Job destruction, workforce characteristics and economic performance: Evidence from firm-level data in France, 2007-2018 *

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Abstract

The role of firms in adjusting workforce extends beyond merely responding to crises; however, other contributing factors remain incompletely understood. This study provides new insights into the determinants of workforce adjustments. Analyzing data from a decade (2007-2018) of medium and large French firms, we investigate how workforce composition and financial indicators drive workforce dynamics. We analyze three main outcomes. First, we examine the probability of mass layoffs within the framework of the french legislation *'Plan de Sauvegarde de l'Emploi'* – PSE. Second, we explore how these factors influence firm size, and finally, we assess their effects across different job growth rates. Our findings provide a comprehensive view of how workforce characteristics and financial indicators shape both expansion and contraction in firm employment, offering policymakers insight into the key factors affecting workforce adjustments.

Keywords: Labor Markets, Layoffs, Firms growth, Accounting indicators **JEL Classification:** D22, J23, J63

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1 Introduction

Contrary to the conventional wisdom that associates mass layoffs exclusively with impending recessions and economic downturns, recent events have underscored the occurrence of large job post destruction even in sectors known for their stability and solid performance. During the first half of 2023, the US technology sector witnessed an unprecedented disruption, displacing a staggering 200,000 workers. Acknowledging the enduring adverse effects on workers (Jacobson et al., 1993; Couch and Placzek, 2010; Davis and Von Wachter, 2011; Brandily et al., 2020; Bertheau et al., 2022), and the consequential ripple effects experienced by local labor markets (Gathmann et al., 2020), governments around the globe have created policies aimed to mitigate such effects.

While research has focused on the consequences of mass layoffs on workers, our current understanding of the specific factors that trigger these events remains incomplete. This study seeks to address this gap by examining the influence of firm financials and workforce composition on year to year firm employment reduction ('job destruction'). As we are interested in job destruction events initiated by firms, we focus specifically on mass layoffs. We depart from the usual classification of mass layoffs, which typically aggregates job destruction over an *ad-hoc* threshold. Instead we use the french legal definition of a mass layoff. We hope that under this definition, that imposes costs on such firms, we capture how firms respond strategically firm initiated workforce adjustment.

In this paper, we present a comprehensive analysis of the determinants of downsizing by examining the financial situation and workforce structure of firms with more than 50 employees in France, from 2007 to 2018. The legal work legislation in France significantly impacts decision-making regarding firm structure and employment. Previous work by Abowd and Kramarz (2003) demonstrated that the legal framework results in a concave cost function with respect to the number of layoffs. Our definition of downsizing aligns with the regulatory framework established by French legislation and reflects the dynamics of the country's industrial and labor landscape. We further investigate the drivers of firm size and employment growth to assess whether the determinants of downsizing mirror those of employment expansion. To assess the financial health and performance of firms, we analyze a comprehensive set of financial metrics derived from their balance sheets and income statements, including measures of productivity, leverage, capital expenditure, ownership structure, and market concentration. Additionally, we incorporate workforce composition variables that capture the firm's demographic composition relative to the broader labor market, including factors such as age, gender, and job type.

While existing literature has frequently relied on mass layoffs as a proxy for involuntary

separations, commonly associated with downsizing and internal reorganization within firms, this paper takes a distinct approach. By leveraging detailed separation information from administrative registries, merged with employer-employee datasets and financial records of firms, our methodology aligns with the precise legislative framework in France, allowing for accurate identification and classification of mass layoffs.

Mass layoffs are often used to identify firm-induced separations and their consequences. Our study takes a different approach by examining mass layoffs as a strategic tool in their own right. While much of the existing literature views mass layoffs as simple responses to economic downturns, we argue that this perspective is too narrow. French labor law recognizes a broader range of motivations for layoffs, and growing evidence suggests that firms use them strategically to optimize workforce composition and financial stability. This paper analyzes the factors driving mass layoffs by studying firms' workforce dynamics and financial data. We explore how companies navigate labor regulations and potentially exploit non-linear firing costs to make these calculated decisions. By shifting the focus from workers to firms, we aim to shed light on how mass layoffs function not just as responses to external shocks, but as deliberate business strategies.

The contributions of the paper are as follows. First, we contribute to the literature on job displacement that focuses on mass layoffs. The literature on the effects of layoffs on workers' outcomes is extensive.¹ However, one of the open questions is to determine the characteristics that influence firms to have mass layoffs. Moreira (2016) found that firms' life cycle is linked to the economic cycle. While the negative effect of the economic cycle is known to be a cause of firm exit and downsizing (Moscarini and Postel-Vinay, 2012; Davis and Haltiwanger, 1999), less is known about the individual firm characteristics and financial performance indicators that determine downsizing. In this paper, we measure mass layoffs by tracking a French legal procedure that firms with 50 employees or more must follow in the case of collective dismissals: the 'job protection plan' (*plan de sauvegarde de l'emploi*, henceforth PSE). Following the law, a firm must put a PSE in place in the case of dismissing ten or more employees for economic reasons over thirty days. This article is the first attempt to systematically track firms that meet the legal conditions of mass layoffs.

Second, we contribute to the literature on employment growth and corporate change. Studies on corporate change often provides analyses with equivocal results because of small samples, and different definitions of downsizing. To avoid the use of any *ad hoc* thresholds

¹Studies have documented the main characteristics of displaced workers (Kletzer, 1998), as well as the consequences of job displacement on earnings (Jacobson et al., 1993; Flaaen et al., 2019), employment, and wages (Bertheau et al., 2022). More recent articles have focused on firm outcomes, such as productivity and the labor share at the firm level (Brandily et al., 2020).

to define mass layoffs, we compute the annual growth rate of job positions at the firm level and estimate quantile regressions to assess the differentiated effects of firm characteristics on that rate according to whether the firms destroy or create jobs. More specifically, we explore the impact of two sets of variables. First, we focus on workforce composition in terms of gender, age, and occupation. The characteristics of the worker (and the job they hold) also play a role in the decision of displacement (Seim, 2019).² Finally, the occupational structure at the firm level is also relevant when analyzing firms' size and its changes. Harrigan et al. (2020, 2023) relate firm-level employment changes to the alteration of the employment structure in terms of occupations and incomes. Whereas job loss in the United States in the 1980s was concentrated among manufacturing firms, affecting blue-collar workers, greater heterogeneity across occupations has since been documented (Farber and Hallock, 1999; Kletzer, 1998). To account for the workforce composition, we calculate the share of job positions in the firm for each modality of these variables. Then, each share is compared to the median share to capture cross-firm differences in workforce composition. Second, we also investigate the effect of the firm's past economic performances - in terms of profitability, productivity, investment, indebtedness, and liquidity on job destruction. As reviewed by Datta et al. (2010), various explanations can be provided for downsizing. First, deteriorating business conditions are significant factors, which, combined with non-linear labor adjustment costs (Hamermesh and Pfann, 1996), may result in layoffs. Focusing on large German firms in the 2000s, Goesaert et al. (2015) find that the main reason for downsizing is a business downturn.³ Then, degrading financial indicators also play a role in downsizing. Reynaud (2013) also indicates that accounting indicators, such as return on equity, productivity, and turnover on sales, are key predictors to downsizing. Finally, as shown by Reynaud (2013), firm attributes-firm size, the sector of activity, and being listed or not-matter. According to Moscarini and Postel-Vinay (2012), larger companies are more likely to contribute to job destruction, particularly in times of high unemployment. Based on a Belgian survey conducted in the 1990s, Coucke et al. (2007) shows that manufacturing firms were more likely to downsize than service firms. Parallel to this literature, some papers have argued that shareholders of publicly-listed companies may also influence their decisions to downsize (Lazonick and O'Sullivan, 2000; Froud et al., 2000). As shown by Jung (2015), who focuses on a large sample of U.S. firms from the 1980s through the mid-2000s, the features of shareholding influence downsizing. Blockholding institutional investors (i.e., investors with more than 5% ownership) are more likely to be associated with fiercer downsizing because

²The likelihood of displacement also changes depending on the difference between the firm's requirements and the worker's endowments (Margolis and Montana, 2023). In addition, the contract type also seems relevant when we consider job creation and destruction. Duhautois and Petit (2023) show that job creation or destruction generally accounts for more than a third of the staff. This flow is mainly driven by CDD, even though the flow of CDI contributes to changes in total employment, especially when it decreases.

³In this case, job reductions tend not to alter productivity or profitability. When job reductions are not associated with poor economic conditions, they tend to target the restoration of productivity and profit margins.

they cannot easily dump their shares of underperforming firms.

Based on a sample of less than 700,000 firms between 2007 and 2018, we estimate a similar this model with different dependent variables: (i) a binary indicator for mass layoffs running logit estimations, (ii) firm size by running OLS and GMM estimations, and (iii) the change in firm size by estimating quantile regressions. Among our main results, we find that the workforce composition in the firm matters in job destruction/mass layoff, and firm size: job destruction or mass layoff tends to be higher in firms with a higher share of young workers or blue collar (skilled and unskilled) workers. Additionally, we find that economic performance also plays a significant role in the job dynamics: for instance, job destruction/mass layoffs are more likely to occur in firms with lower ROA, investment effort and liquidity ratio and with higher aggregate payroll and debt ratios.

Outline The remainder of the paper is organized as follows. Section 2 describes our main data sources and presents descriptive statistics. Section 3 presents the two statistical models that we use to study the determinants of mass layoff and to analyze the determinants of job growth. Section 4 presents the results. Section 5 concludes.

2 Data

2.1 Sources and sample

2.1.1 Sources

Our empirical analysis draws on four different administrative data sources: (i) the French match employer-employee dataset (DADS), (ii) administrative data on worker flows (MMO-DSN), (iii) balance sheets and income statements of firms (BIC-RN/BIC-IS), and (iv) information on their ownership structures (LIFI).

Déclaration Annuelle de Données Sociales (DADS): renamed recently *Déclaration Sociale Nominative*, systematically links employers and employees. The DADS is compiled from mandatory reports to the payroll tax collection agency (URSSAF Caisse Nationale) by all employers operating in France. The initial database contains information on approximately 64 million firms over the studied period (2007-2018). It contains general information on firms (i.e., sector, location, size), their employees (i.e., gender, age, profession, and socioprofessional category), and their jobs. *Mouvements de Main-Oeuvre (MMO):* We also refer to the monthly flow declarations, which record worker recruitments and contract terminations from establishments of 50 employees or more in Metropolitan France. The correspondence between the unique identifier of each company (SIREN number) and those of its establishments (SIRET number) allows us to conduct our analysis at the level of the company, which is the unit of observation for the accounting and financial data. Since 2007, MMO has provided information on the types of exit (end of a fixed-term contract, quit, dismissal for economic reasons, dismissal for personal reasons, mutually agreed-upon termination - rupture conventionnelle-, retirement, etc.). Therefore, we use MMO to identify firms that should implement a legally defined mass layoff (*plan de sauvegarde de l'emploi*, PSE).

Bénéfices Industriels et Commerciaux: Accounting information comes from the tax documents filed by companies and systematically collected by the Ministry of Finance. The database compiles the declarations of all operating firms with more than \in 818,000 in annual sales revenue and subject to the regular corporate tax regime up to 2015. This database provides accounting information on approximately 7.5 million firms between 2007 and 2015, i.e., approximately 940,000 firms each year. From 2016 the sample includes all companies regardless of their tax regime and adopted a new name (The *Bénéfices Industriels et Commerciaux, Tous Régimes* – BIC-IS). This second source covers a larger number of firms, approximately 8 million, from 2016 to 2018, i.e., approximately 2.7 million firms each year. From BIC-RN and BIC-IS, we extract the information needed to construct our accounting indicators that measure economic/financial performance.

Liaisions Financières (LIFI): is an annual survey that provides information on approximately 40,000 business groups operating in France and the shareholdings of holding companies and their subsidiaries, covering approximately 5 million firms over the entire study period, i.e., 333,000 firms each year. Consequently, LIFI makes it possible to distinguish family-run businesses and subsidiaries from independent companies, be they private or publicly listed.

2.1.2 Sample

Using the unique firm identifiers (SIREN), we match the data on workers' characteristics (DADS) with the accounting information (BIC-RN and BIS-IS). Because the calendar and fiscal years do not coincide, we compute the number of jobs in each company on a daily basis and then aggregate this count for each fiscal year.⁴ After merging these two sources of information, our starting sample is composed by 12, 448, 165 firms (an average of 1, 131, 651 firms per year). We merge the flow information at the firm level, using workers' hirings and exits (MMO). The merge requires an additional step since the unit of observation in

⁴Section A.2.2 in Appendix A, documents the data construction.

MMO is the establishment: we aggregate the data across all firms' establishments using the correspondence between the establishment unique identifier (SIRET) and the firm one (SIREN).

We apply basic restrictions to our data set. These restrictions reflect the needs of the statistical exercise proposed and the legal definition of mass layoff. We restrict our sample to firms with flow information, for which we observe financial and worker demographic characteristics. We also restrict our sample to all firms with more than 50 full-time workers on any day between 2007 and 2018. After merging and cleaning the data, our full sample consists of 681, 931 firms (an average of 61, 994 firms per year). The resulting panel is unbalanced.⁵. This could potentially create selection bias in our results. As shown in Table B1 in Appendix B, if we compare the number of firms available each year to the total number of firms, the resulting percentage is relatively stable over time, between 5.4% and 7.1%.

2.2 Measuring mass layoffs / job destruction

One of the main challenges in analyzing mass layoffs is defining such an event. The size and dispersion of jobs flow largely varies between countries, and it is sensitive to its institutional context (OECD, 2009). Is the threshold valid across countries? Are statistical reasons to set such thresholds? While there is no definitive answer to this question, the definition may vary depending on the literature being considered. Two approaches can be clearly seen: one from the economic literature and one from the corporate change literature.

The economic approach is based on a clear threshold of employment reduction. Jacobson et al. (1993) defines mass layoffs as a reduction of 30% of the initial workforce. Using this threshold allows us to distinguish voluntary and involuntary separations. This definition has since been commonly used in the literature on job displacement (Bertheau et al., 2022). Davis and Von Wachter (2011) develop an even stricter set of criteria: (i) an employment contraction of 30 to 99% at the end of the mass layoff period (from t-2 to t), (ii) employment at the beginning of the mass layoff period (in t-2) greater than 130% of employment during the pre-layoff period (t-3), and (iii) no full recovery after the mass layoff period in t-2). The first condition excludes spurious firm deaths, while the other two exclude temporary variations. Very similar conditions—with a minimum employment contraction threshold of 25%—are adopted by Margolis and Montana (2023) for France. Finally, Brandily et al. (2020) defines mass layoff as a 10% decrease.

