-0.0272*** (0.00278)
Being part of a group	-0.000191 (0.00954)	-0.0154 (0.0113)
Total number of recruitments	0.000115 (0.000107)	0.000225* (0.000122)
Staff turnover rate	-0.00099 (0.000679)	-0.00153* (0.000964)
Proportion of seasonal workers in recruitments	-0.114*** (0.0103)	-0.115*** (0.0129)
Pay gap (by occupation, geographical department and establishment size)	-3.89e-05 (0.00292)	-0.00560 (0.00603)
Size dummies	Yes	Yes
Age dummies	Yes	Yes
Geographical characteristics		
Population density	-0.0170*** (0.00238)	-0.0141*** (0.00292)
Unemployment rate (by geographical department and occupation)	-0.386*** (0.0873)	-0.423*** (0.109)
Occupation characteristics		
Occupation dummies	Yes	Yes
Activity sector dummies	Yes	Yes
Number of observations	18,467	18,467
Pseudo-R ²	0.140	0.145

Notes: Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. The Probit regression covers the establishments that responded to the survey in both 2018 and 2019. The explained variable is equal to 1 if the establishment reports anticipating a difficult recruitment plan in 2019, or 0 otherwise. "Persistence" is a dummy variable equal to 1 if the establishment reported anticipating difficult projects in 2018, or 0 otherwise. The values shown correspond to marginal effects.

Sources: BMO surveys, Pôle emploi, FARE and DADS data, INSEE.

This is the main finding of this study. After the introduction of a large number of explanatory variables into the econometric model, which relate not only to the characteristics of the establishments, but also their environment and the occupations in which they recruit, the pseudo-R² value remains very low. While these observed characteristics are generally those taken into consideration to explain recruitment difficulties (de Zeeuw, 2018; Lhommeau & Rémy, 2019), our analysis suggests that the main factors are essentially unobserved. These could include, for example, organisational characteristics such as recruitment methods and the organisation of human resources departments, or idiosyncratic characteristics such as recruiters' mindsets, which may affect their perception in terms of anticipated recruitment difficulties (Weaver, 2021).

Table 2 shows that the "persistence" of anticipated recruitment difficulties is significant. When we check using anticipated difficulties in the previous year, the predictive quality of the model is significantly improved. Compared to Table 1, the amount of variance explained increases from 6% to 14%. This persistence may

be interpreted as a sign of consistency of anticipations expressed over two consecutive years. The coefficient that measures persistence varies little with the different specifications (whether or not we control for occupation, sector, size and location using dummy variables). In principle, this low level of variability reveals that these unobserved factors are independent of the observed factors. The additional variance explained by the persistence could be attributed to unobserved organisational (quality of human resources management, for example) or idiosyncratic (pessimism of the employer) factors.

4.4. Contribution of the Various Explanatory Factors

We will now examine the relative contributions of each category of variables: those that are characteristic of the establishments, those related to the establishments' environments, and those specific to the occupation and sector for which recruitment is being conducted. Starting from the estimation of equation (1), each of the categories of variables is removed successively to compare their relative contributions.

Table 3 – Amount of explained variance (Pseudo-R²) – Equation (1)

	(1)	(2)	(3)	(4)	(5)
Establishment characteristics					
Financial turnover	Yes		Yes	Yes	Yes
Being part of a group	Yes		Yes	Yes	Yes
Total number of recruitments	Yes		Yes	Yes	Yes
Staff turnover rate de la main-d'œuvre	Yes		Yes	Yes	Yes
Pay gap	Yes		Yes	Yes	Yes
Proportion de saisonniers	Yes		Yes	Yes	Yes
Size dummies	Yes		Yes	Yes	Yes
Age dummies	Yes		Yes	Yes	Yes
Geographical characteristics					
Population density de population	Yes	Yes		Yes	Yes
Unemployment rate	Yes	Yes		Yes	Yes
Occupation characteristics					
Occupation dummies	Yes	Yes	Yes		Yes
Activity sector dummies	Yes	Yes	Yes	Yes	
Number of observations	89,139	89,139	89,139	89,139	89,139
Pseudo-R ²	0.0622	0.0448	0.0566	0.0394	0.0618

Notes: Probit model where the explained variable is a dummy variable equal to 1 if the establishment reports anticipating at least one recruitment plan to be difficult. "Yes" means that the variable is included in the regression as an explanatory variable (unweighted model).

Sources and coverage: BMO surveys, Pôle emploi, FARE and DADS data, INSEE. Establishments that responded to the BMO survey in 2018 or 2019.

