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WORKING IN FAMILY FIRMS: PAID LESS BUT MORE SECURE? EVIDENCE FROM FRENCH MATCHED EMPLOYER-EMPLOYEE DATA

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AND ANTOINE REBÉRIOUX*

The authors study compensation packages in family-owned and nonfamily-owned firms. Using French matched employer-employee data, they first show that family firms pay on average lower wages. Part of this wage gap is attributable to low-wage workers sorting into family firms and high-wage workers sorting into nonfamily firms; however, they also find evidence that company wage policies differ according to ownership status, so that the same worker is paid differently under family and nonfamily firm ownership. In addition, family firms are characterized by lower job insecurity, as measured by lower dismissal rates. Family firms also appear to rely less on dismissals, and more on hiring reductions, than do nonfamily firms when they downsize. The authors show that compensating wage differentials account for a substantial part of the inverse relationship between the family/nonfamily gaps in wages and job security.

Family-owned firms are ubiquitous in most countries. Bloom and Van Reenen (2007) estimate that 28% of medium-sized manufacturing firms are owned by a family in the United States, and that the proportion is even larger in Europe: 46% in the United Kingdom, 37% in Germany, and 56% in France. Family firms are also numerous in emerging countries (see La

Porta, Lopez-de-Silanes and Shleifer 1999, and Bloom, Genakos, Sadun, and Van Reenen 2012). Widely held companies are typically the other main category to which family firms are compared. The literature has traditionally focused on corporate performance, trying to assess whether family firms are efficient or whether they give rise to private benefits of control (see Bertrand and Schoar 2006 for a review of the literature).

The consequences of firm ownership for employee compensation have been much less researched so far. The existing literature focuses almost exclusively on CEO and managerial pay, with most papers suggesting that top executives earn less in family firms than in nonfamily ones (Gomez-Mejia, Larraza-Kintana, and Makri 2003; Bach and Serrano-Velarde 2009; and Bandiera, Guiso, Prat, and Sadun 2010). In contrast, the pay level of non-managerial workers has been largely neglected. Moreover, employee compensation cannot be reduced simply to pay. Workers are concerned by job insecurity and, in particular, by the risk of job loss (see Valletta 2000; Nickell, Jones, and Quintini 2002; and Clark and Postel-Vinay 2009); in addition, they are ready to trade off lower wages against less churning by their employer (Böckerman, Ilmakunnas, and Johansson 2011).

With respect to widely held companies, family firms may have a comparative advantage at offering a compensation package involving greater job security and lower pay. This is because, as suggested by the literature in finance, families have longer time horizons than nonfamily shareholders. They derive a significant amenity potential from firm family control (Demsetz and Lehn 1985). For example, family owners often see their firm as an asset to pass on to their descendants, and they derive direct utility from seeing their children running a firm that bears the family name (Anderson and Reeb 2003; Burkart, Panunzi and Shleifer 2003). This ties family members together over succeeding generations, hence generating a longer time horizon than in nonfamily firms (James 1999). As a consequence, family firms can more credibly commit to implicit contracts (Anderson and Reeb 2003). So, they benefit from a comparative advantage at establishing long-term employment relations, which may lead them to offer greater job security to their employees. By doing so, family firms may afford to pay lower wages, thus offering a different compensation package from nonfamily firms which have to offer higher wages as a compensation for lower job security.

In this article, we investigate whether family firms actually offer specific compensation packages including lower wages and greater job security. We also try to identify to what extent this specific package corresponds to a compensating wage differential whereby workers would trade off lower wages against greater job security. From a unique data set matching several individual- and establishment-level data sources for France, we have access to information on firm ownership, company accounts, establishment characteristics, worker flows, and employees' social security records including wages. Looking at evidence on family firms in France is interesting because they account for a large share of national employment. Our data set contains a cross section of about 2,000 establishments in 2004—of which a vast majority belong to firms that are not listed on the stock market—and

longitudinal information on a subset of establishments and workers. Having time variation in our data is fundamental in order to disentangle whether family and nonfamily firms have distinct compensation policies or whether the observed differences in pay and job security levels between them are attributable to other unobserved characteristics or because they hire dissimilar workers.

Our contribution to the existing literature is threefold. Our article is one of the few investigations of nonmanagerial pay in family firms—the only other article we are aware of is Sraer and Thesmar (2007). They estimate firm-level wage equations on a repeated cross section of French listed firms over 1994 to 2000. Controlling for the workforce's occupational structure, they find a wage penalty of about 4.5% in family firms run by heir CEOs as compared with widely held companies. In this article, we quantify the family/nonfamily wage gap when non-listed companies are included along with listed ones. More important, using the time variation in our data, we are able to estimate which part of this gap is due to family and nonfamily firms having different wage policies and which part is due to a sorting process whereby high-ability workers sort into nonfamily firms while low-ability workers sort into family firms.

Our article also contributes to the small amount of literature focusing on job security in family firms. So far, this issue has been addressed only indirectly. Stavrou, Kassinis, and Filotheou (2006) and Block (2010) investigate the relationship between corporate ownership and downsizing and find that family ownership is associated with smaller employment reductions conditional to downsizing.[1] The key problem in interpreting these results is that a given amount of job destruction can result from either voluntary quits or hiring reductions or dismissals, and that only dismissals affect the job security of incumbent workers. We improve on this literature by directly focusing on the risk of job loss for incumbent workers. Using quarterly data on hirings and separations, we first investigate whether a transition from family to nonfamily ownership (and symmetrically from nonfamily to family ownership) is associated with a change in the rate of dismissal. We also investigate whether family firms rely less on dismissals than nonfamily firms when they downsize. This is indeed crucial for incumbent workers: If firms increase dismissals rather than reduce hirings when hit by a negative shock, incumbents face a higher risk of job loss, independent of their effort.

Finally, our article is also the first to investigate whether and to what extent the patterns of wages and job security observed across family and nonfamily firms are due to a compensating wage differential mechanism.

The Empirical Framework

Wage Equations

In the first part of this article, we estimate the relationship between family ownership and wages. To do this, we start from a standard wage equation (Mincer 1974), augmented with family ownership:

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[1]Other papers have looked at employment fluctuations in family firms (see Sraer and Thesmar 2007 and D'Aurizio and Romano 2011).

$$(1) \qquad\qquad \log w_{ij} = \gamma F_j + X_{ij}\alpha + Z_j\beta + \varepsilon_{ij}$$

where w_{ij} is the gross hourly wage of worker i employed in establishment j estimated for the year 2004—the year for which we have ownership data for most establishments—F_j is a dummy variable equal to 1 if the firm to which the establishment belongs is family-owned, and 0 otherwise; X_{ij} is a vector of individual characteristics including occupation, age, and tenure. We also control for a set of establishment- and firm-level characteristics (Z_j) including, among others, a large set of industry and regional dummies. Finally, ε_{ij} is an error term.[2]

One issue with this simple cross-section model is that estimates may be flawed by unobserved heterogeneity across establishments. For a subset of establishments, we have ownership status in 1998 and 2004. To control for heterogeneity in unobservable time-invariant characteristics, we re-estimate Equation (1) on the pooled sample covering both available years, including a time dummy and establishment fixed effects. In this specification, the effect of F is identified by transitions between ownership statuses (from family to nonfamily ownership and the other way round). To estimate it correctly, we will have to take into account that such transitions may be endogenous.

A natural explanation of why wages may differ across family and nonfamily firms is that workers may be dissimilar in both types of companies. If, for any reason, workers with specific (unobservable) characteristics tend to match with family (respectively [resp. hereafter] nonfamily) firms, the pattern of wages that we observe may be partly due to this assortative matching mechanism. To investigate this issue, we estimate the following equations:

$$(2) \qquad \log w_{ij,1998} = X_{ij,1998}\alpha + \beta Leaver_{ij} + \delta\Delta F_j * Leaver_{ij} + \mu_j + \varepsilon_{ij}$$

$$(3) \qquad \log w_{ij,2004} = X_{ij,2004}\alpha' + \beta' Arriver_{ij} + \delta'\Delta F_j * Arriver_{ij} + \mu'_j + \varepsilon_{ij}$$

where ΔF_j is the change in family ownership over the period (namely family ownership in 2004 minus family ownership in 1998), and μ_j and μ'_j are establishment fixed effects. $Leaver_{ij}$ is a dummy variable taking value 1 if the worker was in establishment j in 1998 and was no longer there in 2004, and 0 otherwise. Similarly, $Arriver_{ij}$ is a dummy variable taking value 1 if the worker was not in establishment j in 1998 but was there in 2004, and 0 otherwise.[3] In this construction, any estimate of δ and/or δ' that is significantly

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[2]Our data set is representative of the population of establishments with 20 or more workers in the French private sector. All individual regressions in this article are therefore weighted by the inverse of the number of observations of each establishment, in order to give the same weight to each of them. This approach avoids having our results driven by larger firms and plants and also maintains comparability with establishment-level equations, such as those on separations (see below). Our results are virtually unchanged when removing weights, however, which amounts to weighting each establishment by the number of its employees. In addition, as the source of variation of ownership status is at the level of firms, errors are assumed to be correlated within firms.

[3]Note that in the vast majority of cases we do not have information on the ownership status (either family or nonfamily) of the firm the worker goes to when she leaves establishment j, nor do we know

different from 0 suggests that workers with specific unobservable character-istics correlated with the wage level leave (or join) family firms when they become nonfamily (or vice versa), hence providing an indication of assorta-tive matching between workers and firms. More precisely, provided that the coefficient δ does not depend on the direction of the transition, $\delta > 0$ indi-cates that the difference in 1998 wage levels between "leavers" and "stayers" is greater in nonfamily firms becoming family-owned (and smaller in family firms becoming nonfamily-owned) than in firms remaining in the same ownership status, which we use as a control group. The same holds for δ' as regards the difference in 2004 wage levels between "arrivers" and stayers.