⁵Firms might not show in the data for several reasons. The most evident is firms that merge or disappear. A firm can also not appear in our sample if there is no financial information for the specific year or the firm does not have any employees for the period. Using a balanced panel for the time span considered (2007-2018) would be too restrictive, resulting in a smaller sample of 'only' 271, 164 between 2007 and 2018.

Instead, the corporate change research defines downsizing as a reduction in the scale of a firm's operations that implies layoffs (Espahbodi et al., 2000). Different thresholds for job reductions exist. For instance, Suarez-Gonzalez (2001) studied a small sample of firms experiencing a 5% decrease in operations, whereas De Meuse et al. (2004) considered reductions of 3%. As reviewed by Datta et al. (2010), 3%, 5% and 10% are the most common percentages used in this literature to measure the share of the labor force made redundant in one or two consecutive years. The selection of the threshold is 'ad hoc', and is not tied to any institutional obligation. One exception is Coucke et al. (2007), who use the obligation of Belgian firms with more than 20 employees to report a collective dismissal, defined as a workforce reduction of more than 10% of employees. Alternatively, researchers rely on press releases and newspaper articles that announce sweeping layoffs (Espahbodi et al., 2000; Goesaert et al., 2015; Jung, 2015).

2.2.1 A legal definition of mass layoffs

In the first part of the paper, we study mass layoffs. Unlike the existing literature, we adopt the French legal definition of mass layoffs, which is based on a legal requirement in the case of collective dismissals. We construct an indicator variable that determines if a firm had a mass layoff based on this definition.

Since the implementation of the Social Modernization Act in 2002 – *Loi de modernisation sociale* –, a scheme of employment protection is in place in France. The job protection plan (henceforth PSE, from the french *'plan de sauvegarde de l'emploi '*) consist of a series of administrative and in-kind obligations for companies that plan mass layoffs. The type of in-kind obligations considers, among others, the provision of alternatives to termination of employment, such as redeployment opportunities or training.

Three main conditions trigger the requirement for a firm to implement a PSE.⁶ First, a firm with 50 or more employees must dismiss at least 10 employees for economic reasons within 30 days of announcing the decision to the workers' representatives. Second, if a firm terminates at least 10 employees for three consecutive months without ever reaching 10 terminations during the same period of 30 days, then any new dismissal during the following three months triggers a PSE. Third, if a firm fires at least 18 employees in a given calendar year, any new dismissal during the first three months of the next year triggers a plan. We count dismissals for economic reasons (*licenciements pour motifs économiques*)

⁶Section A.4. in Appendix A provides a more detailed description of the computation of this variable, which identifies all firms meeting the legal criteria for putting a PSE in place.

and (early) retirements (*retraites et préretraites*) to identify PSEs. We identify the economic separations from the French Ministry of Labor's job flows (MMO) database. However, because of missingness and under reporting, we are only able to track PSEs between 2007 and 2017. It is important to note that this definition of a PSE may underestimate the number of layoffs, as it does not consider worker transfers between different establishments within the same firm. These transfers do not change the total number of firm employees, but they may locally worsen the living conditions of workers at establishments that reduce their workforce.

Only a very small percentage of firms, i.e., approximately 0.65% in our sample, were in a situation to implement a PSE between 2007 and 2017 (Table 1). Even if the firms that were in a position to adopt a PSE is relatively low, the number of workers in firms that had a PSE is around 5% of the workforce (around 5,8 millions of workers). Moreover, as shown in Table B2 in Appendix B, large year-to-year variations can be observed. If we consider yearly, the maximum is attained in 2015, where the number of workers in firms that had a PSE is 10% of the workforce. When focusing on job destruction, PSE firms account for approximately 8% on average, again with a higher percentage at the end of the study period.

2.2.2 Job creation and job destruction

The second outcome of interest is firm-level job growth. It is measured as the year-toyear change in workforce size in all the firms in our sample, from 2007 to 2018. This second sample is not restricted to size as in the previous case, but includes all the firms that had demographic, composition, and financial information during this period. The aim of using this variable is to investigate the asymmetrical effects of the independent variables on job destruction and job creation.

Figure 1 shows the distribution of the annual growth in the number of job positions within firms, with little variation over time. In our sample, firms in the first decile experienced an employment reduction of 16.0% on average. Then, the average decline, over the period, in the number of job positions within the firms of the 25th percentile is 5.7% on average over the entire study period. There is an average increase of 0.05% among firms in the 50th percentile, of 9.1% in the 75th percentile, and, finally, of 25.2% in the 90th percentile.

On average over the entire period, shrinking firms (i.e., firms with a negative annual job growth rate) account for 41.84% of all firms (see Table 1). In addition, Figure B1 in Appendix B depicts the share of jobs destroyed by job destruction quantile over the entire study period, suggesting strong concentration in job destruction with little variation across years.

Figure 1: Yearly job growth distribution (2004-18).



2.3 Socio-demographic and financial variables

Table 1 presents the descriptive statistics of the variables of interest that are used as covariates in the empirical exercise. The variables can be divided into three groups:

- Firm characteristics: These variables describe the firm's sector of activity and firm size.
- Workforce characteristics: These variables describe the firm's workforce, such as the average age and the type of occupation of employees.
- Financial characteristics: These variables describe the firm's financial health, such as
 its debt-to-equity ratio and return on assets. From the variables we can also establish
 the direct ownership of the firm to a group or economic conglomerate.

Table 1 presents descriptive statistics on all the firms with more than 50 full-time employees any day between 2007 and 2018, from three sources: DADS, MMO and LIFI survey. The numbers in the table are the average frequencies of the modalities of variables that describe the firms and their workforces. All accounting-based indicators are expressed in mean values, except for sales revenues (expressed in current Euros) and shareholding variables (business group membership and direct ownership of known individuals) that are expressed in percentages. The first column presents the frequencies among all firms. The second one focuses on the firms that should implement PSE. The third and fourth columns divide the full sample between downsizing and non-downsizing firms. For instance, 49.47%

of the firms that should implement a PSE concern the manufacturing sector, while it only consists of 22,34% of all firms.

We compute the gender composition, age distribution, and occupation structure of the firm's workforce to characterize it. We use the aggregate French occupational classification to characterize the occupation, which classifies workers into the following levels: managers, middle-management professions, non-manual employees, and skilled or unskilled blue-collar workers.⁷

The descriptive statistics indicate large heterogeneity in firm characteristics when comparing PSE firms or shrinking/nonshrinking firms. Some differences by industry and firm size are observable: whereas PSEs are more frequent among manufacturing firms, job destruction is more pronounced among service firms. PSE firms and shrinking firms have a higher share of male and older workers (i.e., aged 35-64). In addition, PSE firms have a higher share of managers and middle-management professions and a lower share of non-manual employees. In contrast, we do not observe large differences in occupational ratios between shrinking firms and all firms in our two samples.

Second, we focus on several accounting variables that capture the firms' economic performance⁸ Two measures of profitability are used: the return on assets (ROA), which compares firm net result with total assets, and the margin rate, which is the ratio of the gross operating surplus to value added (i.e., turnover minus external charges). These two variables are expected to be negatively correlated with the probability of implementing a PSE and with job destruction. Then, we use sales revenue in level (t-1) as well as in annual variation. The first metric is an indicator of the size of the business which is expected to be positively associated with our dependent variable, while the second captures the state of the business and is expected to be negatively correlated with the explanatory variable. Next, we compute the Herfindahl-Hirschman Index (HHI) as a measure of the concentration of sales at the industry level to represent the competitive pressure. This index is expected to be negatively correlated with the dependent variables. Then, to measure labor productivity, we compute the ratio between the value added and the number of employees. In addition to labor productivity, we consider the total payroll expenditures (wages and social contributions) as a share of the value added. Our measure of labor productivity is expected to be negatively associated with the probability of implementing a PSE and with job growth, whereas we expect a positive correlation with the aggregate payroll ratio. Investment effort is then

⁷We exclude 'farmers and smallholders', and 'artisans, shopkeepers and company managers' from our analysis. The present analysis is performed on non-farm firms only. We do not report artisans due to the specific sociodemographic characteristics of such workers.

⁸Table A2 in Appendix A provides more information on the definition and computation of each variable.

	All finner	DCE	Doumoining	Nan
	All liftis	PSE -	Downsizing	non
	(1)	(2)	(3)	(4)
	(-)	(-)		(*/
All firms		0.65	<i>A</i> 1 8 <i>A</i>	58 16
Industry		0.05	41.04	50.10
Retail	19 53	13 87	19 78	19 34
Manufacturing	22.24	49 47	24 97	20.29
Services	49 46	33 45	46 27	51 75
Construction	8 77	3.21	8.98	8.92
Firm size	0., ,	5.21	0.70	0.72
1-49 employees	54.30	5.74	52.72	55.43
50-249 employees	36.81	41.18	37.69	36.18
250-4.999 employees	8.62	48.85	9.31	8.13
More than 5.000 employees	0.26	4.24	0.28	0.25
Gender				
Female workers	38.34	36.25	37.75	38.77
Age				• • •
Share of 15-24 y.o.	10.52	4.65	9.30	11.40
Share of 25-34 y.o.	26.66	20.80	24.82	27.99
Share of 35-44 y.o.	26.73	30.00	27.08	26.48
Share of 45-54 y.o.	24.41	30.87	26;08	23.20
Share of 55-64 y.o.	11.67	13.67	12.71	10.92
<i>Occupations</i>				
Executives and managers	17.08	24.48	16.30	17.64
Middle-management professions	17.89	21.76	18.08	17.75
Non-manual employees	29.61	16.32	28.88	30.13
Unskilled blue collar	10.07	11.02	10.16	10.00
Skilled blue collar	25.36	26.41	26.58	24.48
Financial indicators				
ROA	20.05	-3,00	14.96	23.72
Operating margin/Net surplus	13.79	-4,99	11.45	15.47
Sales revenues [†]	27.97	0.14	28.96	27.25
HHI on sales	0.03	0.02	0.02	0.03
Labour productivity [‡]	165.29	166.85	160.61	168.65
Total payroll ratio	65.96	82.31	67.39	64.93
Investment effort	26.48	23.24	23.07	28.93
Debt rate	69.58	88.04	71.21	68.42
Liquid assets/Debt	27.79	14.39	27.02	28.35
Business group membership	62.57	78.46	64.80	60.97
Direct ownership $(> 50\%)$	56.53	46.88	56.12	56.82

Table 1: Descriptive Statistics

Source: *DADS, BIC, MMO*, 2007 – 18.

Note: calculations by the authors. The proportions are expressed in percentages. For the variables that describe the firms and their workforces, the numbers in the table are average frequencies. All accounting-based indicators are expressed in mean values, except for sales revenues (expressed in current Euros) and shareholding variables (business group membership and direct ownership of known individuals) that are expressed in percentages. † symbol indicates that the results are expressed in millions. ‡ symbol indicates that the results are expressed in thousands. Column (1) presents the results for the whole sample, column (2) presents the results for the sample of firms that fulfill the conditions for an administrative mass layoff according to French legislation (PSE). Columns (3) and (4) divide the full sample between shrinking () and non-shrinking firms .

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computed as the variation in capital assets, i.e., an increase in acquisitions, creations, provisions of funds, or transfers from one item to another, measured as the ratio to total assets. Investment effort is thus expected to be negatively related to our dependent variables. To measure the effect of indebtedness, we calculate the ratio of the total debt to capital (defined as the sum of debt and equity).⁹ Higher debt ratios are expected to be associated with a higher probability of implementing a PSE and with a higher job destruction rate. Finally, firms may face liquidity difficulties, with liquidity referring to the cash immediately available to repay loans and longer-term debt that fall due at the end of the year.¹⁰ As a primary variable, we compute the ratio of cash and marketable securities to short-term debt.¹¹ A negative relationship is expected between our liquidity ratios and our different dependent variables.

Descriptive statistics (Table 1) clearly show that PSE firms and shrinking firms tend to be less profitable. These statistics also indicate that PSE firms have on average a much higher level of sales revenues. Somewhat similarly, we observe the same characteristics among shrinking firms (relative to non-shrinking firms). Next, we find that these firms also face a more competitive environment, as indicated by lower HHI values. We also observe a higher level of labor productivity among PSE firms, unlike shrinking firms, which exhibit lower labor productivity than non-shrinking firms. Much less surprisingly, both PSE firms and shrinking firms have a higher total payroll ratio. These firms also display lower investment effort, a higher debt ratio (despite very small differences relative to non-shrinking firms) and a lower liquidity ratio.

Finally, using ownership data from LIFI allows us to identify the subsidiaries of larger groups and businesses owned by known individuals (located in France). First, we define a variable that indicates whether a firm belongs to a business group (i.e., to a parent firm or a firm controlled with an ownership rate greater than 50%) (Naouas et al., 2016). Then, we construct a second ownership variable that indicates whether the self-reported fraction of equity held by French individuals is above 50% (Thesmar and Thoenig, 2011). PSE and shrinking firms can be observed to belong more frequently to a business group. In contrast, PSE and shrinking firms tend to have a lower ownership concentration.

⁹We also computed disaggregated ratios: the total debt-to-equity ratio, the financial debt-to-equity ratio, as well the ratio of the interest payments to financial debt.

¹⁰This measurement, although crucial for practitioners, is rarely used, even in the management literature.

¹¹As robustness checks, we also consider alternative computations: comparing cash and marketable securities corrected for bank account overdrafts and short-term debt with turnover or long-term debt as well as total current assets as a share of short-term debt.

3 Econometric specification

In this section, we introduce the general model underlying the statistical analysis presented next. The general model is presented in the following equation:

$$Y_{jt} = \alpha Y_{jt-1} + \gamma Z_{jt-1} + \beta X_{jt} + \theta_s + \tau_t + \epsilon_{jt}$$
⁽¹⁾

Where Y_{it} is the dependent variable, X_{jt} is the matrix of observed time variant characteristics X_{jt} captures the characteristics of the workforce of the firm. Z_{jt-1} refers to the financial indicators, all expressed in t - 1 to address potential simultaneity issues. To account for the effects of the economic cycle we include time fixed effect τ_t . Moreover to account for different hiring and firing dynamics, and in order to capture for unobserved heterogeneity across sectors we include a set of fixed effects θ_s at the one-digit sector level. Finally, ϵ_{jt} is the error term. Incorporating lagged firm size, allows us to capture the influence of past firm size on the current dependent variable. However, it is acknowledged that including a lagged dependent variable can potentially introduce bias due to the creation of an endogeneity issue. This arises because the lagged dependent variable might be correlated with the error term.