Table 3 shows the pseudo-R² values for the various estimates in equation (1). The largest increase in the pseudo-R² comes from the inclusion of dummy variables related to occupations. It is an important conclusion: occupation-specific characteristics have the strongest explanatory power compared to the other variables, even though that power remains low. These findings are consistent with Lhommeau & Rémy (2022), who show that recruitment difficulties are very heterogeneous across occupations, distinguishing between four categories: technical, manual, personal assistance and public-facing occupations.

* *
*

The aim of this article was to study the factors traditionally raised to explain the recruitment difficulties expressed by French companies and to determine the main ones. Unlike previous studies (Lhommeau & Rémy, 2019; Gaumont *et al.*, 2020), difficulties are examined at the establishment level and not at the level of the occupation for which the establishment is seeking to recruit.

Which factors explain the difficulties expressed by recruiters? A first finding is that, together, the observed characteristics included in our

models explain a maximum of 14% of the difficulties expressed by the employers surveyed. Managers of companies with similar characteristics thus have perceptions of recruitment difficulties which can vary greatly. This finding is comparable to those found in other countries (Fabling & Maré, 2016; Arik *et al.*, 2021) and suggests that these difficulties are due to factors not directly observable. These can be organisational or idiosyncratic characteristics, such as the quality of human resources management and of leadership, the mindset of the company manager, the company's brand image, etc. This finding is in line with those of Algan *et al.* (2020) who show that providing support to companies to strengthen their human resources department can significantly increase the number and quality of recruitments.

The observable factors are classified by order of importance. The first category relates to the type of occupation that is sought, which contribute around one third to the explained variance. Table S1-11 in the Online Appendix lists the 10 occupations for which the proportion of employers anticipating recruitment difficulties is highest. The second type of factor is related to the characteristics of the establishment, namely its size, activity sector, the company's financial turnover and staff turnover. These factors contribute less than 30% to the explained variance. The third type of factor, contributing

approximately 10% to the explained variance, concerns the geographical characteristics and the surrounding economic conditions (population density in the municipality and unemployment rate in the geographical department to which the establishment belongs).

In many activity sectors, the anticipated recruitment difficulties vary in the manner of an “inverted U-shaped curve” with the number of employees of the establishment and the company’s financial turnover. The higher the staff turnover rate, the less frequently difficulties are anticipated, which is indicative of a learning effect from managing recruitment plans. The local context also has a degree of explanatory

power, but it is limited: the higher the local unemployment rate and population density, the less establishments express difficulties.

In summary, these findings suggest that traditional observed characteristics provide a limited explanation for recruitment difficulties, which are explained mainly by unobserved or unobservable characteristics, such as organisational or idiosyncratic characteristics. Among observed characteristics, the occupation for which the recruitment is being carried out is the category that best accounts for the explained variance. Targeted support for occupations concerned could thus prove useful in alleviating perceived recruitment difficulties. □

Link to the Online Appendix:

www.insee.fr/en/statistiques/fichier/8305259/ES544_Bezy-et-al_OnlineAppendix.pdf

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APPENDIX 1

Table A1 – Characteristics of the new sample compared to the original BMO database

Variables	Initial database	Initial database restricted to recruitments	Final database
Percentage of establishments recruiting	26	100	100
Percentage of establishments expressing recruitment difficulties among those recruiting	52	52	66
Number of recruitments plans per establishment	1.5	5.7	7.6
Proportion of seasonal workers in recruitments	26	26	18
Breakdown by size of establishment (%)			
0 employees	11	10	1
1 to 4 employees	45	28	20
5 to 9 employees	15	16	18
10 to 19 employees	10	15	18
20 to 49 employees	12	19	23
50 to 99 employees	3	6	9
100 to 199 employees	2	4	6
200+ employees	1	2	5
Breakdown by activity sector (%)			
Manufacturing, mining and quarrying, and other	10	11	18
Construction	10	11	14
Trade, transport, hospitality	30	33	41
Information and communication services	2	3	2
Real estate activities	2	2	1
Specialist scientific and technical activities and administrative and support services	15	13	14
Public administration, education, health and social work	21	18	5
Other service activities	9	9	4
Number of observations	760,544	199,192	89,139

Notes: The "initial database" is the two stacked BMO 2018 and BMO 2019 databases. The "initial database restricted to recruitments" includes only establishments that report having at least one recruitment plan in the year they are interviewed. The "final database" is the one obtained after matching the "initial database restricted to recruitments" with the 2015 DADS and 2017 FARE data.