Besides differences in the observed and unobserved characteristics of their workforce, a potential gap in wages between family and nonfamily firms may also occur because the same worker is paid differently in firms with dissimilar ownership statuses, to the extent that they do not apply the same wage policy. To estimate this effect, controlling also for time-invariant unobserved heterogeneity across workers, we estimate the following long-difference equation on the subsample of workers who do not change estab-lishment over the period:

$$(4) \qquad \Delta \log w_{ij} = \gamma \Delta F_j + \Delta X_{ij} \alpha + \Delta Z_j \beta + u_{ij}$$

where $\Delta \log w_{ij}$ denotes the change in the gross hourly wage of worker i con-tinuously employed in establishment j between 1998 and 2004. ΔF_j is the change in family ownership over the period, ΔX_{ij} and ΔZ_j are two sets of time-varying individual and establishment controls, respectively, and u is the error term. Of course, correctly estimating Equation (4) requires taking into account the potential selection of workers into firms.

Job Security

As a second step, we investigate whether family firms offer a specific com-pensation package that includes more job security. We first estimate the re-lationship between family ownership and different types of separation rates. In our data, separation rates are available for each quarter over 1997 to 2007 whereas family ownership, establishment-level, and firm-level controls are available for most establishments for only the year 2004. Some types of separations, including dismissals, fluctuate noticeably over time and are 0 in a number of quarters. This is why we average them over a rather long period of time roughly corresponding to an entire cycle (2001–2007) centered on the year for which we have ownership status for most establishments. The model we estimate is the following:

$$(5) \qquad S_j^a = \gamma F_j + Z_j \beta + \varepsilon_{jt}$$

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where she comes from when arriving at establishment j. This is because those firms do not belong to the REPONSE data set that provides us with the information on ownership—see the Data section.

where S_j^a is the average separation rate of type a (dismissal, voluntary quit, retirement, end of trial period, and end of fixed-term contract), in establishment j over 2001 to 2007, F_j is our dummy variable indicating family ownership, and Z_j is a vector of establishment and firm-level controls. As we try to establish some statements concerning job security, our main interest is in dismissal rates. Nevertheless, looking into other types of separations is also important in order to make sure that a lower level of one type of separation is not compensated by a higher level of another type.

Here again, our results could be driven by unobserved heterogeneity across establishments. To overcome this problem, we re-estimate Equation (5) in long differences on the subsample of establishments for which we have ownership data both in 1998 and 2004. To do so in a meaningful way, we recompute average separation rates over shorter periods (3 years) centered on years for which we have ownership status. In practice, we estimate:

$$(6) \qquad \Delta S_j^a = \gamma \Delta F_j + \Delta Z_j \beta + u_j$$

where ΔS_j^a is the change in the separation rate of type a in establishment j between 1997 to 1999 and 2003 to 2005, ΔF_j is the change in family ownership over the period, and ΔZ_j denotes time-varying establishment controls.

A particularly important issue for the job security of incumbent workers is the behavior of their employer when a negative shock forces her to destroy jobs. In such cases, there is clearly a greater risk that the positions of incumbent workers will be terminated independently of the effort they put into their jobs. So, we estimate whether, when family firms are hit by a negative shock and downsize, they rely more or less on dismissals than nonfamily firms do under the same circumstances. We do so by looking at the sensitivity of establishment-level dismissals to establishment-level job creation and destruction, and then testing whether this sensitivity differs between family and nonfamily firms. However, other establishment-level characteristics are likely to affect this sensitivity (notably establishment age), and we need to control for them in our estimates. Our model is the following:

$$(7) \qquad DR_{jt} = \alpha_{1j} JCR_{jt} + \alpha_{2j} JDR_{jt} + D_t + \mu_j + \varepsilon_{jt}$$

where DR_{jt} is the dismissal rate in establishment j at quarter t, JCR_{jt} (resp. JDR_{jt}) is the job creation (resp. destruction) rate, D_t is a time dummy, and μ_j is an establishment fixed effect, which allows us to take into account that dismissal rates persistently differ across establishments. The coefficients of JCR_{jt} (resp. JDR_{jt}) are assumed to vary across establishments according to the following model:

$$(8) \qquad \begin{aligned} \alpha_{1j} &= \alpha_1 + \gamma_1 F_j + Z_j \beta_1 \\ \alpha_{2j} &= \alpha_2 + \gamma_2 F_j + Z_j \beta_2 \end{aligned}$$

where F_j and Z_j are defined as for Equation (5) and refer to 2004. Plugging Equation (8) into Equation (7) yields the final regression that we estimate:

$$(9) \quad DR_{jt} = \alpha_1 JCR_{jt} + \alpha_2 JDR_{jt} + \gamma_1 F_j JCR_{jt} + \gamma_2 F_j JDR_{jt}$$
$$+ Z_j JCR_{jt}\beta_1 + Z_j JDR_{jt}\beta_2 + D_t + \mu_j + \varepsilon_{jt}.$$

A negative coefficient on the $JDR_{ij}F_j$ interaction term would suggest that family firms rely less on dismissals than nonfamily firms do when they downsize. If this is the case, they must make the necessary adjustments by reducing hiring. We check this by re-running our estimates with hiring as a dependent variable as well.

The Data

Accessing several data sources is necessary to allow us to combine information on wages, firm ownership, worker flows, employees' characteristics, as well as a wide array of firms' and/or establishments' characteristics.

The first data source we use is the 2004 wave of the REPONSE survey (RElations PrOfessionnelles et NégocationS d'Entreprise, which was also conducted in France in 1992 and 1998). To our knowledge, it is one of the very few databases that include information on ownership status of companies that are both listed and not listed on the stock market. In 2004, a representative sample of 2,930 establishments with at least 20 employees was surveyed. One top manager per establishment was asked questions about firm ownership, use of information and communication technologies (ICT) and innovative managerial practices, as well as establishment characteristics.

Regarding firm ownership, the manager is asked: "What is the type of the main category of shareholder of the firm?" We group firms into two main categories: those with family ownership (the main shareholder is either a family or an individual) and those with nonfamily ownership (i.e., for which ownership is either dispersed or private equity or are joint-ventures). Other categories are charities, associations, and governmental organizations operating in the business sector, as well as firms owned by their own workers, by the government, or by other types of shareholders. We group together firms owned by a family and by an individual because anecdotal evidence suggests that individuals see themselves as part of a family and eventually transfer part of the firm capital to their descendants. For example, this is the case of Silvio Berlusconi in Italy, who has long been the sole owner of his company, before transferring part of his shares to his children. In a similar way, one of the most famous French individual raiders, Vincent Bolloré, recently declared:[4] "We are very lucky because our group was created 190 years ago and it has the peculiarity of being still controlled by the same family. So, instead of having financial investors [. . .], around the table we have people who allow us to make long-term planning." This suggests that individual owners are closer to families than to dispersed owners, which justifies grouping them together. Nevertheless, we checked in our regressions that firms owned by an individual and by a family do not behave in dissimilar ways, and this is actually the case.

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[4]Interview to the French radio *France Info* on Saturday, December 17, 2011.

We define a dummy variable that takes value 1 if the firm is owned by a family or an individual, and 0 otherwise. We will call it "family ownership" or "family firm" hereafter. With this definition of family ownership, family firms account for 58.2% of the total number of firms in our sample. Using data provided by Bloom and Van Reenen (2007) for France yields a similar figure: family firms account for 56% of their sample, out of which 26% are founder-owned and 30% are owned by second-generation (or beyond) family members.[5] Both Bloom and Van Reenen's and our sample include non-listed along with listed companies. Sraer and Thesmar (2007), who focus only on French listed firms, use a different definition of family ownership: a firm is family-owned if the family or a member has more than 20% of the voting rights. This definition of family firms on the basis of ultimate ownership is frequent in the literature on listed companies (e.g., Faccio and Lang 2002). However, data on ultimate ownership are not available in a reliable form for non-listed companies whatever the country (see, e.g., Bianco, Golinelli, and Parigi 2009 for Italy), which is why we rely on the information on the main type of shareholder provided by the top manager interviewed in the REPONSE survey.

Because we are interested in contrasting compensation packages between family firms and widely held, private equity or joint-venture companies, we exclude other types of firms from the sample, thus bringing our sample down to 2,133 establishments.[6] Our results are, however, robust to including these firms and controlling for their ownership status.

REPONSE also provides data on the use of information and communication technologies (ICT) and innovative managerial practices. Regarding ICT, we build a summary index capturing the intensity of use of computers, the Internet, and the Intranet at the establishment level and standardize it to 0 mean and 1 standard deviation. As for managerial practices, we build an index capturing the importance of a series of innovative devices (see Data Appendix). Here again, it is standardized to 0 mean and 1 standard deviation. One interesting point is that family firms appear to be much less innovative than nonfamily ones both in terms of ICT and in terms of managerial practices (see Appendix Table A.1).[7]

Finally, the REPONSE data set provides information on establishment size, age, the presence of a union representative in the establishment, and whether the company (or the group to which it belongs) is listed on the stock market. As can be seen from Appendix Table A.1, family firms are less likely to be listed on the stock market and union representatives are much less frequent than in nonfamily firms. Moreover, establishments are, on average, smaller in family firms than in nonfamily ones. One could be concerned that all nonfamily firms be larger than family ones so that both

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[5]Strictly speaking, only the latter group of firms is referred to as "family firms" by Bloom and Van Reenen (2007).

[6]In this sample the proportion of *establishments* belonging to a family firm is 51% (see Appendix Table A.1).

[7]This is consistent with the findings of Bloom and Van Reenen (2007).

groups would not be strictly comparable; however, such is not the case in our data. For 2004, our sample contains 1,870 firms of which 74 have more than 4,000 employees. Out of these 74 largest firms, 41% are family-owned. The overlap of the size distribution across family and nonfamily firms is also observed at the very top of the distribution: among the 10 largest firms in our sample, 5 are family-owned.

Information on labor productivity (defined as valued added per worker at the firm level) comes from the DIANE database, which contains publicly available company accounts. We also draw from DIANE information on profitability and firm age.