To characterize the firm's workforce, we compute the shares of workers in terms of gender, age, and occupation. For each grouping, we calculate the median value across all firms in each year. Then, we construct a set of dichotomous variables that describe the firm's structure. Each variable has a value of 1 if the firm's share is above the median value across firms, and 0 otherwise. For example, firm j has a value of 1 if its share of female workers is above the median value of female workers across all firms in a given year t. The advantage of using these dichotomous variables is that they capture the share relative to the median firm composition, making it easier to interpret the results. For example, in the case of the share of female workers, the resulting β coefficient indicates the effect of having a relatively higher share of female workers.¹²

Within the time-variant characteristics, we include the lag of financial variables. We use the balance-sheet information of firms to construct a set of financial indicators that are widely used in accounting and finance to measure and identify economic or financial performance. Since the indicators vary and some are expressed in shares while others are in monetary terms, we normalize them to ease interpretation. This also helps interpret the

¹²Other literature that deals with the estimation of productivity-age profiles, and age-wage profiles at the wage level uses the firm characterization using the shares (van Ours and Stoeldraijer, 2011; Cardoso et al., 2011), and use GMM to estimate the coefficients of interest. Aligned with this literature, we complemnt our analysis with GMM estimates to understand the dynamics of firm size, and to tackle the bias introduced by the correlation of the lagged variable and the error term.

coefficients resulting from the regression.

We use this model with different dependent variables: (i) a binary indicator for mass layoffs, (ii) firm size, and (iii) the change in firm size.

3.1 What determines the likelihood of a mass-layoff?

In order to analyze what are the determinants of a massive layoff we use a logistic model with fixed effects. To determine a mass layoff we use the french legal definition, constructed using administrative data (see Section 2.2). The outcome variable is then a binary variable that equals 1 if the firm j meets the PSE criteria in year t, and 0 otherwise. The underlying equation is given by:

$$P_{jt} = \alpha N_{jt-1} + \beta X_{jt} + \gamma Z_{jt-1} + \theta_s + \tau_t + \epsilon_{jt}$$
⁽²⁾

where, P_{jt} is an indicator whether firm j in year t met the conditions to face a PSE; the right hand side follows the model presented in early, where N_{jt-1} is the lagged firm size.

In order to interpret the results of the logit model (equation 2), we do not present the coefficients but directly the marginal effects. The marginal effects indicate the change in the probability of the outcome for a one-unit change in the independent variable, holding all other independent variables constant.

3.2 What determines the dynamics of firm size?

To analyze the determinants of the dynamics of firm size in France, we study the following model:

$$N_{jt} = \alpha N_{jt-1} + \beta X_{jt} + \gamma Z_{jt-1} + \theta_s + \tau_t + \epsilon_{jt}$$
(3)

Retrieving unbiased estimates from equation (3) by OLS can only be done under the assumption that all regressors are uncorrelated with the error term. This is unlikely since an unmeasured third factor, such as productivity, determines firm size and financial indicators. Moreover, the model includes a lagged dependent variable, which can potentially introduce bias due to endogeneity, as the lagged dependent variable might be correlated with the error term. If the unobserved factors are constant over time, the bias could diminish with the inclusion of fixed effects. However, when shocks in the unobserved component result in changes in both financial indicators and firm size, it could lead to biased estimates, even with fixed effects.

To account for potential endogeneity, we estimate equation (3) using both the system and difference generalized method of moments (GMM). We instrument the financial indicators by their lags in levels and differences. The underlying assumption for identification is that the unobserved shocks are uncorrelated with lagged financial indicators but could be correlated with firm indicators in period t. We estimate standard error clustering at the firm level, making our reported statistics robust to heteroskedasticity and clustering.

3.3 The distributional determinants of job creation and destruction

To study the determinants of job growth across the distribution in France, we use a quantile regression approach. This approach allows us to examine how the relationship between firm characteristics, workforce composition, and financial condition varies across different quantiles of the job growth distribution. We expect that the relationship between these factors will be different for shrinking, stable, and expanding firms. For example, we may find that the workforce composition has a stronger positive effect on job growth for expanding firms than for shrinking firms. Using a quantile regression approach allows us to validate these heterogeneous effects and to gain a better understanding of the factors that drive job growth in France.

More specifically, we want to estimate the partial effects of the explanatory variables on any unconditional quantile of the dependent variable following the approach introduced by Firpo et al. (2009) that utilizes 'recentered influence function' (RIF) regressions. This method estimates the partial effect of a small location shift in the distribution of the explanatory variables on the dependent variable. More intuitively, the RIF allows us to quantify how each observation contributes to a given statistic. Regressing the explanatory variables on these contributions, allows us to see the incidence of firm financial indicators and workforce characteristics on different patterns of firm growth. As emphasized by Firpo et al. (2018), this method focuses on small changes in the distribution of the dependent variable.

The RIF for a quantile q_{τ} is defined as:

$$\operatorname{RIF}(y, q_{\tau}) = q_{\tau} + \frac{\tau - \mathbb{1}(y \le q_{\tau})}{f_Y(q_{\tau})}$$

where q_{τ} is the τ -th quantile of the distribution of Y, $f_Y(q_{\tau})$ is the density of Y evaluated at q_{τ} , and $\mathbb{I}(y \leq q_{\tau})$ is an indicator function equal to 1 if $y \leq q_{\tau}$ and 0 otherwise. The RIFregression model can be estimated using Ordinary Least Squares (OLS), where the dependent variable is replaced by the estimated RIF:

$$\hat{\beta}_{\tau} = \left(X'X\right)^{-1} \left(X'\hat{\mathsf{RIF}}(y, q_{\tau})\right)$$

Considering the general model of job growth:

$$\Delta N_{jt} = \alpha N_{jt-1} + \beta X_{jt} + \gamma Z_{jt-1} + \theta_s + \tau_t + \epsilon_{jt}$$
(4)

where ΔN_{jt} denotes the change in employment size in firm j. The outcome variable then is $\Delta N_{jt} = \frac{N_{jt}-N_{jt-1}}{N_{jt-1}}$. We calculate the Recentered Influence Function (RIF) for the firm job growth variable in each quantile of interest RIF $(\Delta N_{jt}, q_{\tau})$, and regress it on our set of variables. This procedure allow us to estimate the conditional probability model given our covariates of interest of being below or above certain quantile. In other words, we can evaluate the marginal contribution of each covariate to the quantile q_{τ} of the distribution of the dependent variable. Specifically, we can examine whether the employment structure and its characteristics, or how the financial indicators, have differential effects across the firm growth distribution.

As in the previous exercise, our model includes a set of dichotomous variables that describe the firm's composition relative to the median firm in each dimension of the workforce structure. The model also includes financial indicators and a one-year lagged dependent variable to capture the potential inertia in job growth over time. We also include firm and year fixed effects to tackle unobserved invariant firm and year effects.

4 Results

4.1 Baseline results

Regressions on PSE First, we explore how firm characteristics and firm workforce composition are related to the likelihood of initiating a mass layoff. To determine which firms are involved in a mass-layoff event, we resort to the legally-defined conditions for implementing a PSE.

Table 2 presents the regression results of the likelihood of having to implement a PSE. To make the interpretation of our results easier, we compute the marginal effects which indicate the change in the probability of the outcome for a one-unit change in the independent variable, holding all other independent variables constant. First, the composition of the workforce matters for PSE. Employing a higher share of male workers than the median share is negatively associated with the probability for a firm to have to implement a PSE (whereas the coefficients are weakly significant). The relationship between age categories and the dependent variable is not monotonic: firms with a higher share of younger workers (i.e., workers between 15 and 34 years old) and, to a much lesser extent firms with a higher portion of senior workers (55 years old and above) are less likely to need to implement a PSE.

Among firms that employ a large share of younger workers, firms that had to bear relatively large training costs have lower incentives to fire those younger workers. In addition, because employers may be more likely to hire young workers using fixed-term contracts, it can be costlier, in the French legal context, to lay off these workers. In contrast, firms with a larger share of middle-aged workers (i.e., workers between 35 and 54 years old) are more likely to trigger a PSE. Finally, companies with an overrepresentation of middle-management professions tend to be more often in the situation of triggering a PSE. Finally, we find that having a larger share of (unskilled and skilled) blue-collar workers is positively associated with triggering a PSE.

When focusing on economic indicators, we find that higher level of return to assets, margin rate, investment effort, and liquid ratio as well as a variation of sales revenue are all negatively correlated to the likelihood of PSE. On the other hand, a higher total payroll ratio is consistently found to be associated with a higher probability of implementing a PSE. We also find clear evidence that a higher debt ratio has a positive correlation with our dependent variable. In this case, companies may adjust their workforce to renegotiate interest rates or debt maturities with their creditors, who demand such adjustments. The positive relationship between sales revenue (in level) and PSE may suggest running a big business—here proxied by the value of what is sold—exposes to the risk of PSE. Finally, we find that a higher degree of competitive pressure (reflected by a lower HHI) is associated with a higher probability of PSE. We also explore some additional firm characteristics related to governance (captured by a dummy variable for business group membership) and concentration (measured by a variable indicating whether the self-reported fraction of equity held by French individuals is above 50%): our results indicate that belonging to a group is positively correlated with the probability of PSE.

Dynamics of firm size Next, we study the determinants of firm size, including the lag of the dependent variable among the explanatory variables. Table (3) presents the results of our estimation of equation 3). The first column estimates the model using OLS, while columns (2) and (3) estimate the model by GMM. When examining the OLS results (column (1)), we find that the relationship between age categories and the dependent variable is decreasing; for instance, we observe a higher magnitude in firms with a higher share of young workers. Additionally, having a higher share of middle-management professionals and blue-collar workers is correlated with larger firm size, whereas an overrepresentation of managers and non-manual employees is correlated with smaller firms. Firm employment is positively correlated with margin rate, competitive pressure, the share of aggregate payroll, investment effort, and the share of liquid assetsWhat determines the dynamics of firm size. In contrast, debt ratio, the labour productivity and our two ownership variables are associated with lower

Dependent variable	$\mathbb{1}_{\mathrm{PSE},t}$ (1)	$\mathbb{1}_{\mathrm{PSE},t}$ (2)	$\mathbb{1}_{\mathrm{PSE},t}$ (3)	$\mathbb{1}_{\mathrm{PSE},t}$ (4)	$\mathbb{1}_{\text{PSE},t}$ (5)
Full time employment $(t-1)$	0.004***	0.004***	0.004***	0.004***	0.003***
Share of male workers	(0.000) -0.002^{***} (0.000)	(0.000) -0.001^{***} (0.000)	(0.000) -0.002^{***} (0.000)	(0.000) -0.001^{***} (0.000)	-0.001
Share of 15-24 y.o.	(0.000) -0.005^{***} (0.000)	(0.000) -0.004^{***} (0.000)	-0.005^{***}	(0.000) -0.004^{***} (0.000)	(0.007) -0.003^{***} (0.000)
Share of 25-34 y.o.	-0.003^{***}	-0.002^{***}	-0.003^{***}	-0.002^{***}	-0.002^{***}
Share of 35-44 y.o.	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	$(0.000)^{***}$
Share of 45-54 y.o.	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	0.001^{*}
Share of 55-64 y.o.	-0.002^{***}	-0.001^{***}	-0.001^{***}	-0.001^{***}	-0.000
Share of managers	0.002***	0.001***	0.002***	0.001***	0.000
Share of professionals	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	(0.000) 0.001^{***} (0.000)	$(0.000)^{***}$
Share of Non-manual employees	-0.002^{***}	-0.001^{***}	-0.002*** (0.000)	-0.001^{***}	-0.000
Share of Unskilled blue collar	0.001***	0.001**	0.001***	0.001**	$(0.000)^{***}$
Share of Skilled blue collar	0.001***	0.000	0.001***	0.000	$(0.000)^{***}$ $(0.001)^{***}$
ROA	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
Margin rate	-0.002^{***}	-0.002^{***}	-0.002*** (0.000)	-0.002*** (0.000)	-0.003***
Sales revenues	0.003***	0.003***	0.003***	0.003***	-0.002^{**}
Δ Sales revenues	-0.010*** (0.000)	-0.009***	-0.009***	-0.009***	-0.012^{***}
HHI on sales	-0.002^{***}	0.000	-0.003*** (0.000)	-0.002^{***}	-0.002^{***}
Labour productivity	-0.000	-0.000	-0.000	0.000	-0.002*** (0.000)
Aggregate payroll/VA	0.001***	0.001***	0.001***	0.001***	0.005***
Debt ratio	0.002***	0.002***	0.002***	0.002***	0.002***
Investment effort	-0.001^{***}	-0.001^{***}	-0.001*** (0.000)	-0.001*** (0.000)	-0.000***
Liquid assets/Debt	-0.001^{***}	-0.000***	-0.001^{***}	-0.000***	0.000
Business group membership	0.001***	0.001*** (0.000)	0.001***	0.001***	-0.001* (0.000)
Direct ownership (≥ 50 %)	0.000	0.001*** (0.000)	0.000	0.000	0.001*** (0.000)
Observations	494,939	494 939	494 939	494 939	495,460
Industry FE	No	Yes	No	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
	INU	INU	105	103	103

Table 2: Determinants of PSE

Significance:

Source: MEADOW from DADS, MMO, BIC, LiFi, 2007 - 2017, accessed through CASD.

^{*}p<0.1; **p<0.05; ***p<0.01

Note: Calculations by the authors. The table presents estimated coefficients of different versions of model 2. The model examines the factors that affect the likelihood of a mass layoff. The first column only includes the time-varying coefficients. The second column estimates the variation within industry, meaning that it controls for all unobserved factors that are constant within an industry. The third column, estimates the variation within years, accounting for unobserved constant characteristics at the year level. The fourth column includes a full set of industry and year-fixed effects. Columns (1) to (4) present the marginal effects of the logistic regression. The last column present the coefficients of the linear probability model.

firm size.

Then, to address the issue of potential endogeneity, we run difference and system GMM regressions (columns (2) and (3)). Tests for second-order autocorrelation in the residuals, reported in columns (2) and (3), indicate no evidence of additional serial correlation, but only for difference-GMM estimations. Finally, we reject the null hypothesis of valid instruments, as indicated by Hansen tests for both GMM specifications. Difference GMM estimations produce very similar results when compared with our baseline results (column (1)), except for the age categories (with non-linear effects), margin rate, debt ratio, the share of liquid assets and our two variables of ownership when the coefficients appear as significant. Our system-GMM estimations yield similar results, especially for the economic performance variables, although the magnitude of the estimated coefficients is larger compared to our previous specifications.

Quantile regressions on job growth Finally, to explore some heterogeneous effects across firms, we run quantile regressions on shrinking firms (q = 0.10; 0.25) and growing firms (q = 0.50; 0.75; 0.90). Table 4 display our OLS and quantile regression results. Note that for shrinking firms (Q10 and Q25), a positive coefficient indicates that the variable is associated with a lower rate of job destruction whereas a negative coefficient indicates a higher rate of job destruction. For growing firms (Q50 to Q90), a positive coefficient indicates that the independent variable correlates with a higher job creation rate. A negative coefficient signals a lower rate of job creation.