Due to its construction, anticipated recruitment difficulties and seasonal worker recruitment plans are calculated only for establishments with recruitment plans. The proportions of plans deemed difficult and seasonal worker plans therefore remain the same in the first and second columns. These figures vary as a result of the matching with the other databases because the characteristics of the establishments retained in the final database (size, sector) differ from the initial database. After the matching with the economic databases, the number of establishments in the agricultural and financial activities sectors was too small to be representative of the sector (fewer than 100 observations); they were therefore excluded from the analysis.

Sources: 2018 and 2019 BMO surveys (excluding establishments in the "agriculture, forestry and fisheries" and "financial and insurance activities" sectors), DADS and FARE data, INSEE.

DESCRIPTION OF THE VARIABLES

A2-1. List of the Variables and Databases Used

Table A2 – List of variables used in the model

Variable	Databases used	Years selected
Establishment characteristics		
Number of recruitments	BMO surveys (Pôle emploi)	2018/2019
Size		
Sector		
Proportion of seasonal workers		
Occupation type		
Being part of a group	FARE Data (INSEE)	2017
Financial turnover*		
Total number of recruitments	DADS Data (INSEE)	2015
Pay gap		
Characteristics of their environment		
Unemployment	Population census (INSEE)	2019
Population density*	ANCT Data	2018
Population*		
Urban area category	Base des aires urbaines 2010 (INSEE)	2018

*Variables expressed in logarithm in the estimations.

A2-2. Calculation of the Staff Turnover Rate

We do not have data on the number of incoming and outgoing staff each year. It was therefore necessary for us to use another formula. The standard formula for the staff turnover rate is as follows:

$$Turnover = \frac{NBa + NBd}{2 \times E(01.01)}$$

where NBa is the number of incoming staff for the establishment for the year, NBd is the number of outgoing staff for the year and $E(01.01)$ is the establishment's workforce at the start of the year on 1 January. The total workforce during the year is written as $E(TOT)$ and the establishment's number of employees at the end of the year on 31 December is written as $E(31.12)$.

We can write:

$$E(TOT) = E(01.01) + NBa = E(31.12) + NBd$$

Which gives the result:

$$NBa = E(TOT) - E(01.01)$$

$$NBd = E(TOT) - E(31.12)$$

By replacing NBa and NBd in the staff rotation rate equation, we finally get:

$$Turnover = \frac{2E(TOT) - E(01.01) - E(31.12)}{2 \times E(01.01)}$$

We therefore use this formula in our study. For establishments with no staff as at 01.01, we set the staff turnover rate to 0. This implicitly means that there is no staff turnover.

A2-3. Calculation of the Unemployment Rate

The unemployment rate by geographical department is calculated using data on individuals from the 2019 Population Census (INSEE). For each geographical department, we calculate unemployment rates by socio-professional category (CS), with eight categories. These geographical departmental rates for each CS are obtained using the individual weightings provided in the census database.

Each recruitment is then assigned the unemployment rate for its socio-professional category in its geographical department.

Example: an establishment in Ain is planning to recruit for CS 1. The unemployment rate for CS 1 in Ain is 8%. We therefore assign the value of 8% to this recruitment.

We then look at all the recruitments planned by the establishment and calculate the associated average unemployment rate.

Example: an establishment in Ain is planning two recruitments in CS 1 and three in CS 2. The unemployment rate for CS 1 in Ain is 8% and for CS 2 it is 10%. The unemployment rate the establishment is facing for these recruitments is calculated as follows:

$$UnemploymentRate = 8\% \times \frac{2}{5} + 10\% \times \frac{3}{5} = 9.2\%$$

A2-4. Calculation of the Pay Gap

An average reference wage is first calculated by socio-professional category (CS with 8 categories), size of establishment and geographical department. Each recruitment is then assigned a pay gap, depending on the average wage paid by the establishment recruiting in the CS concerned, by measuring the gap with the reference wage as percentages.

Example: establishments with between three and four employees in Ain offer an average wage of €2,000 per month in CS 1. Establishment A, based in Ain and with between three and four employees is seeking to recruit in CS 1 and pays its employees in CS 1 €2,400 a month on average. The pay gap assigned to this recruitment is:

$$WageGap_{recruitment} = \frac{2,400 - 2,000}{2,000} = 20\%$$

Once a pay gap value has been assigned to each recruitment, it is necessary to aggregate them at establishment level. We therefore take into consideration all the recruitments carried out by each establishment and calculate the associated pay gap, weighted by the number of recruitments.

Example: establishment A hires employees in CS 1 and 2. The pay gap is 20% for CS 1 and -10% for CS 2. Establishment A hires two new employees in CS 1 and three new employees in CS 2. In this case, the formula for the pay gap is therefore:

$$WageGap = 20\% \times \frac{2}{5} + (-10\%) \times \frac{3}{5} = 2\% .$$