The REPONSE (and DIANE) data sets have been matched with Social Security records (Déclarations Annuelles de Données Sociales [DADS]). These contain information on gross hourly wages (constructed as gross annual wages divided by the number of hours worked), gender, age, occupation, working full time or part time, and a rough measure of job tenure[8] for nearly all workers in the French private sector. Matching the DADS files with REPONSE and DIANE provides us with 511,230 employees (working in 1,995 establishments), of whom 35% are employed in family-owned establishments and 65% in nonfamily establishments. Such a design generates linked employer-employee information, which allows us to study individual compensation taking into account both firm and worker heterogeneity on observable characteristics. As is usually done with the DADS and to eliminate implausible values of hourly wages due to misreporting of either annual wages or hours worked, we drop the lowest and highest percentiles of the hourly wage distribution, and we exclude CEOs and board members.[9] As evidenced in Appendix Table A.2, in 2004, family establishments paid on average lower wages, and employed more women and fewer highly skilled workers (managers and technicians) than did nonfamily establishments. In contrast, average age and tenure as well as part-time work were very similar in both types of firms.

The REPONSE survey has a panel subsample that provides information on establishments in 1998 and 2004 by means of the manager questionnaire. It contains 481 establishments for which we have data on ownership status at both dates. We match it with the DADS panel for which we have yearly data from 1994 to 2006. This panel covers 1/12th of all workers in 2004 and 1/24th in 1998 and enables us to follow workers from one year to the next. In 1998, 4,713 workers from the DADS panel are employed in one of the REPONSE establishments. About 2/3rd of these workers were still in the same establishment in 2004 whereas 1/3rd had left—usually to establishments outside the REPONSE panel. The information available in the DADS panel is similar to the DADS cross section except for job tenure,

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[8]We know whether workers have tenure less than one year, between one and two years, or more than two years.

[9]Our results are nonetheless robust to the inclusion of extreme hourly wages and CEO and board members.

which is more detailed. (We are able to code it into 8 categories instead of 3.) Changes in family ownership are captured through a variable defined as family ownership in 2004 minus family ownership in 1998. This variable may thus take values 0 (no change in ownership), +1 (family-owned in 2004 but not in 1998) and −1 (family-owned in 1998 but not in 2004). On average, this change-in-family-ownership variable is equal to 0.017 in our sample (see Appendix Table A.3). But the proportion of firms changing family owner-ship whatever the direction is much higher: 17% over the period, with half of the changes taking place from family to nonfamily ownership and half of them taking place in the opposite direction.[10]

The last source that we use is the DMMO-EMMO database. In principle, the DMMO (Données sur les Mouvements de Main-d'Oeuvre) has exhaus-tive quarterly data on gross worker flows (hirings and separations, exclud-ing temporary help workers) for establishments with 50 or more employees. Data are broken down by type of flow. The EMMO (Enquête sur les Mouve-ments de Main-d'Oeuvre) has identical information on a representative sample of establishments with less than 50 employees. We match the DMMO and EMMO data sets with REPONSE 2004, which provides 1,803 establish-ments reporting information both on job and worker flows and on owner-ship. We use the DMMO-EMMO data to compute indicators of job security and, more specifically, of hiring and separation rates at the establishment level. We exclude movements attributable to transfers between two estab-lishments of the same firm. Our data allow us to build hiring and separation rates for each quarter over 2001 to 2007.[11] As standard in the gross worker flow literature (e.g., Davis, Faberman, and Haltiwanger 2006), the hiring rate is defined as the ratio of all hires during a given quarter to the average employment level of that quarter,[12] and the separation rate as the sum of all types of separations divided by average employment. To go deeper into the types of separations, we define dismissal rates, quit rates, retirement rates, rates of end of trial periods, and rates of end of fixed-term contracts as the ratio of the corresponding type of movement during the quarter to the aver-age employment of the quarter. Following the gross job flow literature (e.g., Davis, Haltiwanger, and Schuh 1997), we also define the job creation rate as

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[10]The idea that family firms have longer time horizons might seem at odds with the fact that in our data, changes from family to nonfamily ownership are as frequent as changes from nonfamily to family ownership. This does not, however, imply that family firms change owner as frequently as nonfamily firms. Firms may indeed change owner either because they switch from family to nonfamily ownership (or the other way round), or they may change owner while remaining family-owned or nonfamily-owned. The REPONSE survey also has direct information on *all* changes of owner for the period 2002 to 2004. In our sample only 8% of family firms changed owner over this period as compared to 19% for nonfamily firms. This suggests that family firms change owner much less frequently than nonfamily firms, which is consistent with the idea that they have a longer time horizon.

[11]Our main sample is from 2001 to 2007. We also have data going back to 1997, which allows us to construct quarterly separation rates for two other subperiods: 1997 to 1999 and 2003 to 2005 on which we estimate our long difference specification (see previous section).

[12]Average employment level of the quarter is defined as half of the sum of the employment levels at the beginning and the end of the quarter (see, e.g., Davis et al. 2006).

the net growth rate of employment in the establishment between the beginning and the end of the quarter when it is positive, and 0 otherwise. Symmetrically, the job destruction rate is the absolute value of the net growth rate of employment when it is negative, and 0 otherwise. Appendix Table A.4 shows descriptive statistics on worker and job flows.

Results

Wages in Family Firms

Family Firms Pay Lower Wages

Estimates from cross-sectional individual wage equations suggest that average gross hourly wages are lower in family than in nonfamily firms (Table 1). The simple bivariate correlation between family ownership and wages in column (1) indicates that wages are about 20% lower in family firms than in nonfamily ones. Not surprisingly, the family wage penalty is much smaller when we include establishment controls (establishment size and age, presence of a union representative, being listed on the stock market, use of ICT and innovative managerial practices, 10 regional and 2-digit industry dummies) and workforce characteristics (occupation, gender, age, job tenure, and part-time/full-time status). Nonetheless, when including all these controls, the wage gap between family and nonfamily firms still amounts to about 2.4% and is significant at the 1% level, as seen in column (2).[13] This suggests that this wage gap cannot be entirely explained by such factors as family businesses being overrepresented in specific industries, employing a larger share of unskilled workers, being less unionized and less intensive in ICT and innovative managerial practices, hence being less productive (Batt 1999, Bloom and Van Reenen 2007; Sraer and Thesmar 2007; Mueller and Philippon 2011; and Appendix Table A.5).

One could think that our results are essentially driven by the fact that career opportunities, in particular for managers, are more important in publicly held companies than in family firms. If this were so, higher wages in nonfamily firms could be due to the fact that a larger proportion of managers are employed in jobs at the very top of the hierarchy. Interestingly, our results are unchanged if we exclude all managers from the sample,[14] which suggests that the wage gap we detect also holds for nonmanagerial occupations.

Another concern could be that these results might be driven by the fact that family firms employ family members who benefit from nonwage

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[13]In a previous version of this paper (Bassanini, Breda, Caroli, and Reberioux 2010), we exploited information on educational attainment available for a very small subsample of our workers (about 1% of the whole sample). Including controls for seven educational classes (instead of four occupational groups) yields very similar results, with the point estimate on family firm being –0.029 (with standard error 0.013).

[14]The point estimate on family firm in column (2) is then –0.021 with standard error 0.009. In contrast, including CEOs and board members in our sample leaves the point estimate and standard error unchanged as compared to Table 1.

Table 1. Family Firms and Wages in 2004

Dependent variable	(1) Log wage	(2) Log wage
Family firm	−0.198*** (0.012)	−0.024*** (0.008)
Observations	511,230	417,071
R-squared	0.064	0.626
Workers' controls	No	Yes
Establishments' controls	No	Yes

Notes: Dependent variable: log gross hourly wage. *Family firm* takes value 1 if the establishment is part of a firm that is family-owned, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Workers' controls* include age (8 classes), tenure (3 classes), occupation (4 groups), gender, and a dummy variable for working full time. *Establishment controls* include establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market, ICT, Innovative managerial practices, and industry dummies (at 2-digits of the NACE, Rev. 1, classification).
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

earnings and are, in turn, paid lower wages. If this were the case, our results would be driven by small establishments, since family members are unlikely to represent a large fraction of the workforce in large firms. To check that our results are robust to the elimination of smaller establishments, we rerun our regressions on establishments with more than 50 workers. Our findings are virtually unchanged, thus suggesting that earnings of family members do not account for a major part of the family/nonfamily wage gap that we find.

Results in Table 1 could also be driven by other sources of heterogeneity across firms that we are unable to observe directly. In Table 2 we use the REPONSE and DADS panels to investigate this issue and re-estimate our wage equation on the subsample of establishments (and employees) for which we have ownership data in both 1998 and 2004. We include establishment fixed effects to control for time-invariant unobserved heterogeneity. Our results suggest that when family firms change to nonfamily ownership (i.e., the family firm indicator shifts from 1 to 0), average wages grow by 4.9% and this pay increase is significant at the 1% level (see Table 2, column (1)). So, if anything, the family/nonfamily wage gap seems to be larger than in the simple cross section when including establishment fixed effects, although the difference in point estimates is not significant at conventional levels.

As our results in Table 2 are identified through changes in family ownership, we wonder whether the effect of changes in family ownership is symmetric: Are changes from family to nonfamily ownership associated with an increase in wages as large as the decrease in wages observed when a nonfamily firm is sold to a family? We can investigate this issue by including an interaction between the family firm indicator and a time-invariant dummy that takes value 1 in both years if the firm was family-owned in 1998, and 0 otherwise. The coefficient of this interaction term turns out to be close to 0 and

Table 2. Family Firms and Wages: Establishment
Fixed Effects, 1998–2004

Dependent variable	(1) Log wage	(2) Log wage
Family firm	−0.049*** (0.014)	−0.047*** (0.015)
Family firm*Family firm in 1998		−0.004 (0.032)
Observations	8,812	8,812
R-squared	0.784	0.784
Workers' controls	Yes	Yes
Time-varying establishment controls	Yes	Yes
Time dummy	Yes	Yes
Establishment fixed-effects	Yes	Yes

Notes: Dependent variable: log gross hourly wage. *Family firm* takes value 1 if the establishment is part of a firm that is family-owned, and 0 otherwise. *Family firm in 1998* takes value 1 if the establishment is part of a firm that was family-owned in 1998. Robust standard errors, clustered on firms by years, in parentheses. *Workers' controls* include age (8 classes), tenure (8 classes), occupation (4 groups), gender, and a dummy variable for working full time. *Time-varying establishment controls* include establishment size (6 classes), presence of union representative, being listed on the stock market, ICT, and innovative managerial practices. All regressions include two dummy variables that take value 1 if change in ICT (resp. change in management practices) is missing.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

insignificant (Table 2, column (2)), suggesting that the effect of changes in family ownership is symmetric.