We find that workforce composition is related to job growth. First, the lagged value of the dependent variable shows a negative and significant coefficient, suggesting that firm size is correlated with job growth. Numerous dimensions of the workforce composition seem to be related to employment changes. We find some heterogeneous coefficients of workforce composition across age categories. Whereas the overrepresentation of young workers is always positively correlated to job growth, the overrepresentation of senior workers is associated with higher job growth in shrinking firms (columns (1) and (2)) but with lower job growth in growing firms (columns (3) to (5)). Similarly, the relationship between occupations and job growth is heterogeneous. An over-representation of managers or non-manual employees tend to accelerate job destruction among shrinking firms, whereas a higher share of middle-management professions or blue-collar workers tend to be associated with lower job destruction among shrinking firms.

When investigating the relationship between economic performance proxied by accounting indicators and job growth, our results not display some heterogeneous coefficients across the quantiles of our dependent variable. When focusing on shrinking

Dependent variable	Employment (t) - N_t (1)	Employment (t) - N_t (2)	Employment (t) - N_t (3)
	OLS	Diff-GMM	Syst-GMM
Full time employment $(t-1)$	0.269***	0.323***	0.268***
Share of male workers	(0.001) 0.029***	(0.015) 0.029***	(0.009) -0.082***
	(0.001)	(0.003)	(0.004)
Share of 15-24 y.o.	0.091***	0.043***	0.104***
Share of 25-34 v.o.	0.055***	0.015***	(0.003) 0.051***
j	(0.001)	(0.003)	(0.003)
Share of 35-44 y.o.	0.023***	-0.000	0.011***
Share of 45-54 vo	(0.001)	(0.002)	(0.003)
Share of 45-54 y.o.	(0.001)	(0.003)	(0.003)
Share of 55-64 y.o.	0.008***	0.026***	0.025***
	(0.001)	(0.003)	(0.003)
Share of executives and managers	-0.035***	-0.036***	-0.164***
Share of middle-management professionals	(0.002)	(0.004)	(0.006)
share of midule-management professionals	(0.002)	(0.003)	(0.004)
Share of non-manual employees	-0.015***	-0.017***	0.052***
	(0.002)	(0.004)	(0.008)
Share of unskilled blue collar	0.086***	0.037***	0.071***
	(0.001)	(0.003)	(0.004)
Share of skilled blue collar	0.094***	0.061***	-0.086***
ROA	(0.002)	(0.005)	(0.005)
iton i	(0.001)	(0.001)	(0.001)
Margin rate	0.031***	-0.026**	0.125***
-	(0.001)	(0.011)	(0.006)
Sales revenues	0.854***	1.695***	0.850***
	(0.003)	(0.047)	(0.022)
Δ Sales revenues	-0.125	-0.112	$-0.102^{+0.10}$
HHI on sales	-0.030***	-0.002	-0.025***
	(0.002)	(0.004)	(0.002)
Labour productivity	-0.061***	-0.036***	-0.034***
	(0.002)	(0.009)	(0.006)
Aggregate payroll/VA	0.098***	0.069**	0.351***
Daht ratio	(0.003)	(0.030)	(0.016)
Debt fatio	(0.001)	(0.009)	(0.004)
Investment effort	0.008***	0.019***	0.006***
	(0.001)	(0.002)	(0.001)
Liquid assets/Debt	0.005***	-0.011***	0.001
Durain and amount an all in	(0.001)	(0.002)	(0.001)
Business group membership	-0.003^{+1}	0.208	-0.008
Direct ownership ($> 50\%$)	-0.005***	0.629***	0.001
F ()	(0.002)	(0.087)	(0.004)
Constant	2.761***		3.009***
	(0.007)		(0.039)
Observations	495,460	461,174	502,023
R-squared	0.936	-	-
p-value AR(1)	-	0.000	0.000
p-value AR(2)	-	0.140	0.000
p-value Hansen	-	0.000	0.000

Table 3: Determinants of firm size

Note: CALCULATION DIC, MMU, 2007 – 18. **Note:** calculations by the authors. For all columns, the dependent variable is the level of full-time employment within the firm during period t. We present in the table the estimates of the dynamic model using three techniques: a linear regression model (column (1)), a difference-in-differences GMM estimator (column (2)), and a system GMM estimator (column (3)). Standard errors are reported in parentheses.

firms, our findings suggest that indicators usually signal sound business conditions, i.e. higher ROA, margin rate, sales revenues, investment effort and liquidity ratio, are all associated with a slower rate of job destruction.¹³ Then, we find that higher indebtedness, labor productivity, payroll ratio, and lower competitive pressure are all related to higher job destruction among shrinking firms (columns (1) and (2)), while all these variables are correlated with higher job creation in growing firms (columns (3) to (5)). Finally, we find that business group membership is associated with a higher rate of job destruction in all firms. In addition, ownership concentration is correlated with a lower rate of job destruction among shrinking firms and with a higher rate of job creation in growing firms. This is consistent with the results of Thesmar and Thoenig (2011), who find that shareholder representatives who oppose employment growth are less influential among firms with more concentrated ownership structures.

4.2 Robustness checks

4.2.1 Determinants of PSE

Additional regressions are then estimated to test the robustness of our results. First, alternative lags (t-2 and t-3) for our economic variables are considered. We want to investigate whether the likelihood of a PSE is affected by financial indicators with a delay, which would indicate that these indicators have a persistent effect on the likelihood of a PSE. Moreover, using longer lags can be justified, as managerial decisions can be made in the context of a longer-term strategic vision. As indicated in Table C1, we obtain robust results, with the same sign and magnitude as in our baseline results (except for investment effort and competitive pressure, which are no longer statistically significant). Interestingly, the significance of labor productivity increases, suggesting that the decision to trigger a PSE may be based on longer term trends, instead of short-term fluctuations in labor productivity. In the same vein, all our accounting variables are then expressed as three-year averages computed. Our results (Table C2 in Appendix C) are somewhat different to those of our baseline regressions: among the main differences, we first find, as predicted, that a lower level of productivity is correlated with a higher probability of adopting a PSE. More surprisingly, we find that higher debt ratio is now associated with a lower probability of PSE (suggesting that companies with high and sustained levels of long-term indebtedness are not ailing companies, but on the contrary companies that can invest for growth). Third, our results indicate that a variation in sales revenues is positively related to a higher likelihood of PSE.

¹³Very surprisingly, we find that higher margin rate and higher liquid ratio are both correlated with lower job growth in firms with create the most jobs (columns (5)).

	Δ Employment (t)				
	(1)	(2)	(2)	(4)	(5)
	0 10	(2) O ar	(3)	(4) () ==	(3)
	(-0.1597)	(-0.0571)	(0.0057)	(0.0917)	(0.2517)
Full time employment $(t-1)$	-0.054***	-0.023***	-0.016***	-0.054***	-0.229***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)
Share of male workers	-0.011***	-0.003***	-0.001***	0.001	0.004*
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of 15-24 y.o.	0.063***	0.027***	0.023***	0.033***	0.042***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of 25-34 y.o.	0.020***	0.008***	0.011***	0.023***	0.049***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
Share of 35-44 y.o.	0.014***	0.004***	0.001***	-0.003***	-0.014***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Share of 45-54 y.o.	0.032***	0.004***	-0.005***	-0.020***	-0.037***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
Share of 55-64 y.o.	0.024***	0.002***	-0.003***	-0.015***	-0.024***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of executives and managers	-0.031***	-0.008***	-0.001**	0.007***	0.007***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of middle-management professions	0.008***	-0.000	-0.003***	-0.011***	-0.026***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Share of non-manual employees	0.003**	-0.003***	-0.006***	-0.022***	-0.061***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of unskilled blue collar	0.029***	0.009***	0.005***	0.008***	0.028***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Share of skilled blue collar	0.006***	-0.003***	-0.007***	-0.021***	-0.068***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
ROA	0.003***	0.002***	0.001***	0.002***	0.002**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Margin rate	0.047	0.017****	0.008	0.005	-0.006
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Sales revenues	0.132	0.048	0.022	0.032	0.16/
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
∆ sales revenues	(0.002)	0.125	0.092	0.204	0.023
HHI on calos	(0.003)	(0.001)	(0.001)	(0.002)	(0.005)
HHI OII Sales	(0.000	(0.004	(0.002	-0.004	-0.049
Labor productivity	-0.036***	-0.004***	0.001)	0.011***	0.0003)
Labor productivity	(0.001)	(0.001)	(0.002	(0.001)	(0.002)
Aggregate navroll/VA	-0.004***	0.007***	0.009***	0.026***	0.093***
highe gate payron, m	(0.002)	(0.001)	(0,000)	(0.001)	(0.002)
Debt ratio	-0.025***	-0.008***	-0.000**	0.006***	0.019***
200014010	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Investment effort	0.009***	0.006***	0.005***	0.012***	0.030***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Liquid assets/Debt	0.013***	0.005***	0.003***	0.001**	-0.005***
1 ,	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Business group membership	-0.005***	-0.005***	-0.004***	-0.008***	-0.021***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
Direct ownership ($\geq 50\%$)	0.001	0.003***	0.003***	0.010***	0.045***
- /	(0.002)	(0.001)	(0.000)	(0.001)	(0.003)
Constant	-0.036***	0.012***	0.061***	0.321***	1.203***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.008)
Observations	489 940	489 940	489 940	489 940	489 940
R-squared	0.075	0.075	0.092	0.145	0.147
	0.075	0.075	0.072	0,113	0,11)

Table 4: Determinants of firms job growth - Quantile regressions

Significance:

*p<0.1; **p<0.05; ***p<0.01

Source: *DADS, BIC, MMO,* 2007 – 18. **Note:** calculations by the authors. Columns 1 to 5 present the unconditional quantile regression estimations at the 10th, 25th, 50th, 75th, and 90th percentile of the firm's job growth distribution. At the top of each column, we display the corresponding value of the outcome variable in the corresponding percentile. Standard errors in parentheses.

Next, firm restructuring decisions can be affected by the business cycle, which is captured with year fixed effects. From this perspective, it is interesting to investigate the specific role of the 2009 crisis by comparing the relationship between each accounting indicator and the dependent variable prior to and after 2009. Consequently, we interact each of our economic and financial variables with a dummy variable equal to 1 for observations after the 2009 crisis (and 0 otherwise). Our results suggest similar marginal effects prior to and after 2009, except for some variables (e.g. margin rate, or productivity), confirming that the crisis hardened the operating conditions of companies: margin rates would no longer protected against the risk of PSE, while labor productivity became a preventive factor (Table C3 in Appendix C).

To assess the robustness of the estimated parameters of the financial indicators, we use alternative definitions for each indicator. We run regressions, replacing each indicator one at a time, and check the stability of the remaining estimates. The results of each exercise are presented in Table C4 in Appendix C. To measure profitability, we use two alternative indicators: return on equity (ROE), which compares net income to shareholder equity, and an alternative margin rate, which compares operating income to value added. Compared to our baseline regressions where ROA does not appear as significant, ROE has a negative and significant coefficient (column (1)), which is coherent. Nonetheless, we preferred not to use the ROE in the baseline regression since this performance indicator does not take into consideration the firms' levels of debt. Similarly, we also find that our alternative margin rate is negatively associated with our dependent variable, and appears as statistically significant compared to our baseline regression results (column (2)). Then, three alternative measures of indebtedness are used: (i) the total debt-to-equity ratio, (ii) the financial debt-to-equity ratio and (iii) the interest payments-to-financial debt ratio. Except for our first alternative variable, which analyzes the financial debt-to-equity ratio (column (3)) and which has a positive (but weakly significant) coefficient, the estimated effects of our different ratios do not appear to be statistically significant. Finally, three alternative measures of liquidity are used. The first (second) ratio compares cash and marketable securities corrected for bank account overdraft and short-run debt with turnover (long-run debt), and finally, the last ratio measures total current assets as a share of short-run debt. We obtain conflicting results for our different debt ratios. The liquidity ratio, when expressed in proportion to debt, is positively associated with our dependent variable (column (7)), in contrast with our baseline results. However, our two alternative liquidity ratios do not appear to be significant (columns (6) and (7)).

4.2.2 Determinants of job growth

As in our previous PSE analysis, we estimate additional regressions to test the robustness of our results. When considering alternative lags (t-2 and t-3) for the accounting indicators, we find very similar results among shrinking firms (in terms of sign and magnitude) (Table

C6 in Appendix C). Next, we investigate the effect of the 2009 crisis on shrinking and growing firms (Table C8). Among shrinking firms (columns (1) and (2)), the coefficient signs for most variables are similar when comparing the average effect of each independent variable and the effect associated with the interacted variable, implying that the crisis made employment reductions even more sensitive to variations in the accounting indicators than they were pre-crisis. In contrast, the effects of economic variables on job creation among growing firms were muted after the crisis (the sign of the coefficient on the interaction term is the opposite of that on the main effect), especially for the debt ratio, labor productivity, the ratio of total payroll to value added, and investment effort (columns (3) to (5)).

Finally, as in our previous PSE regressions, we test the robustness of our results by using alternative accounting indicators (Tables C9 to C11 in Appendix C). We find results for ROE and the ratio of gross operating surplus to value added (Panels A and B) that are very similar to those in Table 4. When using alternative debt ratios, we find some contrasting results: our findings are very comparable to those in our baseline regressions when measuring total debt as a share of equity (Panel C). In contrast, both of the additional measures for debt (the financial debt-to-equity ratio as well as the ratio of interest payments to financial debt) are correlated with a lower rate of job destruction (column (5) in Panels D and E). Similarly, when focusing on alternative liquidity ratios—which reflect, however, different time horizons—our results show that greater liquidity is associated with slower job creation (Panels F and H).

5 Conclusion

Using firm-level data on a large sample of French firms from 2007 to 2018, this articles analyses the main determinants of job destruction. First, we contribute to the literature on job displacement that focuses on mass layoffs. To do this, we use a first approach based on the French legal definition of mass layoff called a *'plan de sauvegarde de l'emploi'* (PSE). In this first approach, We developed an algorithm identifying all the firms which meet the conditions to use this job protection plan. Similar algorithms can be used in other legal contexts, following the specificities of each country. Second, we contribute to the literature on employment growth and corporate change. In this literature, mass layoffs are usually defined by different *ad hoc* thresholds. In this paper, we used an alternative approach by analyzing the dynamics of firm size estimating by GMM regressions and job growth at the firm-level using quantile regressions. Additionally, comparing these two approaches indicate that legally defined downsizing (PSE in France) only accounts for a small proportion of all job losses.

Then, adopting the same empirical specification when analyzing the determinants of PSE, firm size and job growth makes our different regression results comparable. First, our

results indicate different variables are robustly associated with a higher probability of mass layoff (PSE), higher rate of job destruction or lower rate of job creation. In this category, we find some characteristics on workforce composition such as a higher share of middle-age workers, blue collar (unskilled or skilled) workers or middle-management professions. Firms with a higher aggregate payroll ratio, a higher debt ratio and with a more concentrated ownership structure are more likely to fit into this first category. Second, we find that a series of variables are all associated with lower probability of mass layoff (PSE), lower rate of job destruction or higher rate of job creation. This is the case for firms with a higher share of young workers, with higher ROA, margin rate, and liquidity ratio. Finally, we find more contrasted results for other socio-demographic or economic/financial variables, when comparing our three models. This may suggest that the determinants of mass layoff (PSE), firm size and job destruction/creation do not systematically follow the same logic.

All these results have strong policy implications, especially when identifying companies in difficulty. This aim of our algorithm based on administrative micro-data–which can detect all the firms which could be evolved in PSE in the case of collective dismissals–would be to identify alarming factors to prevent them from bankruptcy. Identifying such companies in difficulty at an early stage would allows to implement varied and effective support and financing actions for these companies. Beyond these implications in terms of public policies, a natural extension of this paper would be to analyzed how firms could adjust their employment level (or wages) to shocks on sales/value added/productivity/technological changes. This will be the topic of further research.

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Appendix A

A Variables and sources

Table A2 shows the definition of each performance indicator used in the paper, its definition, and the formula from which it is computed. The inputs for the formula uses the field names of the financial statements database (BIC). The following section presents in detail the data sources used in the paper.

A.1 Sources

A.1.1 DADS Postes

The Déclarations annuelles de données sociales (DADS) is a compulsory procedure that must be completed annually by all businesses operating in France. This obligation serves both fiscal and administrative purposes: providing information on the characteristics of the firms and their establishments (i.e., sector of activity, location, size), the people that they employ (i.e., gender, age, geographical department of residence) and the jobs that they perform (i.e., duration, employment conditions, qualifications, remuneration).

More precisely, in the DADS Postes series, the unit of observation is the job position ("*poste*"), which is defined as a succession of periods of employment for a given employee. The quantitative variables (i.e., wage, working hours) for each period are summed together, while for the categorical variables (such as job qualifications, contract type, employment conditions, and individual-level socioeconomic qualifications), only those corresponding to the period of employment with the highest pay are recorded. Companies and their establishments are identified by a unique identifier (SIREN for firms and SIRET for establishments), and they are qualified by the legal category of the firm and its APE code (*activité principale de l'entreprise*), which characterizes the sector in which the firm operates. If there are two employment periods, their start and end dates are registered. Otherwise, the limits on the first period are known, and a 'second' period contains the aggregate of all the others. 'Ancillary jobs' ('*postes annexes*'), i.e., jobs in which workers are employed less than 30 working days or 120 hours and paid less than three times the monthly minimum wage are distinguished from sustained jobs ('postes non-annexes'). Here, we study only the latter.

Until mid-2015, the data in the DADS Postes series were taken from compulsory declarations from companies with 50-plus employees and from surveys of smaller companies. Beginning in the third quarter of 2015, there is one consolidated source of information: the 'Nominative Social Declaration' (*Déclaration Sociale Nominative*, or DSN). This change in

	Variable	Definition	Computation (BIC codes)
Profitability	Return on assets (ROA)	Net income over total assets (i.e., net intangible and tangible assets + working capital)	GG/[((AN+AP+AR+AT+AV+AX) - (AO+AQ+AS+AU+AW+AY) + (AB+CX+AF+AH+AJ+AL)- (AC+CQ+AG+AI+AK+AM) + (BL + BN + BR + BT + BV + BX + BZ) - (DW + DX + DY + DZ + EA)]
	Return on equity (ROE) Margin rate	Net income over shareholder equity Gross operating surplus over value added Operating income over value added	DI/DL [(FL + FM + FN + FO)- (FS+FT+FU+FV+FW+FY+FZ)/[(FL+FM+FN+F (FS+FT+FU+FV+FW)] GG/[(FL+FM+FN+FC)-
	- 1	1. 1.1 1.1	(FS+FT+FU+FV+FW)]]
Turnover and competitive pressure	Sales revenues Competitive pressure	Turnover achieved through sales Herfindahl-Hirschman Index (HHI) for sales takes on values between 1/Nk (where Nk is the number of companies in activity k) and 1. We then compute an index for the average competitive pressure faced by the firm in the market in which it is active. This average is the average of the sectoral indices.	FL Sales = Sales on goods (FC) + Quantity of goods sold (FF) + Quantity of services sold (FI)
			$HHI = \sum_{k=1}^{N} \left(\frac{Sales_i}{\sum\limits_{k=1}^{N} Sales_i} \right)^2$
Productivity and payroll ratio	Labor productivity	Value added over the average number	((FL+FM+FN+FC)- (FS+FT+FU+FW+FW))/YP
	Payroll ratio Aggregate payroll (gross payroll tax, and employees payroll tax, and employees sharing) over value added		(FY + FZ + HJ)/((FL+FM+FN+FC) - (FS+FT+FU+FV+FW))
Investment	Investment effort	Increase in acquisitions, creations, provisions of funds, and transfers from one item to another over total assets	LP / [((AN+AP+AR+AT+AV+AX) - (AO+AQ+AS+AU+AW+AY) + (AB+CX+AF+AH+AJ+AL) - (AC+CQ+AG+AI+AK+AM)]
Indebtedness	Total debt/Capital Total debt/Equity	Total debt over capital, where capital is the sum of debt and equity Total debt over equity	(DS+ DT + DU + DV+DW+DX+DY+DZ + EA – EH +J7)/(DL + DS+ DT + DU + DV+DW+DX+DY+DZ + EA – EH +J7) (DS+ DT + DU + DV+DW+DX+DY+DZ +
	Financial debt/Equity Interest paid on debt	Financial debt over equity Interest payments over financial debt	EA – EH + J7)/DL (DU+DV-EH)/DL GR/(DU+DV-EH)
Liquidity	Cash and marketable securities/Short-run debt	Cash and marketable securities over short-run debt	(CF – CG)/EG
Liquidity	Current assets/Turnover	(Cash and marketable securities – bank account overdrafts – short-run debt) over sales revenue	[(CF – CG) + (CD – CE) – EH – EG]/FL
	Current assets/Long- run debt	(Cash and marketable securities – bank account overdrafts – short-run debt) over long-run debt	[(CF – CG) + (CD – CE) – EH – EG]/(DU + DV)
	Total current assets/Short-run debt Business group membership	Total current assets over short-run debt Equal to 1 if a firm is a parent firm or is controlled by another firm with at least 50% ownership	(CJ-CK)/EG
Ownership	Ownership concentration	Equals 1 if the self-reported fraction of equity held by French individuals is above 50%.	

Table A1: Definition of the performance indicators

protocol for collecting information has occasionally deteriorated the quality of the microdata for the transition year of 2016 (Bonnet and Vuillemin, 2019)¹⁴.

A.1.2 MMO

The Labor Movements (MMO) databases provide very detailed information on each employee's entry and exit at the establishment level and their motivations (recruitment with permanent or fixed-term contracts, transfers to other establishments, quits, dismissals for economic or other reasons, retirements, terminations by agreement, etc.) as well as the sociodemographic characteristics of employees. The MMO databases are produced by the DARES, the statistical office of the French Labor Ministry, and are derived from several sources. Until the second quarter of 2015, they were based on historical sources, i.e., declarations of labor movements (DMMOs, which are compulsory for all establishments with more than 50 employees) and an associated survey (EMMO, for establishments with fewer than 50 employees). Beginning in the third quarter of 2015, they were reconstituted from the data on the Nominative Social Declaration (DSN).

The data source that we use is the 2018 version of the MMO. It combines data on labor movements from 1993 to 2018. These data record all recruitments and terminations of employment contracts at the establishment level. They make it possible to measure entries and exits according to the type of contract (fixed-term contract/permanent contract), the duration of the contract, and the reason for termination. For each reference year, the data are separated into two files: one with the characteristics of the establishments and another with the movements associated with the establishments. The MMO universe is establishments in the private sector, excluding temporary workers and agriculture, in Metropolitan France. These are establishments that were employers for more than two years at the time the database was created, with the exception of establishments with more than 50 employees. Historically, labor movement statistics have covered private sector establishments in Metropolitan France excluding agriculture and excluding temporary workers.

A.1.3 BIC

The *Bénéfices industriels et commerciaux, régime normal* (BIC-RN) are composed of the tax returns processed by the General Directorate of Public Finance (DGFIP, Ministry of Finance) and by INSEE for companies that declare more than &818,000 in revenue.¹⁵ These documents

¹⁴Bonnet, Odran Bonnet and Tony Vuillemin (2019), "Salaires dans le secteur privé En 2016, le salaire net moyen augmente de 0,5% en euros constants", Insee Première, n°1750, Avril.

¹⁵Source : https://www.efl.fr/chiffres-taux/fiscal/impot_benefbic.html

contain the standardized balance sheet and operating account. The BIC-IS (*Bénéfices Industriels et Commerciaux, Tous Régimes*) started in 2016 and includes all companies regardless of their tax regime.

These two databases provide information on firm identifiers (SIREN), balance sheets, and income statements. These two databases are used to calculate all our economic/financial variables: ROE/ROA, the margin rate, turnover from sales, the HHI for sales, investment effort, the debt ratios, and the liquidity ratios as computed in Table A2 (where codes are taken from the BIC).

A.1.4 LIFI (Financial Relationships Survey)

Liaisons Financières (LIFI) provides information on capital ownership between holding companies, subsidiaries and joint-venture firms incorporated in France. Until 1999, LIFI was based on an annual survey of 40,000 companies (private, publicly listed and state controlled) and their shareholders. From 1999 onward, INSEE has combined this survey with information provided by the commercial database Bureau Van Dijk. Since 2014, LIFI combines information from Banque de France (tax returns collected on a voluntary basis as part of bank credit rating activities), from the Bureau Van Dijk (certified accounts), from DGFIP tax returns (from 2015 onward), and from a residual survey on groups of firms controlled by the State or by French sovereign-fund like entities (APE, BPI, CDC).

We use the following variables from the first source, 'LIFI_Liaison', which provides information on parent firms and their subsidiaries: the share of capital (txcm) or votes (txvm) reported as held by the parent company, the share of votes reported by the subsidiary company (txvf) and the control rate (txcontra). Then, from the 'LIFI_Enterprises' database, which gives some information on the ownership characteristics of each company, we extract the nationality of the parent company (natiotg, relabeled natiogr) and its subsidiaries (natio) and the fraction of equity that is held by French individuals (acppf, relabeled $part_pp_fr$), foreign individuals (acppe, relabeled $part_pp_etr$), French firms (acpmf, relabeled $part_pm_fr$), foreign firms (acpme, relabeled $part_pm_etr$) and the state (recme). Finally, we use information on the position of the company in the business group (contour), where the options include the parent company, a company for which the parent company controls more than 50% (i.e., a member of the 'core' group), a company that is controlled by another company that belongs to the group (contour élargi and mouvance), or finally, independent.

A.2 Calculation of the firm annual full time job growth employment rate

The DADS, MMO and LIFI series follow a 360 days calendar-year periodicity, whereas BIC contains data corresponding to fiscal years ("*exercices comptables*"), with dates expressed using the Gregorian calendar (DD/MM/YYYY). To respect the temporal order that causality imposes, we matched the employee data from DADS Postes with the accounting data from BIC and the ownership data from LIFI on the closing days of each fiscal year.

A.2.1 Identifying the periods of employment

The first step is to identify all the periods during which positions in a company (which may include several establishments) were held according to the information taken from the DADS Postes. The source collects information on the period of employment for each employee as reported by each establishment: (i) the start (DATDEB) and end (DATFIN) date for each period of employment, (ii) the motivations for starting and ending, and (iii) additional characteristics such as occupations and job descriptions. Therefore, a position refers to the sum of the periods of employment held by an employee within the same establishment. All the quantitative variables that are available for each period, i.e., salary, duration of work, and the number of hours worked, are then aggregated for the entire period of employment. For the qualitative variables, we use only the period with the highest salary. Finally, we focus only on 'sustained jobs' (*postes non annexes*), which refer to jobs lasting more than 30 working days and 120 hours or for which payment exceeds the payment received over three months at minimum wage.

Based on the new database taken from the DADS Postes (starting in 2002), it is possible to restrict our sample to firms that are present in both the BIC (from 2007 to 2018). Some corrections are then made: all positions with no start or end date (which prevents us from calculating the daily number of positions) as well as 'ancillary jobs' (*postes annexes*) are excluded. Then, some corrections can be made to each period of employment to calculate the daily number of positions, especially when different periods may overlap (which are then considered to be the same period).

After deleting some potential duplicates (the same position in the same year may be registered in two regions/departments), we obtain a new database that provides the year, firm identifier (SIREN), employee identifier, start and end dates of the (aggregated) period of employment and employee sociodemographic characteristics such as occupation (PCS), gender and age.

A.2.2 Daily employment count

The second step is to calculate the daily number of job positions on the basis of the information in the previous database for each period of employment. For each year x SIREN, we count the number of periods that include day d (with d ranging from 1 to 360). More precisely, in addition to the periods comprising the last 30 days of the year under consideration, we add those corresponding to positions occupied between the 331st and 360th days but which were declared in the following year. As a result, a new database is created with the following variables: year, day, SIREN, and positions. Then, we restrict our sample to firms that recorded 50 positions or more at least once during our period of study.

This new database has the main advantage of having the same structure as other databases such as BIC and LIFI (with which it is merged). This database does not, however, provide any detailed variables for each employee, such as age, occupation or gender. To include this information, we create an additional database that provides supplementary information on the average number of employees by gender, by age category, and by occupation category per year for each firm. Following the same methodology as above, we calculate the daily number of job positions for male/female employees, by age category (15-24, 25-34, 35-44, 45-54, and 55-64), and by occupation category (managers, middle-management professions, non-manual employees and unskilled/skilled blue-collar workers).

A.2.3 Merging with BIC

The third step is to create a new database integrating the daily number of job positions for each year (from day 1 to day 360), the workforce composition by gender, age and occupation, and the accounting data from BIC. Starting with the BIC data, we restrict our sample to firms that reported 50 positions or more at least once during our period of study. Then, in order to merge our two sources (DADS Postes and BIC), the date formats must be harmonized. In the DADS Postes database, the start and end dates of the employment periods are given by the number of days elapsed since the first day of a given year on the basis of 360 days per year. However, in the BIC (as in reality), a year never includes exactly 360 days, and not all months are 30 days long. It is thus necessary to create a correspondence table that associates each day of the Gregorian calendar with its equivalent in the simplified calendar with 360 days. By doing so, each starting (DEBEX) and ending (CLOTEX) date for each fiscal year is converted into a day from the 360-day calendar (from day 1 to day 360). This allows us to merge the BIC databases with the previous database (created in step 2) to calculate the daily number of job positions on the first (DEBEX) and last (CLOTEX) day of the fiscal year, as well as for each gender, age and occupation category.