Perhaps more important, we are also concerned that changes in family ownership may be endogenous, which can be problematic because we do not dispose of a suitable instrument. In particular, the change in family ownership may be correlated with pre-change performance, which in turn may affect subsequent changes in wages. In fact, evidence in the finance literature supports that firms which are takeover targets tend to perform poorly prior to takeover (Martin and McConnell 1991). We find the same in our data. In the REPONSE survey, we know whether firms have changed owner, whatever its type, between 2002 and 2004. We build a "change of owner" variable that is equal to 1 if the firm changed owner (whatever the type) over the period, and 0 otherwise. Correlating this variable with the initial level of gross operating profits, we find that firms that changed owner between 2002 and 2004 did have lower gross operating profits in 2002.[15] This bears no consequences, however, for the potential endogeneity of our change in family ownership (ΔF) variable. Indeed, among firms that changed owner, in our sample, the proportion changing from family to a nonfamily ownership is equal to the proportion changing from nonfamily to family.[16] This implies that our variable of change in family ownership,

[15]Our standard controls are included in the regression. The point estimate (resp. standard errors) on the variable "change of owner" is −37.88 (18.37), with gross operating profits expressed in millions of euros.

[16]Note that changes of owner also include changes from a family to another family owner and changes from a nonfamily to a different nonfamily owner.

Table 3. Change in Family Ownership and Firm Pre-Change Characteristics: Point Estimates and Standard Errors on Δ*Family firm*

Dependent variable	(1) Gross operating profits	(2) Log productivity	(3) Log size	(4) Log wage	(5) Log firm age
1998 level	15.44 (10.19)	−0.039 (0.043)	0.082 (0.164)	0.008 (0.028)	0.073 (0.129)
1994–1998 change	4.57 (3.61)	0.025 (0.036)	0.048 (0.131)	0.017 (0.022)	

Notes: Each cell corresponds to a different regression for which the dependent variable is indicated in the column title (in level or changes as specified in line headings). Each cell shows point estimates and standard errors of the Δ*Family firm* variable in which Δ*Family firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, −1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Gross Operating Profits* are expressed in millions of euros, *log Productivity* is the log of value added per worker, *log Size* is the log of the number of employees, *log Wage* is the log of the gross annual wage, and *log Firm Age* is the log of firm age; all these variables are defined at the firm level. All equations with a dependent variable in levels include the following establishment-level controls for 1998: intensity in ICT and management practices, region, presence of union representative, being family-owned, being listed on the stock market, and industry dummies corresponding to the 2-digit NACE, Rev. 1, classification. No control is included in equations with a dependent variable in changes.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

which takes into account the direction of the change, is orthogonal to the change of owner variable.[17] So, the fact that the latter is correlated with past performance does not imply that the former has to be so. Table 3 indeed shows that the change in family ownership is not correlated either with the past level of gross operating profits, wages, productivity, establishment size, or age nor with the past growth rate of these variables.[18] Albeit this does not allow us to conclude that family ownership transitions are exogenous; performing this test is equivalent to running a balancing test in a difference-in-difference setup showing that treatment and control groups were not significantly different before treatment (see Altonji, Elder, and Taber 2005).

Another source of endogeneity could arise from negative shocks: If transitions from nonfamily to family ownership are driven by negative economic shocks, the reduction in wages associated with such transitions could also be a consequence of the shock. If this were the case, however, one would expect transitions to family ownership to be associated with increases in dismissals. As shown below, the pattern we observe is the opposite, with changes from nonfamily to family ownership associated with a reduction rather than

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[17]The "change of owner" variable takes value 1 if Δ*F* = 1 (change from a nonfamily to a family owner) or if Δ*F* = −1 (change from a family to a nonfamily owner) and in some cases in which Δ*F* = 0 (when changing from a family to another family owner or from a nonfamily to another nonfamily owner). When regressing Δ*F* on the "change of owner" variable, the coefficient on "change of owner" is the weighted average of Δ*F*, where the weights are the proportions of the corresponding transitions. Given that the share of firms changing with Δ*F* = 1 is equal to the share of firms changing with Δ*F* = −1 in our sample, the coefficient on "change of owner" is 0.

[18]We obtain similar results to those presented in Table 3 if we restrict the sample by excluding firms not changing ownership.

an increase in layoffs.[19] Although one has to be cautious in interpreting our results, we believe that such pieces of evidence suggest they are unlikely to suffer from major endogeneity bias.

Overall, our findings suggest that changes in family ownership generate changes in average wages of about 5%[20] and that this effect is symmetric whatever the direction of the change. At this point, an important question is whether this change in average wages is due to the fact that workers in family and nonfamily firms have different unobservable characteristics, or whether it is due to a change in the firm wage policy such that the same workers are paid in a different way in family and nonfamily firms.

Assortative Matching vs. Changes in Stayers' Wages

A natural explanation of the change in average wages following a change in family ownership is that workers are different in family and nonfamily firms. Although the specification in Table 2 controls for observable workers' characteristics, workers may differ with respect to unobservables. Given that nonfamily firms tend to be more innovative than family firms, they may attract more dynamic workers. If this is the case, part of the wage difference estimated in Table 2 may be due to an assortative matching mechanism rather than to the "true" impact of a change in wage policy brought about by the change in family ownership.

To investigate this issue we estimate whether workers who left a firm that changed family ownership between 1998 and 2004 had wages different from those of stayers before the change took place (i.e., in 1998); see Equation (2).[21] Symmetrically, we also estimate whether workers who arrive in a firm that changed family ownership have different wage levels as of 2004 as compared with workers who have been continuously employed in the establishment between 1998 and 2004; see Equation (3). Results in Table 4, column (1) suggest that leavers are actually different from stayers: when a firm changes from nonfamily to family ownership ($\Delta F = 1$), the difference in 1998 wages between workers who leave the firm and those who eventually

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[19]Additional evidence of the fact that negative shocks are not a major source of endogeneity here comes from the following exercise. We re-estimate the same models as in Table 3 replacing ΔF with its absolute value and an interaction between the latter and the initial family ownership status of the firm in 1998 (i.e., $|\Delta F|$*Family Firm in 1998). If changes from nonfamily to family ownership were significantly more driven by negative shocks than changes from family to nonfamily ownership, then one would expect the coefficient on the $|\Delta F|$*Family Firm in 1998 interaction term to be significantly different from zero. This is not the case. Depending on the dependent variable, t-statistics for the interaction term range from –0.90 to +1.55.

[20]This change in wages may seem small but is actually much larger than the wage penalty at re-employment observed in France in the case of job loss (–1%) as well as the wage premium associated with voluntary job changes in this country (+3%); see OECD (2010).

[21]Recall that in the vast majority of cases we do not have information on the ownership status (either family or nonfamily) of the firm the worker goes to when she leaves establishment j or where she has come from when arriving at establishment j. As a consequence, we cannot assess the existence of assortative matching simply by following workers across firms.

Table 4. Change in Family Ownership and Wages
of Leavers, Arrivers, and Stayers

Dependent variable	(1) Log wage, 1998	(2) Log wage, 2004
Leaver	0.014 (0.011)	
Leaver*ΔFamily firm	0.065*** (0.022)	
Arriver		0.026* (0.016)
Arriver*ΔFamily firm		–0.001 (0.020)
Observations	4,568	4,275
R-squared	0.829	0.832
Establishment fixed effects	Yes	Yes
Workers' controls	Yes	Yes

Notes: Dependent variable indicated in the column title. *Leaver* takes value 1 if the worker separated from the establishment between 1998 and 2004. *Arriver* takes value 1 if the worker was hired in the establishment between 1998 and 2004. Only workers aged 60 or less in 2004 who joined the DADS panel in 1998 or before are included. Δ*Family firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, –1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Workers' controls* include the following groups: age (8 classes), tenure (3 classes), occupation (4 groups), gender, and a dummy variable for working full time.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

stay is, on average, 6.5% higher than in firms not changing ownership. Similarly, the opposite occurs when a firm changes ownership from family to nonfamily. This result supports the idea that workers in nonfamily firms (resp. family firms) are "high-wage" (resp. "low-wage") individuals—after controlling for observable characteristics—and that assortative matching is taking place, with a number of these workers leaving the firm when it switches from nonfamily to family (resp. from family to nonfamily) ownership.[22] In contrast, we do not find any evidence of selection on arrivers: as shown in Table 4, column (2), the wage difference between arrivers and stayers is virtually identical whether firms change family ownership or not. This result is consistent with assortative matching to the extent that once poorly matched workers have left following the change in ownership status, stayers are presumably properly matched and hence have no reason to be different from newly hired workers who have been chosen because they match the firm's needs (and/or characteristics).

So, part of the variation in wages we observe when firms change family ownership is due to a change in the unobservable composition of their workforce. However, a 6.5% wage difference over a population of leavers who represents about one-third of the total workforce (see the Data section) cannot fully account for the overall 5% wage change that we estimate when firms change family ownership. This suggests that some of the workers—those

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[22]We check that if the coefficients of the interaction between *Leaver* and Δ*F* are allowed to depend on the direction of the ownership transition, their difference is statistically insignificant, so that we can claim that the sorting patterns are effectively symmetric.

Table 5. Changes in Family Ownership and Wage Growth of Stayers, 1998–2004

Dependent variable	All establishments		Establishments that changed ownership between 1998 and 2004	
	(1) ΔLog wage	(2) ΔLog wage	(3) ΔLog wage	(4) ΔLog wage
ΔFamily Firm	−0.032** (0.016)	−0.032** (0.016)	−0.034** (0.015)	−0.034** (0.015)
Log relative wage 1998		−0.012 (0.038)		−0.009 (0.062)
Observations	2,663	2,663	487	487
R-squared	0.099	0.099	0.261	0.261
Changes in workers' controls	Yes	Yes	Yes	Yes
Changes in establishments' controls	Yes	Yes	Yes	Yes

Notes: Dependent variable: change in log gross hourly wage between 1998 and 2004. *ΔFamily firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, −1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Relative wage in 1998* is the difference between the log wage of each individual and the average log wage of the establishment, computed in 1998. *Changes in workers' controls* include changes in occupation (4 groups), age (8 classes), tenure (8 classes), and working full time. *Changes in establishments' controls* include change in establishment size, the presence of union representative, stock market listing, ICT, and innovative managerial practices all measured between 1998 and 2004. All regressions include two dummy variables that take the value 1 if change in ICT (resp. change in management practices) is missing.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

who tend to remain in the firm after a change in ownership—are likely to be paid differently in family and nonfamily firms because of different firm wage policies.

To quantify this effect, we estimate the impact of changes in family owner-ship on wage growth for workers who have been continuously employed in the same establishment between 1998 and 2004; see Equation (4). Accord-ing to the results in Table 5, column (1), workers who stay in the same estab-lishment when ownership status changes do experience a change in their wage: When firms switch from nonfamily to family ownership ($\Delta F = 1$), stayers' wages go down by about 3.2% and vice versa when ownership status changes in the opposite direction. Yet, given the existence of assortative matching of workers and firms, one could be concerned that our sample of stayers is selected, generating biases in the estimation of Equation (4). How-ever, while workers leaving firms that change family ownership differ from stayers because of some specific unobserved characteristics correlated with their wage level in 1998 (see Table 4), they have no different wage growth either before (1994–1998) or after the ownership change (2004–2006);[23] see Table 6.[24] This suggests that the observed sorting of workers into family and nonfamily firms is essentially driven by differences in unobserved char-acteristics that are likely to be time-invariant (such as individual productive ability) and, therefore, will be differenced out when estimating Equation

[23]The first year for which we have access to comparable wage data is 1994, and 2006 is the last year.
[24]Specifications estimated in Table 6 are based on Equation (2) except that the dependent variables and the individual controls are differences over 1994 to 1998 and 2004 to 2006.

Table 6. Change in Family Ownership
and Wage Growth of Leavers

Dependent variable	(1) ΔLog wage 1994–1998	(2) ΔLog wage 2004–2006
Leaver	0.011 (0.012)	0.029** (0.012)
Leaver*ΔFamily firm	–0.011 (0.025)	–0.017 (0.017)
Observations	2,477	2,575
R-squared	0.566	0.477
Establishment fixed effects	Yes	Yes
Workers' controls	Yes	Yes

Notes: Dependent variable indicated in the column title. *Leaver* takes value 1 if the worker separated from the establishment between 1998 and 2004. Only workers aged 60 or less in 2004 who joined the DADS panel in 1998 or before are included. Δ*Family firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, –1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. In column (1) only those that were in the same establishment in both 1994 and 1998 are included. In column (2) those staying with the same establishment between 1998 and 2004 but leaving it between 2004 and 2006 are excluded. In column (2) establishment fixed effects refer to establishments in 1998. *Workers' controls* include changes in age (8 classes), tenure (3 classes), occupation (4 groups), and a dummy variable for working full time over 1994–1998 (column 1) and 2004–2006 (column 2).
***$p < 0.01$, **$p < 0.05$, * $p < 0.1$.

(4). In other words, we do not expect our estimates in Table 5 to be significantly biased because of sample selection. Given that selection of workers into firms seems to be driven only by unobserved characteristics correlated with 1998 wage levels, however, we use a proxy-variable approach to further check that selectivity is not driving our results. More specifically, we proxy these unobservables by the relative wage of the individual in 1998 defined as the individual wage divided by the average wage in her establishment computed on all individuals, will they be stayers or leavers in the next period. Including this variable in the regression leaves our results unchanged, see Table 5, column (2), thereby supporting the idea that selectivity is not a major concern in our estimates.

To the extent that only 17% of firms change family ownership in our sample between 1998 and 2004, one could be concerned that the absence of conditional correlation that we find between relative wages in 1998 and subsequent wage growth might be driven by firms that did not change family ownership. To control for this, we re-run our estimates on the subsample of establishments that did change family ownership over the period. Results in Table 5, columns (3) and (4), suggest this is not a concern: estimates are virtually identical to those computed on the whole sample.

Overall, family firms appear to pay lower wages. Part of the wage gap is attributable to differences in unobserved characteristics of workers across family and nonfamily firms; but another part is attributable to different

wage policies being implemented by these firms, so that the same worker's pay is different in family and nonfamily companies, at least for those who tend to stay in the firm after a change in family ownership. The finding that family ownership is associated with differences in wage policies raises the issue of whether it may also affect other components of the compensation package. Job security is one of the most important ones.

Job Security in Family Firms

In this section we investigate whether family firms offer greater job security than their nonfamily counterparts. If so, this would point to a compensation package offered by family firms characterized by lower wages but greater job security.

Separation Rates

A first way to look at job security in family firms is to consider separation rates and, more specifically, rates of dismissals that capture the risk of job loss for permanent workers. We use 2001 to 2007 averages to avoid our results being affected by a large number of zeros in the case of certain separations (notably dismissals). Results in Table 7, panel A, column (1), show that dismissal rates are significantly lower in family firms even after controlling for our basic set of establishment and worker controls. The difference in dismissal rates between family and nonfamily firms is estimated to be as large as 0.15 percentage point per quarter, which amounts to a 28% gap between both types of firms (see Appendix Table A.4). This suggests that the risk of involuntary job loss is substantially lower in family than in nonfamily firms. One interesting point is that the low level of dismissals is not compensated for by other types of separations—see panel A, columns (2) to (5): family firms do not display higher levels of quits, retirement, end of trial periods, or end of fixed-term contracts.

However, specifications in Table 7 do not control for the proportion of permanent workers in the establishment. This may be a problem since external flexibility in family firms might be ensured by fixed-term contracts. As involuntary separations at the end of a fixed-term contract are not reported as dismissals in the data,[25] this may create a bias in our estimates. To deal with this problem, we re-estimated the dismissal equation controlling for the proportion of permanent workers in the establishment in 2004, drawn from the REPONSE data set. Results are very similar to those in Table 7: family firms still display lower rates of dismissals.[26] Given that our information on

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[25] They are simply classified as separations due to end of contract.

[26] The point estimate (resp. standard error) on the family firm variable is –0.136 (0.046). Controlling for the proportion of permanent contracts does not change our result, which is not surprising. When regressing this proportion on our family firm indicator and our standard set of controls, the coefficient on family firm is indeed insignificant with point estimate (resp. standard error) equal to –0.008 (0.006).

Table 7. Family Ownership and Separation Rates

Dependent variable	(1) Dismissals	(2) Quits	(3) Retirement	(4) End-trial	(5) End-fixed term
Panel A. Average separation rates, 2001–2007					
Family firm	−0.153*** (0.046)	0.055 (0.079)	0.003 (0.017)	0.024 (0.030)	−0.141 (0.260)
Observations	1,295	1,295	1,295	1,295	1,295
R-squared	0.433	0.528	0.468	0.506	0.387
Establishment controls	Yes	Yes	Yes	Yes	Yes
Workers' characteristics	Yes	Yes	Yes	Yes	Yes
Panel B. Changes in separation rates, 1998–2004					
ΔFamily Firm	−0.150** (0.076)	−0.109 (0.094)	0.052 (0.047)	−0.016 (0.017)	−0.015 (0.356)
Observations	257	257	257	257	257
R-squared	0.075	0.059	0.075	0.076	0.049
Time-varying establishment controls	Yes	Yes	Yes	Yes	Yes
Change in workers' characteristics	Yes	Yes	Yes	Yes	Yes

Notes: **Panel A.** Dependent variable: establishment-level average of quarterly separation rates over 2001–2007, computed for each type of separation (rate of dismissals, rate of quits, etc.) as indicated in column titles. Only establishments with non-missing observations for at least 9 quarters in 2001–2007 are included. *Family firm* takes value 1 if the establishment is part of a firm that is family-owned in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Establishment controls* include establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market, ICT, innovative managerial practices, and industry dummies (at 4-digits of the NACE, Rev. 1, classification). *Workers' characteristics* include the proportion of women, the proportion of workers below 40 years old, and the proportion of employees in 4 occupational groups.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Panel B. Dependent variable: change in 3-year establishment-level averages of quarterly separation rates over 3-year periods centered on 1998 and 2004, computed for each type of separation (rate of dismissals, rate of quits, etc.) as indicated in column titles. Only establishments with non-missing observations for at least 9 quarters in each 3-year periods are included. Δ*Family firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, −1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Time varying establishment controls* include changes in establishment size (6 classes), age (5 classes), presence of union representative, listing on the stock market, use of ICT, and innovative managerial practices, all measured between 1998 and 2004. All regressions include two dummy variables that take the value 1 if change in ICT (resp. change in management practices) is missing. *Changes in workers' characteristics* include changes in the proportion of workers by occupation (4 groups) and by gender.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

firm ownership is for 2004, a further robustness check consists in reducing our sample to dismissals taking place in 2003 to 2005, a short period of time centered around the date for which we have information on ownership. Family firms still display lower dismissal rates.[27]

Time-invariant unobserved heterogeneity across establishments could be driving our results. To deal with this issue, we re-estimate our model in long differences between 1998 and 2004; see Table 7, panel B. Results are very similar to those in panel A with changes from nonfamily to family ownership ($\Delta F = 1$) inducing a reduction in the rate of dismissals. Moreover, this result is unlikely to be driven by changes in the unobserved composition of

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[27]The point estimate (resp. standard error) on the family firm variable is −0.144 (0.062).

the workforce. As evidenced above, in the case of a transition from nonfamily to family ownership, workers who stay in the establishment have worse productive abilities than those who left. To the extent that these workers have a greater propensity to be dismissed, this is likely to bias our estimates toward zero, if anything. Similarly, the opposite patterns of wages and dismissals suggest that our results are not driven by shocks inducing both ownership changes and changes in dismissals.

Another concern could arise from the fact that, by construction, our panel contains only surviving establishments. Closing establishments have much higher rates of dismissal than average. So, if family-owned establishments were more likely to shut down than nonfamily ones, the lower rate of dismissals observed in the former could be due to the fact that those family-owned establishments that dismissed most workers actually closed down and were selected out of our sample. Using the 2009 edition of the French register of establishments (Répertoire SIRENE), we are able to compute, for all of the establishments that were in the REPONSE sample in 2004, the probability of having closed by 2009.[28] Running a probit regression of the probability of establishment closure on family ownership and the same set of covariates as in Table 7, panel A, we find that family ownership reduces death probability by 5.4%—although this effect is not significant at conventional levels—with a standard error of 3.6%.[29] As a consequence, we believe that selection into sample is unlikely to drive our results.

Downsizing through Dismissals or Hiring Reductions?

As a second step, we investigate whether family firms rely less on dismissals than nonfamily firms do when they downsize. Dismissals are a crucial issue for incumbent workers: When a firm downsizes, they have a greater chance to lose their job independently of their effort. Do they face a lower risk of job loss when the firm is hit by a negative shock, if employed in a family firm? To shed light on this point, we regress dismissal rates on job creation and job destruction rates as well as their interaction with family ownership; see Equation (9). As evidenced in Table 8, panel A, job destruction rates are strongly correlated with dismissals, even controlling for establishment heterogeneity in separations through establishment fixed effects; see column (1).[30] When comparing adjustment patterns in family and nonfamily firms,

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[28]Unfortunately, we cannot compute similar establishment death hazards over 1998 to 2004. The REPONSE panel contains all establishments of the REPONSE 2004 cross section that were also in the 1998 cross section. So, by construction, no establishment in the REPONSE panel closes down between both dates. Therefore, death probability should be computed using the 1998 REPONSE cross section together with the Répertoire SIRENE. Unfortunately, we do not have access to the former.

[29]If we use firm instead of establishment death hazards, our results are qualitatively similar.

[30]As regards the adjustment to job creation, the positive coefficient on the JCR variable in Table 8 might suggest that dismissals increase with employment expansion, although this effect is substantially smaller for family firms as indicated by the negative coefficients on the interaction between family ownership and job creation. This is consistent with previous evidence for France (see Abowd, Corbel,

Table 8. Sensitivity of Dismissal and Hiring Rates to Job Creation and Job Destruction

Panel A. Dismissal rates, job creation, and job destruction				
Dependent variable	(1) Dismissal rate	(2) Dismissal rate	(3) Dismissal rate	(4) Dismissal rate
Job creation rate	0.021** (0.010)	0.021** (0.011)	0.036*** (0.013)	0.010** (0.005)
Job destruction rate	0.115*** (0.038)	0.122*** (0.040)	0.161*** (0.033)	0.121*** (0.010)
Job creation rate × Family firm		−0.035* (0.019)	−0.060*** (0.022)	−0.020* (0.011)
Job destruction rate × Family firm		−0.152** (0.070)	−0.252*** (0.084)	−0.078** (0.033)
Observations	38,360	38,360	31,236	31,147
R-squared	0.247	0.286	0.455	0.723
Establishment fixed effects	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Establishment controls, reduced × JCR/JDR	No	No	Yes	Yes
Establishment controls, extended × JCR/JDR	No	No	No	Yes
Workers' characteristics × JCR/JDR	No	No	Yes	Yes

Panel B. Hiring rates, job creation, and job destruction				
Dependent variable	(1) Hiring rate	(2) Hiring rate	(3) Hiring rate	(4) Hiring rate
Job creation rate	1.019*** (0.018)	1.016*** (0.014)	1.011*** (0.017)	0.993*** (0.014)
Job destruction rate	−0.235*** (0.036)	−0.223*** (0.030)	−0.155*** (0.029)	−0.236*** (0.020)
Job creation rate × Family firm		−0.042 (0.028)	−0.077** (0.032)	−0.055* (0.031)
Job destruction rate × Family firm		−0.251*** (0.067)	−0.170** (0.082)	−0.175*** (0.050)
Observations	38,360	38,360	31,236	31,147
R-squared	0.751	0.756	0.763	0.784
Establishment fixed effects	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Establishment controls, reduced × JCR/JDR	No	No	Yes	Yes
Establishment controls, extended × JCR/JDR	No	No	No	Yes
Workers' characteristics × JCR/JDR	No	No	Yes	Yes

Notes: In panel A, the dependent variable is the establishment-level quarterly dismissal rate. In panel B, the dependent variable is the establishment-level quarterly hiring rate. *Family firm* takes value 1 if the establishment is part of a firm that is family-owned in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Job creation rate* (*JCR*) and *Job destruction rate* (*JDR*) are, respectively, the job creation and job destruction rates in the establishment. *Establishment controls, reduced* include presence of union representative, being listed on the stock market, the use of ICT, and innovative managerial practices. *Establishment controls, extended* include the previous establishment controls plus establishment size (6 classes), age (5 classes), region, and industry dummies (at 2-digits of the NACE, Rev. 1, classification). *Workers' characteristics* include the proportion of women, the proportion of workers below 40 years old, and the proportion of employees in 4 occupational groups. The sample covers 2001–2007.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

see column (2), family firms appear to rely less than nonfamily ones on dismissals when employment contracts: the coefficient on the interaction between family ownership and the job destruction rate is negative and

and Kramarz 1999) and is probably because during expansion, nonfamily firms make a lot of experimentation with new recruits, which generates many hiring and separations of workers who stay with the firm for only a short period of time (see Jovanovic 1979; Pries and Rogerson 2005).

significant.[31] A consistent finding emerges when we use hiring rate as the dependent variable. Column (2) in panel B of Table 8 shows a negative and significant coefficient on the interaction between family ownership and the job destruction rate even in this case. As a consequence, when facing a negative shock, family firms tend to achieve the required staff adjustment by reducing hiring more and by increasing dismissals less than nonfamily firms do.

One concern about these results is that establishments with different size, age, and so forth, operating in different sectors or with different workers' characteristics could react in a different way to job creation or job destruction which could be confounded with the effect of family ownership. To control for this, columns (3) and (4) of Table 8, panels A and B, progressively include interaction terms between job creation and job destruction, on the one hand, and these potentially confounding factors, on the other hand. Our main result is robust to these changes: Family firms consistently appear to rely less on dismissals and to compress hiring more when hit by a negative shock.[32]

Overall, our results suggest that family firms do provide more job security to incumbent workers: Not only do they have lower average dismissal rates but, when employment goes down, they also reduce hiring more than nonfamily firms do and, consistently, they rely less on dismissals.

Compensating Wage Differential

Our results on stayers' wages, on the one hand, and job security, on the other hand, raise the issue of a possible compensation between pay and job security. If workers who stay in an establishment that changes from nonfamily to family ownership experience a reduction in wages, to what extent can this change in pay be explained by a compensating wage differential mechanism, whereby workers would accept lower wages in exchange for greater job security? Similarly, in the event of a transition from family to nonfamily ownership, to what extent does the wage increase act as a compensation for reduced job security?

To provide evidence on this point, one would estimate:

$$(10) \qquad \Delta \log w_{ij} = \gamma \Delta F_j + \delta \Delta D_j + \Delta X_{ij}\alpha + \Delta Z_j\beta + u_{ij}$$

in which the variables are the same as in Equation (4) with ΔD_j denoting the change in the rate of dismissal in establishment j between 1998 and 2004. In this setup, the prediction associated with compensating wage differential is that $\hat{\delta}$ should be positive and $\hat{\gamma}$ should be much smaller than in Table 5, with ^ indicating estimates. Any increase in the rate of dismissal should be matched by a corresponding increase in log wages. In addition, if changes

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[31]Our results suggest that a 10 percentage point increase in job destruction generates a 1.2 percentage point increase in the rate of dismissals in nonfamily firms, whereas this effect is significantly smaller, and actually not statistically different from 0, in family firms.

[32]Our results are unchanged if sample size is kept constant across columns (1) to (4).

Table 9. Testing for Compensating Wage Differentials, 1998–2004

Dependent variable	Establishments that did not change ownership between 1998 and 2004	Establishments that changed ownership between 1998 and 2004	
	(1) ΔLog wage	(2) ΔLog wage	(3) ΔLog wage
ΔFamily firm			−0.019 (0.015)
ΔDismissal rate	−0.009 (0.010)	0.060** (0.026)	0.050* (0.026)
Observations	2,095	480	480
R-squared	0.127	0.304	0.310
Changes in workers' controls	Yes	Yes	Yes
Changes in establishments' controls	Yes	Yes	Yes

Notes: Dependent variable: change in log gross hourly wage between 1998 and 2004. Δ*Family firm* takes value 1 if the establishment was family-owned in 2004 and not in 1998, −1 if it was family-owned in 1998 and not in 2004, and 0 otherwise. Robust standard errors in parentheses. Δ*Dismissal rate* is the change in the average quarterly dismissal rate (computed over 3-year periods centered around 1998 and 2004). *Changes in workers' controls* include changes in occupation (4 groups), age (8 classes), tenure (8 classes), and working full time. *Changes in establishments' controls* include change in establishment size, age, presence of union representative, listing on the stock market, ICT, and innovative managerial practices, all measured between 1998 and 2004. All regressions include two dummy variables that take the value 1 if change in ICT (resp. change in management practices) is missing.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

in stayers' wages are entirely due to changes in dismissals brought about by changes in family ownership, the coefficient on ΔF should be close to zero when estimating Equation (10).

One problem is that ΔD is endogenous and OLS estimates of δ are likely to be biased downward, because any negative shock affecting the establishment is likely to induce at the same time an increase in dismissals and a reduction in wages. As a matter of fact, when estimating Equation (10) on the subsample of establishments that did not change family ownership between 1998 and 2004 (see Table 9, column (1)), we obtain a negative, although insignificant, estimate for the coefficient of ΔD. Now, suppose that the firm wage policy changes only when a change in family ownership occurs. In this case, the effects of potential shocks affecting the establishments are likely to be dominated by the change in wage and job-security policy brought about by the change in family ownership. As a matter of fact, regressing changes in log wages on ΔD without including ΔF, on the subsample of establishments that did change family ownership, yields a positive coefficient on ΔD suggesting that a trade-off exists between lower wages and a higher risk of dismissals (see Table 9, column (2)). When including changes in family ownership in the regression (see Table 9, column (3)), the coefficient on ΔD remains positive and significant (at the 10% level). In contrast, the magnitude of the coefficient on ΔF is reduced by 44%—from −0.34 in Table 5, column (3), to −0.19 in Table 9, column (3)—and is no longer significant at conventional levels. We interpret this result as suggesting that part of the change in wages experienced by stayers when family ownership changes is

due to a compensating wage differential mechanism: Following a transition
from nonfamily to family ownership wages tend to go down, but in exchange
workers benefit from greater job security. Similarly if a family firm becomes
nonfamily-owned, wages go up for stayers partly as a compensation for re-
duced job security.

Conclusion

In this article, we provide evidence that French family firms offer a specific
compensation package to their employees involving lower wages but greater
job security. Controlling for individual characteristics and establishment
fixed effects, we find that family firms pay their employees about 5% less
than nonfamily firms. This result is identified by changes in family owner-
ship. Given that we do not have an instrument for these changes, one needs
to be cautious in interpreting our findings. Changes in family ownership,
however, appear to be uncorrelated with pre-change firm characteristics
and outcomes. Moreover, unobserved shocks are unlikely to account for the
opposite patterns of change in wages and dismissals that we observe when
family ownership transitions take place. Based on such evidence, we are
confident that our estimates are not flawed by major endogeneity biases.

Part of the family/nonfamily wage gap that we find is due to differences
in unobserved characteristics of workers across family and nonfamily firms.
But another part is due to different wage policies being implemented by
both categories of firms, so that a given worker's pay differs in family and
nonfamily companies. *Ceteris paribus*, family firms also feature a substan-
tially lower dismissal rate than nonfamily firms, which is robust to control-
ling for establishment fixed effects. Moreover, when hit by a negative shock
that induces employment downsizing, family firms appear to rely less on
dismissals and more on hiring contraction than nonfamily firms in order to
achieve the required staff adjustment. That family firms offer lower wages
but greater job security suggests that some compensating wage differential
mechanism may be at play. We find evidence of such compensation for
workers who stay in the same establishment when firm ownership changes:
We estimate that about half of the decrease in their wage is accounted for
by a lower risk of dismissal when ownership changes from nonfamily to
family ownership (and vice versa when ownership changes from family to
nonfamily).

Our findings are consistent with a multiple equilibrium model, in which
family firms are in a low-pay/high-job-security equilibrium, while nonfamily
firms are in a high-pay/low-job-security one. Changing ownership is then
equivalent to moving from one equilibrium to the other. Why do some work-
ers go away and others stay in the same establishment when this occurs?
Those who stay are presumably workers with high moving costs. Once these
moving costs are taken into account, they are indifferent between both types
of equilibrium to the extent that they are compensated: by higher wages in
exchange for lower job security when ownership changes from family to

nonfamily and by greater job security in exchange for lower pay when the transition takes place the other way round.

Other workers leave their establishment when ownership changes. One potential explanation for this might be the existence of a complementarity between ICT and innovative managerial practices, on the one hand, and high ability, on the other. In this case, high-ability workers would leave firms when they become family-owned because family firms would not compensate them properly for the large decrease in wages they would have to suffer if staying, due to the sharp reduction in the intensity of ICT and innovative managerial practices. Symmetrically, low-ability workers would leave family firms when they become nonfamily either because they would be fired or because they would be offered wage levels that do not compensate them for the lower degree of job security. However, our data do not quite support this interpretation. When controlling for changes in ICT and managerial practices interacted with *Leaver* in Equation (2), the coefficients on both interaction terms are insignificant, and the point estimate and standard error on $\Delta F^{*}Leaver$ remain unchanged. This suggests that the assortative matching we observe between high (resp. low) ability workers and nonfamily (resp. family) firms is not driven by their dissimilar intensity of use of ICT and innovative managerial practices.

An alternative explanation would then be that workers who leave their establishment when ownership changes have different preferences in terms of wages and/or job security. High-ability workers would leave nonfamily firms when they become family-owned because they have a relative preference for wages over job security, whereas the opposite holds for low-ability workers leaving family firms when they become nonfamily-owned. Some very preliminary indication of this can be found in our data. The 2004 REPONSE survey contains a "worker section" in which employees are asked what pushes them to put a lot of themselves into their job. "Wage incentives" and "promotion prospects" are among the possible choices and for each of them workers may answer "yes, a lot," "yes, to some extent," "not really," or "not at all." For each item, we group answers into two categories: "yes" and "no." Regressing the wage incentive and promotion prospect indicators on our dummy variable for family ownership and the usual set of individual- and establishment-level controls, we find that workers in family firms are significantly less sensitive to wage incentives and to career prospects than workers in nonfamily firms.[33] This is consistent with assortative matching taking place on the basis of preferences as evidenced, for top managers, by Bandiera et al. (2010). Our data do not allow us to go further along these lines; however, investigating potential differences in preferences across workers employed in family vs. nonfamily firms appears to be a promising avenue for future research.

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[33]The corresponding point estimates and standard errors are –0.52 (0.018) for wage incentives and –0.42 (0.017) for career prospects. Results are qualitatively similar if controlling for the worker's wage and her exposure to a wage incentive scheme.

Appendix A. Tables

Table A.1. Means of Variables in Cross Section (2004), Establishment Level

Variables	Whole sample (2,133 obs.)		Establishments belonging to family firms (1,087 obs.)		Establishments belonging to nonfamily firms (1,046 obs.)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Family firms	0.510	0.500	1.000	0.000	0.000	0.000
ICT use (standardized index)	0	1	−0.277	0.991	0.289	0.926
Management practices (standardized index)	0	1	−0.312	1.044	0.305	0.851
Establishment size (total employees)	340.2	608.7	244.7	487.8	439.4	699.5
Establishment age						
less than 5 years	0.035	0.185	0.030	0.169	0.041	0.199
5 to 9 years	0.072	0.259	0.068	0.252	0.076	0.265
10 to 19 years	0.218	0.413	0.233	0.423	0.203	0.402
20 to 49 years	0.425	0.495	0.448	0.498	0.402	0.490
50 years or more	0.249	0.433	0.220	0.415	0.279	0.449
Presence of union representative	0.648	0.478	0.495	0.500	0.807	0.395
Listed firms or belonging to a listed group	0.431	0.495	0.200	0.400	0.674	0.469

Table A.2. Means of Variables in Cross Section (2004), Individual Level

Variables	Whole sample (511,230 obs.)		Establishments belonging to family firms (178,989 obs.)		Establishments belonging to nonfamily firms (332,241 obs.)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Gross hourly wage (€)	17.22	8.180	15.57	7.667	18.11	8.304
Female	0.312	0.463	0.358	0.479	0.287	0.452
Occupation						
Manager	0.177	0.382	0.134	0.340	0.201	0.401
Supervisor or technician	0.251	0.434	0.210	0.408	0.273	0.446
Clerk	0.173	0.378	0.260	0.439	0.126	0.332
Blue-collar	0.399	0.490	0.398	0.489	0.400	0.490
Full-time worker	0.929	0.257	0.919	0.272	0.934	0.248
Age	39.44	10.09	38.58	10.09	39.90	10.07
Tenure						
Less than 1 year	0.099	0.299	0.119	0.324	0.089	0.284
1 to 2 years	0.164	0.370	0.159	0.365	0.166	0.373
More than 2 years	0.737	0.440	0.722	0.448	0.745	0.436

Table A.3. Means of Changes in Variables, 1998–2004

Variables	Mean	Standard deviation
Individual-level data		
Change in log hourly gross wage	0.168	0.174
Change in occupation		
Manager	0.026	0.184
Technicians and supervisor	0.016	0.363
Clerk	−0.004	0.228
Blue-collar	−0.038	0.302
Change in full-time work	−0.030	0.218
Establishment-level data		
Family-owned 2004 – family-owned 1998	0.017	0.416
Change in ICT	0.436	0.720
Change in management practices	0.775	0.810
Change in being listed	0.028	0.412
Change in union representatives	0.050	0.331
Change in size	8.372	133.2

Table A.4. Average of Quarterly Gross Job and Worker Flows
in Percentage of Employment, Establishment Level, 2001–2007

Variables (in %)	Whole sample (1,803 obs.)		Establishments belonging to family firms (858 obs.)		Establishments belonging to nonfamily firms (945 obs.)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Job creation rate	1.83	2.79	2.29	3.53	1.41	1.78
Job destruction rate	1.81	3.02	1.93	3.18	1.70	2.86
Hiring rate	4.48	6.48	5.82	7.39	3.27	5.23
Separation rate	4.49	6.36	5.47	6.85	3.60	5.74
By reason of separation						
Dismissal	0.54	0.87	0.53	0.79	0.55	0.94
Quit	1.08	1.77	1.37	1.99	0.81	1.50
Retirement	0.18	0.26	0.16	0.23	0.19	0.28
End of trial period	0.16	0.80	0.20	0.85	0.12	0.75
End of fixed-term contract	2.16	4.35	2.84	5.08	1.55	3.44

Table A.5. Family Ownership and Establishment Characteristics

Dependent variable	(1) Union reps.	(2) Union reps.	(3) ICT	(4) ICT	(5) Innovative managerial practices	(6) Innovative managerial practices
Family firm	−0.312***	−0.110***	−0.566***	−0.164***	−0.617***	−0.233***
	(0.026)	(0.020)	(0.045)	(0.040)	(0.070)	(0.047)
Observations	2,127	2,081	2,124	2,079	1,710	1,680
R-squared	0.107	0.471	0.080	0.524	0.095	0.391
Establishment controls	No	Yes	No	Yes	No	Yes
Workers' characteristics	No	Yes	No	Yes	No	Yes

Notes: Dependent variables: presence of union representative, use of ICT, or management practices (standardized indexes) as indicated in column titles. *Family firm* takes value 1 if the establishment is part of a firm that is family-owned in 2004, and 0 otherwise. Robust standard errors, clustered on firms, in parentheses. *Establishment controls* include establishment size (6 classes), age (5 classes), region, being listed on the stock market, and industry dummies (at 2-digits of the NACE, Rev. 1, classification). *ICT* and *Management Practices* are the intensity of use of information and communication technologies and of innovative managerial practices, respectively. *Workers' characteristics* include the proportion of women, the proportion of workers below 40 years old, and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars).
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Appendix B. Data

Sample Definition

The REPONSE data set covers 2,930 establishments in 2004. We keep only firms being either family-owned or for which ownership is dispersed, private equity, or joint-ventures, thereby dropping all associations, charities, and governmental organizations operating in the business sector as well as firms owned by their own workers, by the government, or by other types of shareholders (e.g., mutual companies). This brings down our sample to 2,133 establishments. For 481 of these establishments we have data on family ownership in 1998 by using the panel subsample of the REPONSE survey.

Wage equations

We matched our selection of REPONSE establishments with Social Security records (the DADS data set). These contain information on gross hourly wages (constructed as gross annual wages divided by the number of hours worked), gender, age, occupation, working full time or part time, and a rough measure of job tenure for nearly all workers in the French private sector. We remove from the DADS data set CEOs and board members as well as small jobs, farmers, apprentices, workers under a subsidized contract, employees working at home, and employees working less than one month in the year. We also exclude employees working on average less than 6 or more than 10 hours per day or aged less than 21 or more than 59 years. We drop the lowest and highest percentiles of the hourly wage distribution of the remaining workers, and we exclude establishments for which we do not have at least 5 valid observations (17 establishments). These operations are aimed at selecting core workers for whom we have a good measure of the hourly wage. Our final sample contains 511,230 employees working, in 2004, in 1,995 establishments (1,748 firms) being either family-owned or having a dispersed ownership.

The REPONSE survey was designed to have a panel subsample. The establishments belonging to this subsample were surveyed both in 1998 and in 2004. The panel subsample of the REPONSE survey was matched with the DADS panel on which we performed the same

data cleaning as described in the previous paragraph for the cross-section data set (except for the condition on the number of valid observations per establishment, that is obviously not applied in the case of the DADS panel). We exclude all establishments for which we do not have at least one valid observation in both 1998 and 2004. After these operations, we are left with 4,713 workers in 1998 and 5,424 workers in 2004 from 417 establishments (410 firms).

Job security equations

We matched our selection of REPONSE establishments with the DMMO-EMMO data set, which contains quarterly data on job and worker flows. Even if filling the DMMO-EMMO questionnaire is compulsory for all establishments with 50 or more employees and one-fourth of the establishments with 10 to 49 employees, declarations are often incomplete. As a consequence, for our main sample (2001–2007) and once associations, charities, and governmental organizations operating in the business sector as well as firms owned by their own workers, by the government or by other types of shareholders are excluded, the match results in 1,803 establishments that are linked at least once. Similarly, for the panel sample, we matched the panel subsamples of REPONSE 1998 and REPONSE 2004 with, respectively, the 1997–1999 and 2003–2005 waves of the DMMO-EMMO, resulting in 374 establishments that are linked at least once in each subperiod. The DMMO-EMMO database is composed of two data sets, one containing quarterly variables at the establishment level, including net employment growth and total number of movements (hirings and separations), and another one containing information for each movement (that is, for each hiring or separation event). Thirteen establishment-by-quarter observations, for which the total number of movements in the two data sets were inconsistent, were also omitted from the sample.

Main Variables

Establishment- or firm-level variables

Family ownership: Managers are asked: "What is the type of the main category of shareholder of the firm?" Possible answers are family/individual/French or foreign financial company/ French or foreign nonfinancial company/the State/the workers/others. We define a dummy variable for family ownership that takes value 1 if the main category of shareholder is either a family or an individual, and 0 otherwise. Source: REPONSE.

ICT use: Managers are asked what proportion of the employees use computers, the Internet, or the Intranet. For each of these new technologies, the answer is coded from 0 to 4 with 0 corresponding to "nobody," 1 to "less than 5%," 2 to "5–19%," 3 to "20–49%," and 4 to "50% and more." Our ICT variable is defined as the sum of the answers over the three types of technologies. It thus captures the intensity of use of ICT at the establishment level and varies between 0 and 12. We standardize it to 0 mean and 1 standard deviation. Source: REPONSE.

Innovative managerial practices: Our index of innovative managerial practices is the weighted sum of the following 9 composite variables.

   1. *Performance dialogue.* Composite variable scoring from 0 to 12. Sum of the 3 items below:
- Share of employees involved in quality circles: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4
- Share of employees involved in shopfloor meetings: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4
- Share of employees involved in expression groups: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4

   2. *Workers' participation.* Composite variable scoring from 0 to 7. Sum of the 7 items below:
- Firm project: no = 0, yes = 1
- Seminars: no = 0, yes = 1

- Firm newspaper: no = 0, yes = 1
- Open day: no = 0, yes = 1
- Suggestion box: no = 0, yes = 1
- Satisfaction survey: no = 0, yes = 1
- Quality action: no = 0, yes = 1

3. *Workers' autonomy.* Composite variable scoring from 0 to 2. Sum of the 2 items below:
   - In the event of incidents, workers are encouraged to refer to a supervisor = 0, to solve the problem themselves = 1
   - Work is defined: in terms of precise content = 0, in terms of goal to reach = 1

4. *Existence of targets.* Composite variable scoring from 0 to 6. Sum of the 6 items below. Existence of quantitative targets in terms of:
   - Financial return: no = 0, yes = 1
   - Budget balance: no = 0, yes = 1
   - Labor cost: no = 0, yes = 1
   - Quality: no = 0, yes = 1
   - Growth: no = 0, yes = 1
   - Security: no = 0, yes = 1

5. *Managing human capital.* Dummy variable that takes value 1 if a training scheme exists, 0 otherwise.

6. *Rewarding high performance for managers.* Composite variable scoring from 0 to 3. Sum the 3 items below:
   - Existence of a bonus (premium) based on individual performance: no = 0, yes = 1
   - Existence of a bonus (premium) based on collective performance: no = 0, yes = 1
   - Existence of stock options schemes: no = 0, yes = 1

7. *Rewarding high performance for nonmanagers.* Composite variable scoring from 0 to 3. Same components and scoring as for managers.

8. *Performance review.* Composite variable scoring from 0 to 4. Sum of the 2 items below:
   - Individual assessment for managers: no = 0, for some of them = 1, for all = 2
   - Individual assessment for nonmanagers: no = 0, for some of them = 1, for all = 2

9. *Consequence management.* Composite variable scoring from 0 to 4. Sum of the 2 items below:
   - Impact of individual assessment on wages: no assessment or no impact = 0, indirect or long-term impact = 1, direct impact = 2
   - Impact of individual assessment on promotions: no assessment or no impact = 0, indirect or long-term impact = 1, direct impact = 2

Our summary index of innovative managerial practices is the sum of the above composite variables, each variable being weighted by the inverse of its maximum score. The raw summary index ranges between 0 and 8.4 (with mean 5.3) and is standardized to 0 mean and 1 standard deviation. Source: REPONSE.

Establishment size: Number of employees in the establishment. Computed at the end of the year and grouped into 6 categories: less than 50 workers, 50 to 99 workers, 100 to 199, 200 to 499, 500 to 999, and 1000 workers and above. Source: DADS, when available, and REPONSE otherwise.

Establishment age: Grouped into 5 categories: less than 5 years, 5 to 9 years, 10 to 19 years, 20 to 49 years, and 50 years or more. Source: REPONSE.

Presence of union representative: Dummy variable equal to 1 if at least 1 union representative is in the establishment. Source: REPONSE.

Percentage of permanent workers: Proportion of workers on open-ended contracts. Source: REPONSE.

Regions: 10 macroregions in which the establishment is located, resulting from aggregation of French administrative regions. We create a dummy variable for each of them. Source: REPONSE.

Industries: Detailed NAF codes are available in REPONSE. Using a standard map we aggregate them at the 2-digit level of the NACE, Rev. 1, classification.

Listed on the stock market: We build a dummy variable equal to 1 if the establishment is part of a firm listed on the stock market or belonging to a listed group. Source: REPONSE.
Productivity: Annual value-added per employee, measured at the firm level. Source: DIANE.
Gross operating profits: Before-tax profits, measured at the firm level. Source: DIANE.
Firm size: Number of employees in the firm. Source: DIANE.
Average annual wages: Ratio of the firm's gross wage bill to total number of employees, measured at the firm level. Source: DIANE.
Firm age: Difference between the current year and the year of incorporation. Source: DIANE.
Job creation rate: Ratio of the net growth of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is positive, and 0 otherwise. The average employment level during a quarter is computed as half of the sum of the employment levels at the beginning and the end of the quarter. Source: DMMO-EMMO.
Job destruction rate: Ratio of the absolute value of net growth of employment between the beginning and the end of a quarter to the average employment level during that quarter (see above), if the former is negative, and 0 otherwise. Source: DMMO-EMMO.
Separation rate: For each type of separation, ratio of all movements during a quarter—excluding those corresponding to job spells shorter than one month and transfers across establishments of the same firm—to the average employment level during that quarter (see above). Source: DMMO-EMMO.
Hiring rate: Ratio of all hires during a quarter to the average employment level of that quarter (see above). This ratio is obtained from the sum of separation and net employment growth rates, exploiting the identity for which net employment growth must be equal to hirings minus separations. Source: DMMO-EMMO.

Individual-level variables

All variables come from DADS.

Gross hourly wages include basic wages, and performance- and nonperformance-related premiums and bonuses. They are net of employers' and workers' social contributions but gross of income taxes.
Occupations are grouped into 4 groups: managers, supervisors and technicians, clerks, blue-collars.
Full-time worker has a dummy variable taking value 1 if the worker works full time, 0 otherwise.
Age is grouped into 8 categories: 21 to 25 years, 26 to 30 years, 31 to 35 years, 36 to 40 years, 41 to 45 years, 46 to 50 years, 51 to 55 years, 56 to 60 years. Workers aged 20 years or less or more than 60 years are excluded from our sample.
Job tenure is grouped into 3 categories in cross-section equations: 1 year or less, more than 1 to 2 years, more than 2 years. More information is available in the DADS panel. In this case job tenure is grouped into 8 categories: 1 year or less, 1 to 2 years, 2 to 4 years, 4 to 7 years, 7 to 10 years, 10 to 15 years, 15 to 20 years, more than 20 years.

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