Next, some corrections are made to detect outliers in the format values for DEBEX and

CLOTEX and firms with a fiscal year longer than 12 months and to deal with cases when the fiscal year does not correspond to a calendar year. In this case, the fiscal year covers two (or more) years; therefore, the calendar year at the end of the fiscal year is different from the calendar year at the beginning of the fiscal year.

Finally, we obtain a database that provides the number of full-time jobs at the start and the end of the fiscal year. More precisely, we use the number of full-time jobs at the end of the fiscal year (CLOTEX) to calculate the annual growth rates of firm employment as follows:

$$\Delta N_j = \log\left(\frac{N_t}{N_{t-1}}\right) = \log N_t - \log N_{t-1}$$

A.3 Definition of and conditions for a PSE

A.3.1 Legal definition of a 'plan de sauvegarde de l'emploi'

Since the 2002 Social Modernization Act (*Loi de modernisation sociale*), the 'job protection plan' (*plan de sauvegarde de l'emploi* in French, PSE) has imposed obligations on the management of companies that plan mass layoffs. The plan must provide, among other things, alternatives to employment termination, redeployment opportunities or training. Since the passage of the 'Securing Employment Act' (*Loi de Sécurisation de l'Emploi*) on June 14, 2013, the plan must be validated or approved by the administrative authorities (whereas previously, a simple notification was requested). In fact, the regional directorates for the economy, employment, labor and solidarity (*directions régionales de l'économie, de l'emploi, du travail et des solidarités* or DREETS) validate the plan if it is imposed unilaterally and approve the plan if it is negotiated with recognized employee representatives.

The basic mechanism that must be activated for a PSE to be put in place is as follows:

• A firm with more than 50 employees must displace 10 or more employees for economic reasons (dismissal for economic reasons, mutually agreed-upon terminations [*rupture conventionnelle*], early-early retirement, etc.) during a period of 30 days (i.e., the current day plus the next 29 days);

To reduce the risk that firms split their layoffs over a longer time span so as to remain below this threshold, the labor regulation also requires a PSE if:

• A firm with more than 50 employees displaces 10 or more employees for economic reasons during a 90-day period (if these displacements did not occur for 30 consecutive days with a displacement between the 91st and 180th day);

• A firm with more than 50 employees displaces at least 19 employees for economic reasons during a calendar year and reports at least one additional displacement in the first quarter of the following year.

When a firm meets these conditions, it must implement a PSE.

A.3.2 Identifying firms with a PSE

The primary source used to identify firms with a PSE is the MMO, which gathers quarterly information on worker movements (entries and exits) for each firm. The first step is to calculate the daily number of exits in each firm. An observation, i.e., a worker's exit, is usable if the date of the exit from the establishment is correctly filled in, focusing only on exits for economic reasons (mainly dismissals for economic reasons, mutually agreed-upon terminations, early-early retirement, etc.). Since 2016, the category of early retirement has been included in the larger category of retirement. This new version of the database, however, provides more detailed information for the other categories (i.e., dismissals and mutually agreed-upon terminations). Then, using the information on worker movements, it is possible to calculate the daily number of exits by type for each firm (aggregating different establishments) and for each year.

Second, we use our previous database on the daily number of job positions since only firms with more than 50 employees must put a PSE in place. To do this, we calculate the daily number of job positions in all firms, which is available in the database produced in the first step. According to the legal definition of a PSE, the company must have terminated the employment of at least 18 people during one year and have terminated the employment of at least one person in the first quarter of the following year. To verify whether these conditions are met, it is therefore necessary to use the table representing the daily economic exits for each company in each year of the period under consideration to calculate (1) the number of exits for economic reasons occurring in the first quarter of the year and (2) the number of exits for economic reasons over the whole year. With the use of these indicators, it is possible to check the different conditions under which firms must put a PSE in place on a daily basis. This implies two steps: first, Boolean variables representing each of the conditions for a PSE are constructed. Second, all the firms that meet the different conditions for implementing a PSE are identified. Following the legal definition of a PSE, different mechanisms related to the different conditions can be activated.

Table A2: Industry classification

Aggregate sector	French classification of activities (NAF 1993/NAF Rev. 1, 2003)	French classification of activities (NAF Rev. 2, 2008)
Retail	Retail trade, repair of motor vehicles and household goods (section G)	Wholesale and retail trade; repair of motor vehicles and motorcycles (section G)
Manufacturing	Mining and quarrying (section C) Manufacturing (section D)	Mining and quarrying (section B) Manufacturing (section C)
Services	Accommodation and food service activities (section H) Transportation and communication (section I) Financial activities (section J) Real estate, rental and business services (section K) Public administration and defense; compulsory social security (section L) Education (section M)	Transportation and storage (section H) Accommodation and food service activities (section I) Information and communication (section J) Financial and insurance activities (section K) Real estate activities (section L) Professional, scientific and
	Human health and social work activities (section N) Collective, social and personal services (section O) Activities of households (section P)	technical activities (section M) Administrative and support service activities (section N) Public administration and defense; compulsory social security (section O) Education (section P) Human health and social work activities (section Q) Arts, entertainment and recreation (section R) Other service activities (section S) Activities of households as employers; undifferentiated goods- and service-producing activities of households for own use (section T)
Construction	Construction (section F)	Construction (section F)

Source: INSEE

B Additional descriptive statistics

Sample		Shrinking firms in sample	
N. Firms	Share	N. Firms	Share
42,438	8.57	23,749	55.96
41,925	8.47	20,715	49.41
44,334	8.96	20,056	45.24
44,448	8.98	22,912	51.55
45,734	9.24	25,828	56.47
46,759	9.45	27,327	58.44
47,252	9.55	22,800	48.25
47,423	9.58	22,686	47.84
46,945	9.49	23,471	50.00
43,437	8.78	19,777	45.53
44,244	8.94	22,810	51.56
	Samp N. Firms 42,438 41,925 44,334 44,448 45,734 46,759 47,252 47,423 46,945 43,437 44,244	SampleN. FirmsShare42,4388.5741,9258.4744,3348.9644,4488.9845,7349.2446,7599.4547,2529.5547,4239.5846,9459.4943,4378.7844,2448.94	Sample Shrinking in sam N. Firms Share N. Firms 42,438 8.57 23,749 41,925 8.47 20,715 44,334 8.96 20,056 44,448 8.98 22,912 45,734 9.24 25,828 46,759 9.45 27,327 47,252 9.55 22,800 47,423 9.58 22,686 46,945 9.49 23,471 43,437 8.78 19,777 44,244 8.94 22,810

Table B1: Descriptive Statistics

Source: *DADS, BIC, MMO*, 2007 – 17.

Note: The left part of the table presents the number of firms in each year in the sample, and the its share over the whole sample. The last two column present the numbers of firm in the sample that are shrinking, each year. In this table being shrinking consider that the workforce of the firm decreased in at least one unit with respect to the previous year.

Year	Number of firms with PSE	Number of	f full time woi	rkers	Number	jobs destroye	σ	Average workers in firm with PSE	Average jobs destroyed in firms with PSE
		In firms with PSE	All firms	Share	In firms with PSE	In all firms	Share		
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)
2007	464	458,756	9,608,807	4.77	42,204	475,610	8.87	988.70	90.96
2008	412	313,238	9,508,255	3.29	30,168	727,009	4.15	760.29	73.22
2009	753	468,050	9,567,372	4.89	38,890	507,523	7.66	621.58	51.65
2010	460	397,600	9,718,819	4.09	31,183	447,226	6.97	864.35	67.79
2011	374	240,960	10,160,557	2.37	19,303	460,855	4.19	644.28	51.61
2012	342	326,953	11,446,898	2.86	14,726	442,985	3.32	956.00	43.06
2013	397	316,464	11,485,414	2.76	22,130	606,433	3.65	797.14	55.74
2014	446	372,168	11,591,715	3.21	27,064	539,259	5.02	834.46	60.68
2015	812	1,171,719	11,759,208	96.6	138,847	644,606	21.54	1,443.00	170.99
2016	361	837,778	9,817,028	8.53	100,174	2,338,350	4.28	2,320.71	277.49
2017	740	918,742	11,064,593	8.30	54,778	752,129	7.28	1,241.54	74.02
Total	5561	5,822,428			519,467				
Average				5.00			7.00	1047.01	93.41
Source: D _t Note: Colur	ADS, BIC, MMO, 2007 - nn (1) presents the nu	– 17. mber of firms th	at are eligible to	o impleme	nt a PSE accordin	g to our algorith	m. Then,	the three following colu	mns show the number of

Table B2: Employment level and destruction in firms facing a PSE

columns (5) to (7) compare the number of jobs destroyed, again in PSE firms (column (5)), in all firms (column (6)). Column (7) computes the share of jobs destroyed in PSE firms in all firms. Finally, column (8) compares the number of full time workers in PSE firms (column (2)) to the number of PSE firms (column (1)). Column (9) computes the number of jobs destroyed in PSE firms (column (5)) as a proportion of the number of PSE firms (column (1)). full time workers, in PSE firms (column (2)) and in all firms (column (3)). Column (4) computes the share of the number of full time workers in PSE firms in all firms. Then,

	$\tau \leq 10$	$10 < \tau \leq 25$	$25 < \tau \le 50$	$50 < \tau \le 75$	$90 < \tau$
Full time workers	17,787,056	32,122,876	40,869,504	29,322,214	24,271,076
Job destruction	8,369,276	1,626,147	150,584	0	0
Incidence of job loss	47.05	5.06	0.37	0.00	0.00

Table B3: Job destruction by quantile of the job growth distribution

Source: *DADS, BIC, MMO*, 2007 – 17.

Note: The table displays the number of full-time workers and job destruction across the distribution of firm job growth.



Figure B1: Share of jobs destroyed by job destruction quantile

Source: DADS, 2007 - 18. **Note:** This figure depicts the yearly firm full time job growth over 2007-18.

Table B4: Table B.4 - descriptive job growth qt

			Job gr	rowth		
	All firms	Q10	Q25	Q50	Q75	06D
Industry						
Retail	19.53	17.91	21.63	21.54	20.99	15.88
Manufacturing	22.24	21.49	27.67	25.99	22.27	13.96
Services	49.46	51.68	41.40	43.90	47.89	61.87
Construction	8.77	8.91	9.30	8.57	8.85	8.29
Firm size						
1-49 employees	54.30	64.27	46.67	45.36	51.27	64.26
50-249 employees	36.81	30.23	42.17	41.80	39.85	29.83
250-4,999 employees	8.62	5.36	10.82	12.44	8.65	5.73
More than 5,000 employees	0.26	0.15	0.34	0.40	0.24	0.19
Gender						
Male workers (%)	61.66	61.96	62.59	61.50	60.85	61.36
Female workers (%)	38.34	38.04	37.41	38.50	39.15	38.64
Age						
15-24 old aged (%)	10.52	9.57	9.20	9.49	11.47	12.89
25-34 old aged (%)	26.66	25.66	24.07	24.61	27.35	31.77
35-44 old aged (%)	26.73	26.84	27.21	27.15	26.74	25.83
45-54 old aged (%)	24.41	25.18	26.83	26.22	23.59	20.15
55-64 old aged (%)	11.67	12.74	12.69	12.61	10.86	9.35
Occupations						
Executives and managers (%)	17.08	17.94	14.60	15.99	16.13	20.93
Middle-management professions (%)	17.89	17.76	18.14	18.30	17.86	17.48
Non-manual employees (%)	29.61	29.71	28.44	29.17	30.68	29.98
Unskilled blue collar workers (%)	10.07	10.18	10.18	9.55	9.83	10.37
Skilled blue collar workers (%)	25.36	24.39	28.63	26.98	25.50	21.22
Measures of economic/financial performances						
ROA (%)	20.05	12.22	17.88	20.56	24.61	25.01
Operating margin/Net surplus (%)	13.79	8.72	13.73	16.06	16.00	14.51
Sales revenues	27,965.92	18,578.04	33,820.49	38,164.80	29,728.26	19,447.24
HHI on sales	0.03	0.03	0.02	0.02	0.03	0.03
Labour productivity (/1000)	165.29	153.19	166.77	177.59	173.40	156.91
Total payroll ratio (%)	65.96	71.90	63.39	61.53	62.63	69.93
Investment effort (%)	26.48	22.90	23.19	24.72	27.44	34.06
Debt rate (%)	69.58	75.80	67.22	65.48	67.30	72.01
Liquid assets/Debt (%)	27.79	27.45	27.10	29.00	27.75	27.58
Business group membership	62.57	61.78	66.71	65.53	63.32	55.36
Direct ownership of known individuals ¿ 50%	56.53	59.39	53.69	53.53	54.60	59.73

Additional regression tables С

Table C1: Determinants of PSE:	: Economic/financial	variables with a	lternative lag	S
	,		0	

	(1)	(2)
	(1) n=2	(2) n=3
Log Firm Size $(t-1)$	0.004***	0.004***
	(0,000)	(0,000)
Share of Male workers	-0.001***	-0.001***
Share of Male workers	(0.001)	-0.001
Share of 15-24 vo	-0.004***	-0.004***
Share of 15-24 y.o.	(0,000)	-0.004
Share of 25-34 vo	-0.002***	-0.002***
Share of 25-54 y.o.	-0.002	-0.002
Share of 35-44 vo	0.001***	0.001***
Share of 55-44 y.o.	(0.001	(0.001
Share of 15-51 vo	0.001***	0.001***
Share of 45-54 y.o.	(0.001	(0.001
Share of 55-64 vo	-0.001***	-0.001***
Share of 55-64 y.o.	(0,000)	-0.001
Shara of managars	0.000)	0.000)
Share of managers	(0.002	(0.002
Shara of professionals	(0.000)	(0.000)
share of professionals	(0.001	(0.001
Shara of Non-manual amplayoos	(0.000)	(0.000)
Share of Non-manual employees	-0.001	-0.002
Sharo of Unskilled blue collar	(0.000)	(0.000)
Share of Offskilled blue collar	(0.000)	0.000
Share of Skilled blue coller	(0.000)	(0.000)
Share of Skilled blue collar	(0.000)	-0.000
ROA	(0.000)	(0.000)
ROA	-0.001	-0.001
Mangin noto	(0.000)	(0.000)
Margini rate	-0.002	-0.001
Salas novembras	(0.000)	(0.000)
Sales revenues	(0.003	(0.000)
A Salaa maraa	(0.000)	(0.000)
	-0.007	-0.007
IIIII an aslas	(0.000)	(0.000)
HHI OII Sales	-0.001	-0.000
I abour productivity	(0.000)	(0.000)
Labour productivity	-0.000	-0.000
A ganagata naumall /1/A	(0.000)	(0.000)
Aggregate payron/ VA	(0.000)	(0.000)
Daht matia	(0.000)	(0.000)
Debt ratio	(0.002	(0.000)
Investment effert	(0.000)	(0.000)
investment enort	-0.001	-0.001
Liquidi accata /Daht	(0.000)	(0.000)
Liquidi assets/Debt	-0.001	-0.000
Designed and the second second second	(0.000)	(0.000)
business group memoership	(0.000)	(0.000)
Direct our or him (< 5001)	(0.000)	(0.000)
Direct ownership ($\leq 50\%$)	0.000	0.000
	(0.000)	(0.000)
Observations	494,939	494,939
Sociodemographic variables	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes

Significance: *p<0.1; **p<0.05; ***p<0.01

Significance: p < 0.1; p < 0.05; p < 0.01Source: DADS, BIC, MMO, 2007 – 17. Note: Calculations by the authors. The table presents estimated coefficients of model 2. The model examines the factors that affect the likelihood of a mass layoff by including a full set of industry and year-fixed effects where the financial/economic indicators are expressed in t - 2 (column (1)) and in t - 3(column (2)).

	(1)	(2)
Log Firm Size $(t-1)$	0.007***	0.007***
	(0.001)	(0.001)
ROA	-0.001**	-0.001**
	(0.001)	(0.001)
Margin rate	0.022	0.037
	(0.037)	(0.042)
Sales revenues	0.011***	0.011***
	(0.001)	(0.001)
Δ Sales revenues	0.004***	0.004***
	(0.000)	(0.000)
HHI on sales	0.000	0.001
	(0.001)	(0.002)
Labour productivity	-0.002**	-0.002*
1 2	(0.001)	(0.001)
Aggregate payroll/VA	0.002**	0.003***
	(0.001)	(0.001)
Debt ratio	-0.005***	-0.005***
	(0.001)	(0.001)
Investment effort	-0.001*	-0.001**
	(0.001)	(0.001)
Liquidi assets/Debt	-0.002***	-0.002**
1	(0.001)	(0.001)
Business group membership	0.001	0.001
	(0.001)	(0.001)
Direct ownership ($< 50\%$)	0.003***	0.003*
r (<u> </u>	(0.001)	(0.002)
Observations	64,472	64,472
Sociodemographic variables	Yes	Yes
Industry FE	No	Yes
Year FE	No	Yes
Significance:	*p<0.1; **p<	<0.05; ***p<0.01

Table C2: Determinants of PSE: Economic/financial variables three-year-average

Source: *DADS*, *BIC*, *MMO*, 2007 – 17.

Note: Calculations by the authors. The table presents estimated coefficients of model 2. The model examines the factors that affect the likelihood of a mass layoff where the financial/economic indicators are expressed in three-year-average. The first column only includes the time-varying coefficients. The second column includes a full set of industry and year-fixed effects.

	Prior to 2009	After 2009
	(1)	(2)
ROA	-0.001***	-0.000**
	(0.000)	(0.000)
Margin rate	-0.003***	-0.002***
	(0.001)	(0.000)
Sales revenues	0.003***	0.003***
	(0.001)	(0.000)
Δ Sales revenues	-0.004***	-0.007***
	(0.001)	(0.000)
HHI on sales	-0.002**	-0.002***
	(0.001)	(0.000)
Labour productivity	0.001	-0.000
	(0.001)	(0.000)
Aggregate payroll/VA	0.002***	0.001***
	(0.001)	(0.000)
Debt ratio	0.001**	0.002***
	(0.001)	(0.000)
Investment effort	-0.001**	-0.001***
	(0.000)	(0.000)
Liquid assets/Debt	-0.000	-0.000***
	(0.000)	(0.000)
Business group membership	0.001	0.001***
	(0.001)	(0.000)
Direct ownership (≤ 50 %)	-0.000	0.000
	(0.001)	(0.000)
Observations	502,023	502,023
Sociodemographic variables	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Significance:	*p<0.1; **p<0	.05; ***p<0.01

Table C3: Determinants of PSE: Economic/financial variables - Crisis effect

Source: *DADS*, *BIC*, *MMO*, 2007 - 17.

Note: Calculations by the authors. The table presents estimated coefficients of model 2. The model examines the factors that affect the likelihood of a mass layoff where the financial/economic indicators are expressed in three-year-average. The first column only includes the time-varying coefficients. The second column includes a full set of industry and year-fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROA		-0.000***	-0.001***	-0.001***	-0.001***	-0.000***		
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Margin rate	-0.002***		-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales revenues	0.003***	0.003***	0.002***	0.003***	0.002***	0.003***	0.003***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ Sales revenues	-0.006***	-0.006***	-0.005***	-0.006***	-0.007***	-0.006***	-0.006***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI on sales	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Labour productivity	0.000	-0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Aggregate payroll/VA	0.001***	0.002***	0.001**	0.001***	0.001***	0.001***	0.001***	0.002***
_	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt ratio	0.002***	0.002***				0.002***	0.002***	0.002***
22	(0.000)	(0.000)				(0.000)	(0.000)	(0.000)
Investment effort	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquid assets/Debt	-0.000***	-0.000***	-0.000***	-0.001***	-0.001***			
DOE	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
ROE	-0.000							
On anothing managine (an anothing in a second)	(0.000)	0 000***						
Operating margin (operating income)		-0.002						
Financial daht/Equity		(0.000)	0.000					
Financial debt/ Equity			-0.000					
Total dabt / Fauity			(0.000)	0.000***				
Total debt/ Equity				-0.000				
Interast on debt				(0.000)	0.001***			
interest on debt					(0.001			
Liquidity ratio (% of turnover)					(0.000)	0.001***		
Equility facto (% of turnover)						(0.001		
Liquidity ratio (% of debt)						(0.000)	-0.000	
							(0.000)	
Liquidity ratio (Current assets/Debt)							(0.000)	-0.000
								(0.000)
	501.005	500.000	100 500	501.005	110.000	500.000	4/0 7/1	500.000
Observations	501,237	502,023	409,502	501,237	418,989	502,023	469,766	502,023
Sociodemographic Variables	res							
Huusuy FE	res							
ICALIL	162	162	162	162	162	162	162	162

Table C4: Determinants of PSE: Alternative economic/financial variables

Significance: **Source:** DADS, BIC, MMO, 2007 – 17.

*p<0.1; **p<0.05; ***p<0.01

Note: Calculations by the authors. The table presents estimated coefficients of model 2. The model examines the factors that affect the likelihood of a mass layoff where all the financial/economic indicators are interacted with a dummy variable which takes 0 for years prior to 2009 (column (1)) or 1 for years after 2009 (column (2)) by including a full set of industry and year-fixed effects. To measure profitability, we use the return on equity (ROE), which compares net income with shareholder equity, and an alternative margin rate, which compares operating income to value added. Then, three alternative measures of indebtedness are used: (i) the total debt-to-equity ratio, (ii) the financial debt-to-equity ratio and (iii) the interest payments-to-financial debt ratio. Finally, three alternative measures of liquidity are used. The first (second) ratio compares cash and marketable securities corrected for bank account overdraft and short-run debt with turnover (long-run debt), and finally, the last ratio measures total current assets as a share of short-run debt.

	(1)	(2)	(3)	(4)

Log Firm Size (t-1)	0.007^{***}	0.007***	0.007***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
Share of Male workers	-0.002	-0.001	-0.002	-0.001
Sharra of 15, 24 and	(0.000)	(0.000)	(0.000)	(0.000)
Share of 15-24 y.o.	-0.005	-0.005	-0.005	-0.005
	(0.000)	(0.000)	(0.000)	(0.000)
Share of 25-34 y.o.	-0.004	-0.004	-0.004	-0.004
Sharra of 25, 44 and	(0.000)	(0.000)	(0.000)	(0.000)
Share of 35-44 y.o.	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Share of 45-54 y.o.	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Share of 55-64 y.o.	-0.002***	-0.002***	-0.002***	-0.002***
-1 6	(0.000)	(0.000)	(0.000)	(0.000)
Share of managers	0.003***	0.002***	0.003***	0.002***
-1 6 6 1 1	(0.000)	(0.000)	(0.000)	(0.000)
Share of professionals	0.001***	0.001***	0.001***	0.001***
-1 (1 1	(0.000)	(0.000)	(0.000)	(0.000)
Share of Non-manual employees	-0.002***	-0.001***	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Share of Unskilled blue collar	-0.000	-0.001**	-0.000	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Share of Skilled blue collar	0.001**	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Margin rate	-0.005***	-0.006***	-0.005***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)
Sales revenues	0.005***	0.004***	0.005***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Δ Sales revenues	-0.017***	-0.016***	-0.016***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)
HHI on sales	0.000	0.001***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Labour productivity	-0.001*	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Aggregate payroll/VA	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Debt ratio	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Investment effort	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Liquid assets/Debt	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Business group membership	-0.001***	-0.001***	-0.001**	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Direct ownership ($\leq 50\%$)	0.001***	0.001***	0.002***	0.002***
-	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.017***	-0.018***	-0.018***	-0.019***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	502 023	502 023	502 023	502.023
R-squared	0.025	0.026	0.026	0.027
Industry FE	No	Yes	No	Yes
Year FF	No	No	Yes	Yes
	110	110	103	103
Significance:		*p<0.1	1; **p<0.05;	****p<0.01

Table C5: Determinants of PSE: linear probability model

Significance:

Source: DADS, BIC, MMO, 2007 – 17. Note: Calculations by the authors. The table presents estimated coefficients using OLS estimator of model 2. The model examines the factors that affect the likelihood of a mass layoff. The first column only includes the time-varying coefficients. The second column estimates the variation within industry, meaning that it controls for all unobserved factors that are constant within an industry. The third column, estimates the variation within years, accounting for unobserved constant characteristics at the year level. The last column includes a full set of industry and yearfixed effects.

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					∆ Full time	employment				
N. Lags	n = 2	n = 3	n = 2	n = 3	n = 2	n = 3	n = 2	n = 3	n = 2	n = 3
	$Q_{\tau} =$	= 0.10	$Q_{\tau} =$	0.25	$Q_{\tau} =$: 0.50	$Q_{\tau} =$	0.75	$Q_{\tau} =$	0.90
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)
Full time employment (t-1)	-0.050***	-0.055***	-0.021 ^{***}	-0.023***	-0.021 ^{***}	-0.022***	-0.044 ^{***}	-0.046 ^{***}	-0.158 ^{***}	-0.162 ^{***}
	(0.001)	(0.001)	(0000)	(000.0)	(0000)	(0000)	(0.001)	(0.001)	(0.002)	(0.002)
ROA	0.005***	0.003***	0.001***	0.001***	0.001***	0.001***	0.002***	0.001***	0.005***	0.002**
Margin rate	(0.001) 0.030^{***}	(0.001) 0.026 ^{***}	(0.000) 0.012 ^{***}	(0.000) 0.010 ^{***}	(0.000) 0.005***	(0.000) 0.005^{***}	(0.000) 0.003***	(0.000) 0.002 ^{***}	(0.001)	(0.001) -0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0000)	(0000)	(0.001)	(0.001)	(0.002)	(0.002)
Sales revenues	0.125***	0.130^{***}	0.047***	0.050***	0.022***	0.024***	0.027***	0.030***	0.121 ^{***}	0.127***
Salas ravianijas († /t-1)	(0.002) 0.408***	(0.002) 0.331***	(0.001) 0.164***	(0.001) 0.137***	(0.000) 0.100***	(0.000) 0.084***	(0.001) 0.101***	(0.001)	(0.002) 0 516***	(0.003) 0.427***
	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(100.0)	(0.002)	(0.001)	(0.004)	(0.004)
HHI on sales	0.001	0.002	0.000	-0.002**	0.001**	-0.001	-0.006***	-0.004***	-0.037***	-0.010***
ד מאוויזיאיויאיש אייסאס ד	(0.002) 0.025***	(0.002) 0.020***	(0.001) 0.004***	(0.001) 0.005***	(0.001) 0.003***	(0.001)	(0.001) 0.012***	(0.001)	(0.003) 0.004**	(0.003) 0.012***
гароиг ргоцисилиу	(0.002)	(0.002)	-0.004 (0.001)	(100.0)	(0000)	(000.0)	(100.0)	(0.001)	(0.002)	(0.003)
Aggregate payroll/VA	-0.003	-0.002	0.008***	0.008***	0.008***	0.007***	0.025***	0.025***	0.092***	0.095***
	(0.002)	(0.002)	(0.001)	(0.001)	(0000)	(0000)	(0.001)	(0.001)	(0.003)	(0.003)
Debt ratio	-0.019***	-0.017***	-0.007***	-0.006***	-0,003***	-0.002***	0.004***	0.004***	0.012***	0.010***
:	(0.001)	(0.001)	(0000)	(0000)	(0000)	(0000)	(0.00)	(0.001)	(0.001)	(0.001)
Investment effort	0.002***	0.001	0.003***	0.002***	0.002***	0.002***	0.005***	0.003***	0.008***	0.005***
1 i anid accate (Dabt	(0.001) 0.010***	(0.001) 0.000***	(0.000)	(0000)	(0.000)	(0.000)	(0.000)	(0000)	(0.001)	(0.001) 0.003***
Triduia assers/ Deor	(0.001)	(0.001)	(000.0)	(000.0)	(0000)	(0000)	10000)	(0000)	(0.001)	(100.0)
Business group membership	-0.002	-0.001	-0.004***	-0.003***	-0.002***	-0.002***	-0.004***	-0.004***	-0.011***	-0.008***
	(0.002)	(0.002)	(0.001)	(0.001)	(0000)	(0000)	(0.001)	(0.001)	(0.002)	(0.002)
Direct ownership (> 50%)	0.000	-0.001	0.003***	0.002**	0.003***	0.002***	0.008***	0.008***	0.035***	0.033***
Constant	(0.002) 	(0.002) 	(100.0)	(T00.0)	(0,000)	(TUUJ)	(100.0)	(100.0) 0.265***	(0.003) 0 860***	(0.003) 0 878***
	(900.0)	(0.006)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)	(0.003)	(0.008)	(600.0)
		~	~			~	~	~	~	
Observations	317,660	271,172	317,660	271,172	317,660	271,172	317,660	271,172	317,660	271,172
k-squared	0.0/4	600.0	0,0,0	1/0.0	160.0	con.n	071.0	171.0	07170	011.0
Significance:								*p<0.1	; **p<0.05;	*** p<0.01
Source: DADS, BIC, MMO, 2007 –	17.									
Note: All the regressions presented	in this table co	ontrol for socie	odemographic	characteristic	s, industry-fix	effects, and y	ear-fix effects.			

		Δ Ful	l time employ	vment	
	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.50$	$Q_{\tau} = 0.75$	$Q_{\tau} = 0.90$
	(1)	(2)	(3)	(4)	(5)
Full time employment (t-1)	-0.027***	-0.015***	-0.019***	-0.031***	-0.113***
I I I I I I I I I I I I I I I I I I I	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
ROA	0.004**	0.003***	0.002***	0.002***	0.001
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
Margin rate	0.218*	0.104**	0.059*	0.041	0.054
0	(0.117)	(0.048)	(0.031)	(0.050)	(0.137)
Sales revenues	0.044***	0.016***	0.006***	0.010***	0.073***
	(0.004)	(0.002)	(0.001)	(0.002)	(0.005)
Sales revenues (t/t-1)	-0.039***	-0.015***	-0.006***	-0.001	0.010***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
HHI on sales	0.009*	0.002	0.004***	0.007***	0.013**
	(0.005)	(0.002)	(0.001)	(0.002)	(0.006)
Labour productivity	-0.024***	-0.007***	-0.002***	-0.002*	-0.023***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
Aggregate payroll/VA	-0.021***	-0.004***	0.001	0.007***	0.027***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
Debt ratio	0.023***	0.015***	0.011***	0.010***	0.018***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
Investment effort	0.004**	0.003***	0.003***	0.005***	0.011***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
Liquid assets/Debt	0.011***	0.004***	0.002***	-0.000	-0.006***
	(0.002)	(0.001)	(0.000)	(0.001)	(0.002)
Business group membership	-0.007*	-0.004***	-0.003***	-0.006***	-0.017***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
Direct ownership (> 50%)	-0.002	0.003	0.003**	0.006***	0.028***
	(0.005)	(0.002)	(0.001)	(0.002)	(0.005)
Constant	-0.134***	-0.032***	0.068***	0.189***	0.670***
	(0.013)	(0.005)	(0.003)	(0.005)	(0.015)
Observations	63,035	63,035	63,035	63,035	63,035
R-squared	0.039	0.041	0.060	0.082	0.092
*					

Table C7: Determinants of job growth: Economic/financial variables three-year-average

Significance:

p<0.1; p<0.05; p<0.01

Source: *DADS, BIC, MMO,* 2007 - 17. **Note:** All the regressions presented in this table control for sociodemographic characteristics, industry-fix effects, and year-fix effects.

 Δ Full time employment $Q_{\tau} = 0.10$ $Q_{\tau} = 0.10$ $Q_{\tau} = 0.50$ $Q_{\tau} = 0.75$ $Q_{\tau} = 0.90$ (1)(2)(3) (4) (5) -0.054*** -0.023*** -0.016*** -0.054*** -0.229*** Full time employment (t-1) (0.001)(0.000)(0.000)(0.000)(0.002)0.002*** 0.002*** 0.002*** ROA 0.003** 0.004* (0.001)(0.001)(0.000)(0.001)(0.002) $ROA \times Post_{09}$ 0.001 0.000 -0.000 -0.001 -0.002 (0.000)(0.002)(0.001)(0.001)(0.002)0.051*** 0.017*** 0.009*** 0.010*** Margin rate -0.004 (0.003)(0.001)(0.001)(0.001) (0.004)Margin rate $\times Post_{09}$ -0.004 -0.001 -0.001* -0.005*** -0.002 (0.001) (0.003) (0.001) (0.001) (0.004) 0.121*** 0.045*** 0.023*** 0.027*** 0.144*** Sales revenues (0.002)(0.001)(0.001)(0.001) (0.004)Sales revenues $\times Post_{09}$ 0.013*** 0.003*** -0.000 0.006*** 0.027*** (0.002) (0.001) (0.001) (0.001) (0.004) 0.163*** 0.112*** 0.237*** Sales revenues (t/t-1) 0.414*** 0.790*** (0.007)(0.003)(0.002)(0.004)(0.011) Sales revenues $(t/t-1) \times Post_{09}$ 0.034*** 0.011*** 0.003 -0.001 -0.003 (0.008) (0.003) (0.002)(0.004)(0.013) -0.006*** -0.049*** 0.003*** HHI on sales 0.006* 0.001 (0.003)(0.001)(0.001)(0.002)(0.005)HHI on sales $\times Post_{09}$ 0.001 0.001 0.002*** 0.002 0.002 (0.004)(0.001)(0.001)(0.002)(0.006)Labour productivity -0.026*** -0.003*** 0.008*** 0.002** 0.004 (0.003)(0.001)(0.001)(0.001) (0.004)0.020*** -0.013*** Labour productivity $\times Post_{09}$ -0.001 0.000 0.004** (0.002) (0.003)(0.005) (0.001)(0.001)0.021*** Aggregate payroll/VA 0.006*** 0.009*** 0.065*** -0.005* (0.003)(0.001)(0.001)(0.001) (0.005)Aggregate payroll/VA \times Post₀₉ 0.000 0.001 -0.000 0.006*** 0.035*** (0.003)(0.001)(0.001)(0.002)(0.005)Debt ratio -0.021*** -0.007*** -0.001 0.004*** 0.014*** (0.002)(0.001)(0.001)(0.001)(0.004)Debt ratio ×Post₀₉ -0.005* -0.001 0.000 0.002 0.006 (0.002)(0.001)(0.001)(0.001)(0.004)0.045*** 0.006*** 0.016*** 0.009*** 0.006*** Investment effort (0.002)(0.001)(0.000)(0.001) (0.002)-0.004*** Investment effort $\times Post_{09}$ -0.001 -0.000 -0.001* -0.017*** (0.002) (0.001) (0.000) (0.001) (0.003) 0.015*** 0.003*** Liquid assets/Debt 0.006*** -0.000 -0.012*** (0.002)(0.001)(0.000)(0.001)(0.003)Liquid assets/Debt \times Post₀₉ -0.003 -0.001 -0.000 0.001 0.008*** (0.002)(0.001) (0.000) (0.001) (0.003) Business group membership -0.009** -0.005*** -0.003*** -0.005** -0.003 (0.004)(0.002)(0.001)(0.002)(0.007)-0.004*** -0.009*** Business group membership \times Post₀₉ -0.005*** -0.004*** -0.025*** (0.002)(0.001)(0.000)(0.001)(0.002)0.026*** Direct ownership (> 50%) -0.001 0.001 0.000 0.003 (0.005)(0.002)(0.001)(0.002)(0.007)0.011*** 0.050*** 0.003*** 0.003*** Direct ownership (> 50%) \times Post₀₉ -0.000

Table C8: Determinants of job growth: Economic/financial variables - Crisis effect

Observations489,940489,940489,940489,940489,940R-squared0.0750.0750.0920.1450.147

(0.001)

0.012***

(0.002)

Significance:

Constant

*p<0.1; **p<0.05; ***p<0.01

(0.003)

1.200***

(0.008)

(0.001)

0.320***

(0.003)

(0.000)

0.061***

(0.001)

Source: DADS, BIC, MMO, 2007 - 17. **Note:** All the regressions presented in this table control for sociodemographic characteristics, industry-fix effects, and year-fix effects.

(0.002)

-0.035***

(0.005)

		Δ Ful	l time employ	ment	
	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.50$	$Q_{\tau} = 0.75$	$Q_{\tau} = 0.90$
	(1)	(2)	(3)	(4)	(5)
Panel A. ROE					
Full time employment (t-1)	-0.047***	-0.019***	-0.019***	-0.042***	-0.147***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
ROE (t-1)	0.004***	0.003***	0.001***	0.002***	0.003***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.056***	-0.004*	0.086***	0.262***	0. 857***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.007)
Observations	389,910	389,910	389,910	389,910	389,910
R-squared	0.079	0.078	0.092	0.128	0.121
Panel B. Operting margin ratio (using operating income)					
Δ Full time employment (t-1)	-0.049***	-0.020***	-0.020***	-0.042***	-0.147***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Operating margin (operating income) (t-1)	0.036***	0.012***	0.006***	0.006***	0.001
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.049***	-0.002	0.087***	0.264***	0.858***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.007)
Observations	390,418	390,418	390,418	390,418	390,418
R-squared	0.080	0.078	0.092	0.128	0.121
Panel C. Financial debt to equity					
Δ Full time employment (t-1)	-0.046***	-0.019***	-0.019***	-0.041***	-0.141***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Financial debt/Equity (t-1)	-0.003***	-0.001***	-0.001***	-0.003***	-0.010***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.043***	0.000	0.088***	0.260***	0.829***
	(0.006)	(0.002)	(0.001)	(0.003)	(0.008)
Observations	323,230	323,230	323,230	323,230	323,230
R-squared	0.069	0.070	0.087	0.127	0.121
Significance:			*p<	<0.1; **p<0.0	5; ***p<0.01

Table C9: Determinants of job growth: Alternative economic/financial variables

Source: *DADS, BIC, MMO,* 2007 - 17. **Note:** All the regressions presented in this table control for sociodemographic characteristics, industry-fix effects, and year-fix effects.

		Δ Ful	l time employ	ment	
	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.10$	$Q_{\tau} = 0.50$	$Q_{\tau} = 0.75$	$Q_{\tau} = 0.90$
	(1)	(2)	(3)	(4)	(5)
Panel D. Total debt to equity					
Full time employment (t-1)	-0.047***	-0.019***	-0.019***	-0.042***	-0.147***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Total debt/Equity (t-1)	-0.002**	-0.000	0.000	0.002***	0.006***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.056***	-0.004*	0.086***	0.262***	0 . 857***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.007)
Observations	389,910	389,910	389,910	389,910	389,910
R-squared	0.077	0.076	0.091	0.128	0.121
Panel E. Interest on debt					
Δ Full time employment (t-1)	-0.045***	-0.019***	-0.020***	-0.042***	-0.139***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Interest on debt (t-1)	-0.007***	-0.003***	-0.001***	0.003***	0.011***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.056***	-0.003	0.088***	0.259***	0.813***
	(0.006)	(0.002)	(0.001)	(0.003)	(0.008)
Observations	329,195	329,195	329,195	329,195	329,195
R-squared	0.077	0.077	0.090	0.123	0.116
Panel F. Current assets / Turnover					
Δ Full time employment (t-1)	-0.046***	-0.019***	-0.019***	-0.042***	-0.147***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Liquidity ratio (% of turnover) (t-1)	0.004***	0.000	0.001***	0.002***	-0.004***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.054***	-0.003	0.087***	0.263***	0.857***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.007)
Observations	390,418	390,418	390,418	390,418	390,418
R-squared	0.078	0.077	0.091	0.128	0.121

Table C10: Determinants of job growth: Alternative economic/financial variables

Significance:

*p<0.1; **p<0.05; ***p<0.01

Source: DADS, BIC, MMO, 2007 - 17. Note: All the regressions presented in this table control for sociodemographic characteristics, industry-fix effects, and yearfix effects.

		Δ Ful	l time employ	vment	
	$Q_{\tau} = 0.10$ (1)	$Q_{\tau} = 0.10$ (2)	$Q_{\tau} = 0.50$ (3)	$Q_{\tau} = 0.75$ (4)	$Q_{\tau} = 0.90$ (5)
Panel G. Current assets / Long-run debt					
Full time employment (t-1)	-0.047***	-0.019***	-0.020***	-0.041***	-0.144***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Liquidity ratio (% of debt) (t-1)	0.002***	0.001***	0.000	-0.001***	-0.007***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.053***	-0.003	0.088***	0.260***	0.840***
	(0.006)	(0.002)	(0.001)	(0.003)	(0.008)
Observations	366,870	366,870	366,870	366,870	366,870
R-squared	0.078	0.077	0.090	0.126	0.119
Panel H. Total current assets / Short-run debt					
Δ Full time employment (t-1)	-0.046***	-0.019***	-0.019***	-0.042***	-0.148***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Liquidity ratio (Current assets/Debt) (t-1)	0.006***	0.002***	0.001***	0.001***	-0.006***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	-0.054***	-0.003	0.086***	0.263***	0.858***
	(0.005)	(0.002)	(0.001)	(0.003)	(0.007)
Observations	390,418	390,418	390,418	390,418	390,418
R-squared	0.078	0.077	0.091	0.128	0.121
<u> </u>			*	-0.1.**	F. *** <0.01

Table C11: Determinants of job growth: Alternative economic/financial variables

Significance:

*p<0.1; **p<0.05; ***p<0.01

Source: DADS, BIC, MMO, 2007 - 17.

Note: All the regressions presented in this table control for sociodemographic characteristics, industry-fix effects, and year-fix effects.

D Number of observations by year and source of data

			DADS POSTES		BIC RN	BIC IS	TIEI L	iaison	LIFI Ent	reprise	Fulls	ample
	Nombre de (distints (tous postes)	siren s les	En considérant seulement les siren présentes au moins une fois dans les bic-rn / bic-is	En considérant seulement les siren présentes au moins un jour un effectif > 49	N. de siren distints	Nombre de siren distints	Nb siraval distincts	Nb id_ul_fille distincts	Nb sirlifi distincts	Nb id_ul distincts	Nb siren panel non cylindré	Nb siren panel cylindré
2002	1,749,694		705,487	66,012					193,894			
2003	1,752,778		745,568	68,239	692,823		156,516		198,118		13,217	22,597
2004	1,675,488		732,326	67,958	709,682		168,004		213,078		47,026	22,597
2005	1,802,442	Ē	804,670	70,889	727,009		189,742		242,399		49,829	22,597
2006	1,807,182	c	838,262	71,839	747,855		199,512		254,716		54,205	22,597
2007	1,848,875		868,428	72,438	771,084		206,108		261,869		56,539	22,597
2008	1,855,152	c	897,496	72,811	791,266		205,716		263,955		57,491	22,597
2009	5,442,637		931,355	73,937	802,092		207,985		268,417		57,786	22,597
2010	6,232,124		948,774	73,490	813,940		227,134		290,328		56,993	22,597
2011	6,185,247		976,865	73,241	835,121		251,195		323,040		56,863	22,597
2012	6,155,415		1,007,093	73,451	858,494		358,597		485,590		58,639	22,597
2013	6,100,201		1,039,156	73,266	872,412		369,065		507,101		59,879	22,597
2014	6,054,612	c	1,075,124	73,114	886,148		0	370,973		511,437	60,294	22,597
2015	5,994,438		1,118,281	72,799	904,607		0	503,201		698,724	60,224	22,597
2016	5,967,833		1,153,288	72,089	926,621	2,615,592	0	513,224		695,490	55,943	22,597
2017	6,016,620	~	1,209,630	72,492		2,615,592	0	542,366		734,588	55,968	22,597
2018	6,064,647		1,222,675	71,260		2,816,173	0	525,556			45,312	22,597
2019	6,079,573		1,183,681	69,362								
Total (2003-2018)	70,955,691	1	15,568,991	1,153,313	10,412,533	8,047,357	4,99	4,894	5,94	3,850	846,208	361,552
Total/Année	4,730,379		973,062	76,888	867,711	2,682,452	332	,993	396	,590	56,413.87	24,103.47
Significance:											*p<0.1; **p<0.	05; *** p<0.01

Table D1: Count of firms by year and source

Source: DADS, BIC, MMO, 2007 – 17. Note: