Insurance Between Firms: The Role of Internal Labor Markets *

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Abstract

We provide evidence that French business groups rely on Internal Labor Markets (ILMs) to respond to shocks calling for labor adjustments that are costly to perform in frictional external labor markets. ILM activity is higher in more diversified groups, where affiliated firms are more likely to be subject to unrelated shocks. Adverse shocks leading to closures and mass layoffs in affiliated firms trigger ILM activity, boosting the proportion of separating workers redeployed to group-affiliated units as opposed to external labor market partners. This effect is stronger when the shock hits a firm subject to more stringent employment protection regulation, and thus higher firing costs. We also find that ILMs operate differently for different occupations: adverse shocks trigger most markedly the ILM for blue collars, for whom firing costs and union pressure are large, while the ILM for high-skill occupations is the most active in "normal times." Finally, we find that upon closure events the ILM reallocates displaced employees more intensely to groups units that are more efficient and enjoy better growth opportunities, and less intensely to highly levered and financially distressed units. Overall, our evidence supports the claim that Internal Labor Markets emerge as a co-insurance mechanism across group-affiliated firms, providing job stability to groups' employees as a by-product.

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1 Introduction

We investigate the claim that Internal Labor Markets (ILMs) allow complex organizations to accommodate idiosyncratic shocks calling for labor adjustments in their productive units. To the extent that hiring and firing costs plague the external labor market, labor adjustments may be less onerous to perform within the internal labor market. Through the ILM, different productive units in corporate groups and conglomerates can provide mutual insurance to each other: units hit by an adverse shock can avoid termination costs by redeploying part of their employees to healthier units that may benefit from expanding their workforce; similarly, units faced with profitable growth opportunities can swiftly draw on the human capital available within the ILM, curbing search and training costs that can considerably constrain expansion.

In the paper, we provide direct evidence that Internal Labor Markets operate within French business groups. We explore whether external labor market frictions drive an ILM response to adverse shocks hitting individual group subsidiaries, and investigate whether groups' ILMs operate as an efficient co-insurance mechanism, redeploying workers from units hit by adverse shocks towards healthier subsidiaries enjoying growth opportunities. We then ask whether employment insurance is implicitly provided to business groups' workers thanks to the ILM. Our empirical analysis is made possible by a matched employer-employee dataset provided by the INSEE (Institut National de la Statistique et des Études Économiques), allowing us to follow individual job-to-job transitions, merged with detailed information on the structure of business groups in France, as well as administrative fiscal data on balance sheets and income statements at the firm level.

We focus here on the functioning of ILMs within business groups, a widespread organizational form in both developed and developing economies.[1] An established view in the economic literature is that corporate groups fill an institutional void in countries and periods where external labor and financial markets display frictions (Khanna and Palepu (1997), Khanna and Yafeh (2007)). While a large body of work has analyzed groups' internal capital markets, little attention has been devoted to understand whether and how groups operate internal labor markets.[2] Our paper contributes to

[1] Business groups account for a large fraction of the economic activity in many of the countries where they are active. See La Porta, Lopez-de Silanes, and Shleifer (1999) and Faccio, Lang, and Young (2001).

[2] Several papers have studied internal capital markets in groups, showing that internal capital markets make group-affiliated firms more resilient to shocks and to product market competition than stand-alone firms. See Gopalan, Nanda, and Seru (2007), Almeida, Kim, and Kim (2015), and Boutin, Cestone, Fumagalli, Pica, and Serrano-Velarde (2013), as well as Maksimovic and Phillips (2013) for a recent survey. The results in our paper suggest that the possibility to adjust labor internally may be another factor explaining groups' resilience.

fill this gap by providing direct evidence on the activity and the role of internal labor markets in groups.[3] One advantage of studying ILMs in groups of firms is that we can precisely measure profits, productivity, debt, cash holdings and other balance sheet items at the firm level; this allows us to ask several questions on which characteristics make group-affiliated firms more likely to absorb human capital from the ILM.

Our first aim is to document whether French groups actually operate internal labor markets, accounting for the endogeneity of group structure. Indeed, intense within-group mobility may not be *per se* evidence that ILMs function more smoothly than external labor markets. For instance, high intra-group mobility may be observed because group-affiliated firms are intensive in occupations among which workers mobility is intrinsically high. Our aim is to isolate the contribution of the ILM channel to the probability that a worker is hired by a group-affiliated firm; we thus need to account for the time-varying firm-specific "natural propensity" to hire workers who make job-to-job transitions between any two given occupations. The availability of detailed matched employer-employee panel data allows us to include a finely disaggregated firm of destination effect – namely, a firm-of-destination×occupation-of-origin×occupation-of-destination×year effect – to control for such a time-varying propensity. Thus, we estimate our measure of ILM intensity – the *excess probability* that a worker is hired by a given firm if she was originally employed in the same group (over the probability to be hired by that firm if she was originally employed outside the group) – exploiting only variation across individuals who make job-to-job transitions between two given occupations and are hired by a given group-affiliated firm in a given year.

We find that French business groups actively run internal labor markets: for the average group-affiliated firm the probability to absorb a worker previously employed in the same group exceeds by 9 percentage points the probability to absorb a worker not previously employed in its group. Group-affiliated firms in France are thus prone to draw upon their group labor force rather than the external labor market: why is this the case? While the personnel economics literature has emphasized the role of *vertical ILMs* in designing employee careers, our evidence suggests that internal promotions explain only in part why groups operate ILMs. Indeed, we find that measures of ILM activity computed focusing only on horizontal job changes remain very high. We also find that ILM activity is higher in

[3]France represents and interesting case study for investigating corporate groups. From 1999 to 2010, firms affiliated with groups accounted for around 40% of total employment, with substantial variability observed across sectors: in the financial sector affiliated firms account for more than 80% of total employment, whereas in agriculture the percentage is below 10%. Within manufacturing, on average affiliated firms account for almost 70% of total employment, but such share can be as high as 90% in automotive and energy.

groups that are more diversified (both in terms of sectors where affiliated firms operate and in terms of geographical location).[4] This motivates us to explore the role of *horizontal ILMs*, that emerge as a mutual insurance mechanism across affiliated firms against idiosyncratic shocks that call for costly labor adjustments.

In order to study whether and how ILMs allow groups to respond to shocks, we turn to a difference-in-difference identification strategy, based on firm closures and mass layoffs. For each group-affiliated closing firm, we identify the set of all the actual and potential destinations of the displaced workers. Our unit of observation is a pair – firm of origin/firm of destination – in a given year, in which the firm of origin eventually closes within our sample period. We then look at the evolution of employment flows at closure relative to normal times in pairs of firms affiliated with the same corporate group as opposed to pairs that do not belong to the same group. Following a closure shock that raises the outflow of workers from the closing firm, the time dimension - i.e. the comparison between the flows at closure time relative to normal times - allows us to control for all the time-invariant pair-specific determinants of the bilateral flow. The second difference, i.e. the comparison between pairs affiliated with the same group and pairs *not* affiliated with the same group, identifies the ILM effect.

We find that *firm closures within the group trigger ILM activity*: at closure (relative to normal times), the fraction of workers displaced by a closing group subsidiary and redeployed to a group-affiliated partner increases by at least 11 percentage points more than the fraction redeployed to an external labor market partner. We then ask whether ILM activity responds more pronouncedly to the closure of group units that are bound to experience larger firing costs. We find that the closure of group subsidiaries with 50 and more employees - which according to the French labor law are subject to more stringent employment protection regulation - causes a more marked increase in ILM flows. In line with the idea that employment insurance is implicitly provided to group workers through the ILM, we also find that the closure of a group-affiliated firm boosts the number of its employees moving to unemployment significantly less than the closure of a stand-alone firm.

Within our diff-in-diff framework we are also able to study whether the reallocation of human capital within group ILMs depends on the health and financial status of the potential destination firms. We find evidence that the employees displaced from closing subsidiaries are redeployed more intensely,

[4]Sectoral and geographical diversification make it more likely that group units are exposed to unrelated shocks. On the other hand, diversification might also hinder ILM activity: it is more difficult to redeploy workers across group units operating in different sectors because they may require sector-specific skills; similarly, it is more difficult to move workers across units that are geographically dispersed because of trade unions resistance and employment protection regulation. Our results suggest that the former effect of diversification on ILM activity prevails.

within the ILM, to more efficient group units and to units that enjoy better growth opportunities. We also find that displaced workers are more actively reallocated to those units that have the financial muscle to seize growth opportunities (i.e. firms with larger cash reserves), and less intensely to units with limited debt capacity (i.e. firms with very high leverage and very low coverage ratios).

In the paper, we also investigate whether Internal Labor Markets operate differently across occupations, that may be affected differently by hiring and firing costs.[5] When we measure average ILM activity at the firm-occupation level, we find that over our sample years ILM activity is most intense for high skill occupations; for instance, the excess probability to be absorbed within the ILM rather than by a firm on the external labor market is 0.7 percentage points higher for managers and other high-skilled workers than for blue collars. This suggests that search and hiring costs, that in France are significant for high-skilled occupations, are one major determinant of ILM activity. We then ask whether the ILMs for different occupations respond differently to adverse shocks leading to group-affiliated firms' closures. Interestingly, closures spur ILM activity most for blue collar workers, reversing the pattern observed in "normal times" (when higher-skilled employees are redeployed more intensely within the group's ILM). This finding is in line with the idea that groups rely on the ILM in response to employment protection regulation and unions' pressure to limit the impact of large-scale dismissals.

By investigating the existence and the functions performed by internal labor markets in groups, where human capital is actively reallocated across affiliated subsidiaries, this paper builds a bridge across the labor and personnel economics literature and the finance literature. The labor/personnel literature has studied the functioning of internal labor markets *within firms*. Focusing on internal careers, a large body of work has shown how implicit insurance mechanisms and incentives to accumulate human capital can be provided through internal promotions.[6] Our evidence demonstrates that *vertical careers* explain only in part why internal labor markets operate within groups of firms, which spurs us to investigate how groups rely on *horizontal ILMs* to respond to idiosyncratic shocks.

Within the finance literature, many have claimed that internal labor markets in business groups operate alongside internal capital markets to make up for underdeveloped external markets. However, little empirical work has investigated the functioning of ILMs in groups. In a small sample of large

[5] We focus on four broad occupational categories: Managers/High-Skill employees (including doctors, engineers and researchers), Intermediate (technicians and other intermediate administrative jobs), Clerical Support and Blue Collars.

[6] See Gibbons and Waldman (1999), Lazear (1999), and Waldman (2012) for comprehensive surveys. For more recent contributions to this literature, see Friebel and Raith (2013) and Ke, Li, and Powell (2014).

business groups in Chile and India, Khanna and Palepu (1999) find that intra-group mobility is high for managerial occupations. Belenzon and Tsolmon (2015) provide evidence that corporate groups prevail in Western European countries where employment protection regulation is stricter, suggesting that groups derive larger benefits from ILMs in the presence of external labor market frictions. In a recent paper, Faccio and O'Brien (2015) present evidence from a large sample of publicly traded companies in 56 countries consistent with the hypothesis that business groups operate internal labor markets, which allow them to respond to economic shocks differently from stand-alone firms. We support this hypothesis with direct evidence: by tracking individual employee movements across group-affiliated firms, we find that French business groups respond to idiosyncratic shocks by reallocating labor internally.

Our investigation of ILMs in business groups adds to evidence by Tate and Yang (2015a), who study internal labor markets in diversified multi-plant firms. In their paper, they find that workers involuntarily separating from diversified firms that experience plant closures are more likely to move to industries with better prospects (whether through the internal or the external labor market), as opposed to workers displaced from single-plant firms. The former also suffer smaller wage losses than the latter, even when they leave their original firm. This suggests that employment within a diversified firm makes workers more "redeployable" across industries, thanks to human capital investment in broader skills and internal job rotation programs.[7]

Finally, our work contributes to a line of research investigating whether and how firms provide insurance to their employees. While our paper shows that internal labor markets allow business groups to provide employment insurance to workers, a recent paper by Chen, Jiang, Ljungqvist, Lu, and Zhou (2015) unveils a similar role for state groups' internal *capital* markets in China. Other papers find evidence that family businesses provide employees with employment insurance (see Sraer and Thesmar (2007) and Ellul, Pagano, and Schivardi (2015)). However, these papers do not investigate the mechanism through which family owned firms and groups manage to protect employment when faced with shocks – whether by reallocating employees internally or relying on internal capital markets to prop up their weaker units. Other work has asked whether firms provide wage insurance to workers against both temporary and permanent shocks (see Guiso, Pistaferri, and Schivardi (2005)). The

[7] In related paper, Tate and Yang (2015b) provide evidence suggesting that firms engage in diversifying acquisitions partly to reap the benefits of establishing an ILM. While these authors point to a bright side of internal labor markets, Silva (2013) unveils their inefficiencies. He documents wage convergence within diversified firms, whereby conglomerate plants in low-wage sectors overpay workers as compared to stand-alone firms when the conglomerate is also present in high-wage industries.

question of whether diversified groups are better able to provide wage insurance to their workers lies beyond the scope of this paper, and is the next step in our research agenda.

The paper proceeds as follows. Section 2 lays out a series of empirical predictions. Section 3 illustrates our empirical approach. In Section 4 we describe the data, and in Section 5 and 6 we discuss the results. Section 7 concludes.

2 Theoretical Background

This paper empirically investigates the claim that organizations operate internal labor markets as an optimal response to external labor market frictions that make labor adjustments costly: in the presence of substantial firing and hiring costs, labor adjustments may be less onerous to perform within the ILM. In this section we lay out the mechanisms through which ILMs create value, and put forward a series of testable predictions with the aim of investigating whether and when different frictions determine ILM activity.

Consider first a firm hit by an adverse shock and willing to downsize its labor force: direct and indirect costs of displacing workers may arise due to labor market regulation and union pressure. For stand-alone firms, the main route to avoiding labor adjustment costs is through labor hoarding, arguably a suboptimal choice following a permanent shock, and possibly not a financially feasible option even in case of temporary shocks (see Sharpe (1994)). Group-affiliated firms have a further option available: they can redeploy workers within the group's internal labor market, achieving the desired labor force adjustments at substantially lower costs. Indeed, severance payments and dismissal penalties can be avoided altogether when employees move within the ILM, even across different subsidiaries of a corporate group. For instance, dismissals can be turned into costless voluntary separations by offering workers an alternative job within the same group.[8] Also, in case of collective terminations involving more complex employment protection procedures, union pressure can be assuaged and labor law demands met more easily by redeploying (part of) the dismissed workers within the group's ILM. In light of this, we expect *negative* shocks that lead to layoffs to trigger ILM activity. We also expect such ILM response to be more intense when employment protection legislation is more stringent and separation costs are larger.

[8]Furthermore, in some employment protection systems, transfers among group-affiliated firms are penalty-free, to the extent that workers need not be dismissed and re-hired when moving across firms affiliated with the same group (see Belenzon and Tsolmon (2015))

The ability to absorb employees from the internal labor market may be also valuable when productive units aim to expand their labor force in response to *positive* shocks. Indeed, the ILM is likely to suffer less from information asymmetry concerning workers' characteristics (Greenwald (1986)), and thus may perform better than the external labor market in matching a vacancy with the specific skills required. Previous work has documented that search costs are particularly important in the external labor market for skilled human capital.[9] Hence, we posit that hiring costs are a major determinant of ILM activity for the more skilled occupational categories.

In sum, internal labor markets may create value by allowing different productive units within the same organization to provide each other with mutual insurance against shocks that call for costly labor adjustments. As long as mobility costs within the ILM are not high, firms' owners benefit from the co-insurance the ILM provides against both negative and positive shocks. Of course, we expect the co-insurance role of the internal labor market to be more pronounced in more diversified groups, where different units are subject to imperfectly correlated shocks; indeed, when group units are subject to *negatively* correlated shocks, both the redeploying and the absorbing end of an ILM transaction benefit from the ILM ex post, as long as workers move from the units facing adverse shocks towards those presented with profitable expansion opportunities.[10] In light of this, we expect efficient ILMs to reallocate human capital more intensely towards well managed units operating in high-growth sectors, but also to group units that have the financing capacity to seize growth opportunities.

To the extent that group-affiliated firms hit by adverse shocks adjust labor resorting to the ILM, their workers may receive employment insurance as a side product. This happens if reallocation through the ILM reduces the exposure of BG-workers to unemployment risk, as compared to workers employed by stand-alone firms. The existing empirical literature has so far investigated whether *firms* provide insurance to their workers, either by insulating their wages from shocks (see Guiso, Pistaferri, and Schivardi (2005)) or by offering greater employment stability (see Ellul and Pagano (2014) and Sraer and Thesmar (2007) for family firms). We posit here that, thanks to the ILM activity, employment insurance can be offered also at the group level.

[9] Abowd and Kramarz (2003) and Blatter, Muehlemann, and Schenker (2012) document that search and training costs are non negligible for skilled labor. This is supported by recent evidence that firms engage in acquisitions (Ouimet and Zarutskie (2013)) and vertical integration (Atalay, Hortacsu, and Syverson (2014)) mainly to secure scarce human capital.

[10] In other words, the ILM allows growing and healthy units to "subsidize" poorly performing units by absorbing their excess labor force, at the same time benefiting from access to human capital at lower information costs. Cestone, Fumagalli, Kramarz, and Pica (2014) emphasize that the ILM does not share this special feature with the internal capital market, where healthy subsidiaries never benefit *ex post* from financially supporting those group units experiencing a negative shock.

3 Empirical Strategy

3.1 Measuring ILM activity: are group firms more likely to hire on the ILM rather than on the external labor market?

The first aim of the paper is to document whether French groups actually operate internal labor markets. If ILMs display less severe frictions than external labor markets, we should observe that affiliated firms disproportionately rely on their group's ILM in order to adjust their labor force. In other words, *group-affiliated firms should be more likely to absorb workers originating from their own group rather than from other firms in the economy*; at the same time, workers who find a job in a group should be more likely – as compared to workers who find a job outside that group – to originate from an affiliated firm.

In assessing whether internal labor markets facilitate within-group job-to-job mobility we face an identification challenge due to the fact that group structure (in terms of sectors, regions, occupations) is endogenous and may affect within-group mobility patterns. In fact, documenting that a large proportion of the workers hired by an affiliated firm were previously employed in the same group is not *per se* evidence that internal labor markets function more smoothly than external labor markets: intra-group mobility may be high simply because groups are composed of firms that are intensive in occupations among which mobility is naturally high, perhaps for technological reasons. In order to isolate the contribution of the internal labor market channel to the probability that a worker is hired by a firm affiliated with the same group as the originating firm, we need to control for the firm-specific – possibly time-varying – "natural" propensity to absorb workers transiting between any two given occupations.[11] We do this by applying the following methodology.

Consider the triplet $\{o, z, j\}$, where o is the occupation in the firm of origin, z the occupation in the firm of destination, and j a group-affiliated firm. Denote as c the set of workers in occupation o at $t-1$ who move to occupation z in any firm at time t. We model the probability that worker i, moving from occupation o to occupation z, finds a job in the group-affiliated firm j at time t as follows:

$$E_{i,c,j,t} = \beta_{c,j,t} + \gamma_{c,j,t} BG_{i,j,t} + \varepsilon_{i,j,t} \tag{1}$$

where $E_{i,c,j,t}$ takes value one if worker i moving from occupation o to occupation z finds a job in

[11] In other words, we need to properly build the counterfactual probability to hire workers, making a job-to-job transition between two given occupations, if they originally worked in a non-affiliated firm.

firm j at time t and zero otherwise. $BG_{i,j,t}$ takes value one if worker i's firm of origin belongs to the same group as the firm of destination j at time t, and zero otherwise. The term $\beta_{c,j,t}$ is a firm-occupation pair specific effect that captures the time-varying natural propensity of firm j to absorb workers transiting from occupation o to occupation z. This accounts for the fact that occupation o may allow a worker to develop skills that are particularly suitable to perform occupation z in firm j.

Our parameter of interest is $\gamma_{c,j,t}$ – this measures the *excess* probability of a worker moving from o to z to be absorbed by firm j at time t if she comes from a firm affiliated with the same group as j, as compared to a similar worker coming from outside the group. The error term $\varepsilon_{i,j,t}$ captures all other factors that affect the probability that worker i moving from occupation o to occupation z finds a job in firm j. We assume that $E(\varepsilon_{i,j,t}|BG_{i,j,t}, c \times j \times t) = 0$: conditional on observables, namely group affiliation and the firm-of-destination×occupation-of-origin×occupation-of-destination time-varying effect, the error has zero mean. In Appendix A.3, we also address the related albeit not identical question of whether workers who find a job within a group are more likely to originate from an affiliated unit as compared to workers who find a job outside that group.

Direct estimation of equation (1) would require a data set with one observation for each job mover and potential firm of destination for each year. As our data set contains about 1,574,000 job-to-job transitions and approximately 40,000 group-affiliated firms per year, direct estimation of the model would require the construction of a data set with as many as 62 billion observations per year. In order to estimate the parameters of equation (1) while keeping the dimensionality of the problem reasonable, we follow Kramarz and Thesmar (2013) and Kramarz and Nordström Skans (2014),[12] and define

$$R^{BG}_{c,j,t} \equiv \frac{\sum_{i \in c} E_{i,c,j,t} BG_{i,j,t}}{\sum_{i \in c} BG_{i,j,t}} = \beta_{c,j,t} + \gamma_{c,j,t} + \widetilde{u}^{BG}_{c,j,t}. \tag{2}$$

In words, $R^{BG}_{c,j,t}$ is the fraction of workers that, in year t, are hired by firm j among all workers moving from occupation o to z and that originate from a firm belonging to the same group as firm j. Note that this fraction might be high because firm j tends to overhire workers moving between occupations o and z and it happens to be part of a group intensive in occupation o. In this case, one observes many transitions from occupation o to occupation z in firm j originating from the group, but this cannot be ascribed to the internal labor market channel.

[12] Kramarz and Thesmar (2013) assess whether the probability of being hired in a given firm is larger when the individual and the firm's CEO belong to the same network, while Kramarz and Nordström Skans (2014) find that graduates from a given class whose fathers are employed in a firm are more likely to be hired by that firm.

We then compute the fraction of workers that are hired by firm j among all workers moving from occupation o to z and whose firm of origin does not belong to the same group as firm j:

$$R_{c,j,t}^{-BG} \equiv \frac{\sum_{i \in c} E_{i,c,j,t}(1 - BG_{i,j,t})}{\sum_{i \in c}(1 - BG_{i,j,t})} = \beta_{c,j,t} + \widetilde{u}_{c,j,t}^{-BG} \tag{3}$$

Taking the difference between the two ratios eliminates the firm-occupation pair effect $\beta_{c,j,t}$:

$$G_{cj,t} \equiv R_{c,j,t}^{BG} - R_{c,j,t}^{-BG} = \gamma_{c,j,t} + u_{i,j,t}^{G}. \tag{4}$$

We estimate the parameter $\gamma_{c,j,t}$ for each occupation pair-firm as the difference between two probabilities: that of a given firm j absorbing workers (transiting between two occupations o and z) who are separating from affiliated firms, and that of a given firm j absorbing workers (transiting between two occupations o and z) who are separating from non-affiliated firms.

Result: *The coefficient $\widehat{\gamma}_{c,j,t}$ estimated in equation* (4) *is equal to the coefficient obtained from direct estimation of equation* (1).

Proof: See Appendix A.1.

This methodology allows us to obtain a measure of ILM activity for each triplet occupation pair-firm and for each year. We obtain approximately one million ILM measure estimates per year. Section 5 reports the results of this analysis and explores the sources of cross-firm heterogeneity in ILM intensity, looking at how it correlates with group characteristics and how it differs across occupational categories.

3.2 Exploring the co-insurance role of the ILM exploiting firm closures and mass layoffs

As explained in Section 2, the presence of external labor market frictions may spur ILM activity and trigger a cross-firm insurance mechanism within the group, by allowing firms hit by an adverse shock to alleviate separation costs; alongside, the ILM may also allow groups to provide employment insurance to their workforce. To explore those aspects, we set up a difference-in-difference approach and study the ILM reaction of group-affiliated firms to a permanent negative shock, exploiting episodes of firm closures and mass layoffs. We are of course aware that episodes of firm closures and large layoffs may not be entirely exogenous as groups may choose which firms to close/downsize and when. Yet, as long

as groups do not selectively close affiliated firms with the aim of redeploying their workers to their other units, these events do generate some exogenous variation useful to explore the functioning of ILMs.

We first identify all episodes in which firms experience a drop in employment from one year to the next by 90% or more during the period 2002-2010 (Section 6 describes the procedure in detail). For each eventually-closing firm, we identify the set of all actual and potential destination firms of the displaced workers and compute the bilateral flows for each pair of firms.[13] Thus, our unit of observation is a pair – firm of origin/firm of destination – in a given year, in which the firm of origin is a group-affiliated firm that eventually closes down (or dramatically reduces its labor force) within our sample period.

We then study the evolution of bilateral employment flows at closure relative to normal times (i.e. at least four years before closure) in pairs that belong to the same group as opposed to pairs that do not belong to the same group. Following a shock that generates a large outflow of workers from the "closing" firm, the time dimension – i.e. the comparison between the flows at closure time relative to normal times – allows us to control for all the time-invariant pair-specific determinants of the bilateral flow (in other words, we take into account that two specific firms may experience intense flows of workers even in normal times). The second difference, i.e. the comparison between pairs affiliated with the same group and pairs not affiliated with the same group, identifies the horizontal ILM effects.[14] Formally, we estimate the following model:

$$f_{ijt} = \alpha_t + \phi_{ij} + \phi_0 BG_{jt} + \phi_1 SameBG_{ijt} + \phi_2 d_{it} + \phi_3 c_{it} \times BG_{jt} + \phi_4 c_{it} \times SameBG_{ijt} + \varepsilon_{ijt} \quad (5)$$

where f_{ijt} is the ratio of employees moving from an affiliated firm of origin i to a firm of destination j in year t to the total number of job-to-job movers that leave firm i in year t; the term α_t represents a set of year dummies; ϕ_{ij} is a firm-pair fixed effect in our main specification; BG_{jt} is a dummy that takes value 1 if the firm of destination is affiliated with any group in year t; $SameBG_{ijt}$ takes value 1 if the firm of destination is affiliated with the same group as firm i, in year t. The term d_{it} indicates a set of dummies capturing the distance to closure (measured in years) of firm i. The dummy c_{it} takes

[13] We consider as potential destination any firm that absorbs at least one employee, in at least one year, from firm i. Destination firms affiliated with the same group as firm i are deemed as "ILM partners", while the others as "external partners".

[14] Exploiting closure/large layoff events helps us capture the extent of the *horizontal* ILM activity, i.e. within-group moves that are *not* instrumental to the design of employee careers, as opposed to the vertical (career-related) ILM activity that plausibly takes place mostly in normal times.

the value 1 in the last two years of firm i's activity and is interacted with both BG_{jt} and $SameBG_{ijt}$. The variable of interest is the interaction between $SameBG_{ijt}$ and c_{it}. Its coefficient ϕ_4 captures the differential effect of closures on the bilateral employment flows (relative to normal times) between pairs that belong to the same group relative to pairs that do not.

Notice that we measure employment flows at the *firm of origin-firm of destination* level. This allows us not only to control for unobserved heterogeneity at the pair level, but also to explore the characteristics of the firms that absorb the closure shock by hiring the displaced workers through the ILM: we are able to ask, for example, whether the ILM reallocates workers to more efficient/fast growing/financially healthy group affiliates, something which speaks to the efficiency of the internal labor market. Last but not least, this approach has the advantage of allowing us to study, within the same framework, the impact of ILM activity both on quantities (workers flows) and prices (workers wages), and thus to infer whether groups are able to provide workers with some degree of job stability, i.e. insurance.

Within this empirical framework we can also investigate the extent to which the ILM activity is due to labor market regulation. To this aim we exploit the fact that the stringency of French labor market regulation depends on firm size and exhibits discontinuities at 10, 25 and 50 employees. The consensus view is that the latter is the critical one, above which labor regulation – a mix of rules concerning, among others, employment protection and union rights – becomes significantly stricter (see the Appendix for a description of the institutional background).[15] Adopting a regression discontinuity-like approach, we explore whether group-affiliated firms that are above 50 at closure rely disproportionately more on the ILM than firms that are below 50, controlling for the intensity of bilateral worker flows in normal times. More specifically, we estimate the following model:

$$\begin{aligned} f_{ijt} \;=\; & \alpha_t + \phi_{ij} + \phi_0 BG_{jt} + \phi_1 SameBG_{ijt} + \phi_2 d_{it} + \phi_3 c_{it} \times BG_{jt} + \phi_4 c_{it} \times SameBG_{ijt} + \\ & \phi_5 D_i^{50} \times SameBG_{ijt} + \phi_6 D_i^{50} \times BG_{jt} + \phi_7 D_i^{50} \times c_{it} + \phi_8 D_i^{50} \times BG_{jt} \times c_{it} + \\ & \phi_9 D_i^{50} \times SameBG_{ijt} \times c_{it} + X_{it} + \varepsilon_{ijt} \end{aligned} \tag{6}$$

where the specification in equation (5) is augmented with the time-invariant dummy D_i^{50} – equal to one for firms with 50 or more employees at closure – fully interacted with BG_{jt}, $SameBG_{ijt}$ and c_{it}.

[15] Garicano, LeLarge, and VanReenen (2013) in their study of the impact of size-contingent labor laws focus precisely on the French 50-employee threshold.

We also include two (third or fourth degree) polynomials in firm size at closure separately for normal times and closure times (in the matrix X_{it}). The coefficient of interest ϕ_9 measures the impact of closure on within group flows differentially for firms above and below 50 employees.

Of course, to achieve proper identification this approach requires firms to be randomly allocated above and below the 50-employee threshold. The use of firm (and pair) fixed effects already controls for all the time-invariant unobserved factors that may affect the propensity of firms to self-select into (or out of) treatment. However, fixed effects do not account for the selection due to time-varying factors. To control for this, similar to Leonardi and Pica (2013), we instrument the treatment status (and all the interacted terms) with (average) firm size in normal times (and the associated relevant interactions), i.e. at least four years before closure. The validity of this instrument relies on the closure being unexpected in normal times.

4 The data

The implementation of the empirical strategies described in Section 3 requires detailed information on both workers and firms. First, we need to observe workers' labor market transitions, i.e. workers' yearly transitions from firm to firm. Second, for each firm, we need to identify the entire structure of the group that firm is affiliated with, so as to distinguish transitions originating from (landing to) the firm's group and transitions that do not originate from (land to) the group. Third, we need information on firms' characteristics. We obtain this information for France putting together three data sources from INSEE (*Institut National de la Statistique et des Études Économiques*).

Our first data source is the DADS (*Déclarations Annuelles des Données Sociales*), a large-scale administrative database of matched employer-employee information collected by INSEE. The data are based upon mandatory employer reports of the earnings of each employee subject to French payroll taxes. These taxes essentially apply to *all* employed persons in the economy (including self-employed). Each observation in DADS corresponds to a unique individual-plant combination in a given year, with detailed information about the plant-individual relationship. The data set includes the number of days during the calendar year that individual worked in that plant, the (gross and net) wage, the type of occupation (classified according to the socio-professional categories described in Table 1), the full time/part time status of the employee. Moreover, the data set provides the fiscal identifier of the firm that owns that plant, the geographical location of both the employing plant and firm, as well as the

TABLE 1. Professional categories

CODE	CATEGORY
10	Farmers
2	**Top manager/Chief of firms**
21	Top managers/chiefs of handicraft firms
22	Top managers/chiefs of industrial/commercial firms with less than 10 employees
23	Top managers of industrial/commercial firms with more than 10 employees
3	**Management and superior intellectual occupations**
31	Healthcare professionals, legal professionals and other professionals
33	Managers of the Public Administration
34	Professors, researchers, scientific occupations
35	Journalists, media, arts and entertainment occupations
37	Administrative and commercial managers
38	Engineers and technical managers
4	**Intermediate occupations**
42	Teachers and other education, training and library occupations
43	Healthcare support occupations and social services occupations
44	Clergy and religious occupations
45	Intermediate administrative occupations in the Public Administration
46	Intermediate administrative and commercial occupations in firms
47	Technicians
48	Supervisors and 'agents de maitrise'
5	**Clerical Support and Sales occupations**
52	Clerical support occupations in the Public Administration
53	Surveillance and security occupations
54	Clerical support in firms
55	Sales and related occupations
56	Personal service occupations
6	**Blue collar occupations**
62	Industrial qualified workers
63	Handicraft qualified workers
64	Drivers
65	Maintenance, repair and transport qualified workers
67	Industrial non qualified workers
68	Handicraft non qualified workers
69	Agricultural worker

Source: INSEE.

industry classification of the activity undertaken by the plant/firm. The DADS Postes, the version of the DADS we work with, is not a panel of workers: in each yearly wave the individual identifiers are randomly re-assigned. Nevertheless, we are able to identify workers year-to-year transitions as each wave includes not only information on the individual-plant relationships observed in year t, but also in year $t-1$. This structure allows us to identify workers transiting from one firm to another along two consecutive years.[16]

The identification of group structure is based on the yearly survey run by the INSEE called LIFI (*Enquête sur les Liaisons Financières entre sociétés*), our second data source. The LIFI contains

[16]If an individual exhibits multiple firm relationships in a given year, we identify his/her main job by considering the relationship with the longest duration and for equal durations we consider the relationship with the highest qualification.

information which makes it a unique data set for the study of business group activity. It collects information on direct financial links between firms, but it also accounts for indirect stakes and cross-ownerships. This is very important, as it allows the INSEE to precisely identify the group structure even in the presence of pyramids. More precisely, LIFI defines a group as a set of firms controlled, directly or indirectly, by the same entity (the head of the group). The survey relies on a formal definition of *direct* control, requiring that a firm hold at least 50% of the voting rights in another firm's general assembly. This is in principle a very tight threshold, as in the presence of dispersed minority shareholders real control can be achieved with substantially lower equity stakes. However, we do not expect this to be a major source of bias in our sample, as most French firms are private and in France ownership concentration is strong even among listed firms.[17] Thus, for each firm in the French economy, the LIFI allows us to assess whether such firm is group-affiliated or not and, for affiliated firms, to identify the head of the group and all the other firms affiliated with the same group.

The third data source we rely upon is the FICUS, which contains information on firms' balance sheets and income statements. It is constructed from administrative fiscal data, based on mandatory reporting to tax authorities for all French tax schemes, and it covers the universe of French firms, with about 2.2 million firms per year. The FICUS contains accounting information on each firm's assets, leverage and cash holdings, as well as capital expenditure, cash flows and interest payments.

The data span the period 2002-2010. We remove from our samples the occupations of the Public Administration (33, 45 and 52 in Table 1) because the determinants of the labor market dynamics in the public sector are likely to be different from those of the private sector. We also remove temporary agencies and observations with missing wages. Finally, we also remove from the data set those employers classified as "*employeur particulier*": they are individuals employing workers that provide services in support of the family, such as cleaners, nannies and caregivers for elderly people.[18] These restrictions leave us with, on average, 1,574,000 job-to-job transitions per year during the sample period, with detailed information regarding the occupation of origin and of destination of each worker.

[17] Bloch and Kremp (1999) show that ownership concentration is pervasive in France. For non listed companies with more that five hundreds employees, the main shareholder's stake is 88%. The degree of ownership concentration is slightly lower for listed companies, but still above 50% in most cases.

[18] We remove also those employers classified as 'fictitious' because the code identifying either the firm or the plant communicated by the employer to the French authority does not belong to the existing ones and is, therefore, incorrect.

5 Internal labor markets at work

We address first the fundamental question of whether firms affiliated with French business groups actually operate internal labor markets. To this aim, we rely on the empirical model laid out in Section 3.1 to ask whether group-affiliated firms are more likely to absorb labor from the internal pool of workers in transition within their group, rather than from the external labor market.

To do so, for each year t and each occupation pair $\{o, z\}$, we identify the set of workers c moving from occupation o to occupation z between year $t-1$ and year t. Then, we associate each occupation pair $\{o, z\}$ with a firm j. This means that, for each firm j, we have as many triplets $\{o, z, j\}$ as the total number of occupation pairs, i.e. 625. For each triplet $\{o, z, j\}$, we separate those transitions that originate from the same group as firm j from those transitions that do not. This allows us to compute the denominators of the ratios $R^{BG}_{c,j,t}$ and $R^{-BG}_{c,j,t}$ indicated in (2) and (3) for inflows.[19] For each triplet $\{o, z, j\}$, we then compute the number of workers transiting from occupation o to occupation z that are hired by firm j, distinguishing between those that originate from the same group as firm j and those that do not. This allows us to compute the numerator of the ratios $R^{BG}_{c,j,t}$ and $R^{-BG}_{c,j,t}$ indicated in (2) and (3) for inflows, and ultimately to estimate our parameter of interest $\gamma_{c,j,t}$ for each triplet. To ensure that the internal and external labor markets are as homogeneous as possible, we restrict attention to the transitions occurring between occupation o and occupation z originating from the same geographical areas (French departments) where firm j's group is active.[20,21]

This procedure allows us to obtain approximately one million estimated $\widehat{\gamma}_{c,j,t}$ per year. A similar procedure applies to outflows (see Appendix A.3). To form an idea on how much group-affiliated firms rely on the ILM, we aggregate the parameters estimated from equation (1) at the firm level,

[19] We then drop the triplets in which this distinction cannot be drawn because either all the transitions originate from j's group or all the transitions originate from the external labor market. Trivially, on those sets of workers it is not possible to identify the excess probabilities. This restriction is without loss of identifying variation since the discarded observations are uninformative conditional on the fixed effects.

[20] In the administrative division of France, *departments* represent one of the three levels of government below the national level, between the region and the *commune*. There are 96 departments in mainland France and 5 overseas departments. We focus on mainland France.

[21] A broader definition of c is the set of workers moving within a given occupation pair in the *whole French economy*. This definition may raise the concern that the subset of workers originating from firm j's group and the subset originating from any other firm in France are not homogeneous. This is particularly relevant if a group's units are all located within the same department: then, all the transitions originating from the group will also originate from that particular department, whereas the transitions originating from outside the group may come from any department in France. In this respect, the two pools of workers firm j can draw upon are not fully comparable. Excess probabilities $\gamma_{c,j,t}$ computed using this broader definition of c turn out to be slightly higher than the ones obtained imposing the department restriction. The same holds when we compute excess probabilities imposing a region restriction, i.e. define c as the set of workers moving within an occupation pair in the same *regions* where firm j's group operates. The corresponding tables are available upon request.

taking both simple and weighted averages of the estimated $\widehat{\gamma}_{c,j,t}$.[22] This allows us to estimate for each group-affiliated firm in our sample time-varying firm-specific *average excess probabilities* $\widehat{\gamma}_{j,t}$.

The upper panel of Table 2 shows descriptive statistics of the firm-level (unweighted) average excess probabilities (referred to as "inflows"). We find that for the average firm the probability to absorb a worker already employed in the same group exceeds by about 9 percentage points the probability to absorb a worker on the external labor market between 2003 and 2010. Table 27 in Appendix A.3.1 complements Table 2 by considering outflows: on average, the probability that a worker separates from a firm if she is moving to an affiliated firm exceeds by about 9 percentage points the probability that the worker separates from that firm if she is moving to a non-affiliated firm through the external labor market. The bottom panel of the table shows weighted averages: the results are very similar to unweighted averages.

Group-affiliated firms are thus particularly prone to draw upon their group labor force rather than the external labor market: why is this the case? As pointed out by the personnel economics literature, corporate groups and diversified firms may rely on their *vertical ILM* to shape employees' careers. However, groups may as well operate an *horizontal ILM* as a way to adjust their labor force in response to idiosyncratic shocks hitting some of their productive units: this allows affiliated firms to co-insure each other against adjustment costs associated with external labor market frictions. In Table 3, we focus on the subset of excess probabilities computed for job-to-job transitions between identical occupations of origin and destination. Insofar as a promotion often results in a move across different occupational categories (e.g. a non-qualified blue collar promoted to qualified blue collar), this should rule out many job transitions up the career ladder. The results in Table 3 show that even when focusing on *same-occupation* transitions, average excess probabilities remain high: for a group-affiliated firm, the probability to absorb a worker already employed in the same group exceeds by 7 percentage points the probability to absorb a worker on the external labor market. Similar results hold for outflows (see Table 28 in Appendix A.3.1). This evidence suggests that the design of employee careers explains only in part why French groups operate internal labor markets.

[22] The weights reflect the importance of the transitions from occupation o to occupation z for the group firm j is affiliated with. In other words, the weight is the ratio of the number of transitions from occupation o to occupation z that originate from firm j's group to the total number of transitions (for all the occupation pairs associated with firm j) that originate from firm j's group.

5.1 ILMs and group diversification

An interesting feature of Table 2 that calls for further investigation is the enormous amount of heterogeneity hiding behind the average figures. The estimated ILM parameter $\widehat{\gamma}_{j,t}$ is positive only for firms belonging to the top quartile of the distribution and is negative for firms in the bottom decile: clearly, not all group-affiliated firms rely on the internal labor market. Which firm and group characteristics help explain this pattern? Interestingly, the population of French groups is also highly heterogeneous along many dimensions: there exist relatively few, very large groups, with many large affiliates that are diversified both from a sectoral and geographical perspective; and many small groups, with few small affiliates, that are hardly diversified.[23]

If there are benefits from adjusting a group's labor force internally in response to shocks, we expect group diversification to be a significant determinant of ILM activity: firms in more diversified groups are more likely to be exposed to unrelated shocks, which creates more scope to use the ILM as a cross-firms co-insurance mechanism. We thus investigate whether our measures of ILM intensity are larger in groups that are more diversified, both at a sectoral and a geographical level. To do so, we estimate the following model:[24]

$$\widehat{\gamma}_{j,g(j),t} = \delta Div_{g(j),t} + \zeta gsize_{g(j),t} + \theta Div_{g(j),t} \times gsize_{g(j),t} + \beta X_{j,g(j),t} + a_{j,g(j)} + b_t + \varepsilon_{j,g(j),t} \qquad (7)$$

where $\widehat{\gamma}_{j,g(j),t}$ is our estimated measure of ILM activity for firm j affiliated with group g at time t: the *excess* probability that firm j hires a worker originating from group g rather than hiring a worker on the external labor market. $Div_{g(j),t}$ is a time-varying measure of (sectoral and geographical) diversification of the group g firm j is affiliated with; $gsize_{g(j),t}$ is the number of employees of (the rest of) the group at time t; the matrix $X_{j,g(j),t}$ includes additional firm- and group-level controls. The descriptive statistics of these variables are shown in Table 4.[25] The model also includes firm×group fixed effects to account for unobserved heterogeneity at the firm×group level and year dummies to control for macroeconomic shocks common to all firms. The parameter θ, in this context, measures

[23] Looking at the distribution of group size in France, measured by group total employment, one finds out that groups belonging to the top decile on average have 20 affiliates, employ 800 workers per unit, operate in 7 different four-digit industries and in 4 different regions. Instead, groups in the rest of the population have on average less than 5 units, employ less than 50 workers per-unit, operate in less than 3 different four-digit sectors and mostly in the same region.

[24] In equation (7) we make explicit which variables vary at the group- versus firm-level adding the subscript $g(j)$ which denotes the group g firm j is affiliated with.

[25] Note that descriptive statistics are computed using *firm-level* data. Hence, large groups are over-represented and the average group characteristics are larger than those computed using data at the group level (mentioned in footnote 23).

the differential impact of diversification for groups of different size on our measure of ILM activity. Tables 5 and 6 show the results.

Table 5 focuses on sectoral diversification. We measure group diversification by calculating the share of the group total employment that is accounted for by units active in each macro/4-digit sector; then we take the (opposite of the) sum of the squared values of these shares.[26] Columns 2 and 3 show that diversification across macro sectors (agriculture, service, finance, manufacturing, automotive and energy) is associated with more intense ILM activity only for large groups, while this is not the case for average-sized groups. This result is in line with the intuition that labor is less redeployable across very distant sectors (that require different sector-specific skills), which in turn may hinder ILM activity; this effect is arguably less important in large groups where the internal labor market is thicker and the array of skills available wider. Conversely, and as expected, diversification across 4-digit sectors boosts ILM activity irrespective of group size (column 4), the more so the larger the group.[27]

Table 6 focuses instead on geographical diversification. We first compute the share of total employment of the group that is accounted for by units located within the Paris area and outside the Paris area, respectively. Our measure of diversification is the (opposite of the) sum of the squared values of these shares. Then we perform the same exercise by computing employment shares referred to regions, i.e. the share of total employment of the group accounted for by units located in each region in France. As shown by columns 1 and 3, firms rely more on the ILM when they are affiliated with a more geographically diversified group. This effect is stronger in larger groups (columns 2 and 4). A priori, geographical dispersion allows group units to be exposed to unrelated regional shocks, thus creating more scope for co-insurance to be provided via the horizontal ILMs. On the other hand, moving workers across more distant geographical areas might be difficult, due to trade union resistance and employment protection regulation. Our results suggest that the former effect prevails.[28]

[26] Essentially, we compute an Herfindahl-Hirschman Index based on the employment shares of the group in the different macro/4-digit sectors.

[27] Tables 5 and 6 show a negative correlation between the number of affiliated firms and the excess probability, in the presence of a group fixed effect. This can be partly explained by the fact that in years when groups lose one or more units due to closures, ILM activity intensifies, hence larger excess probabilities are observed (see the results in Section 6). However, the negative correlation may also be driven by a mechanical effect. Firms affiliated with larger groups are likely to have a higher number of triplets $\{o, z, j\}$ associated with them. This is because we observe transitions originating from firm j's group for a higher number of occupation pairs if the group is composed of larger units or a higher number of units (due to its more heterogeneous workforce). This in turn implies that when firm j is affiliated with a larger group there are fewer triplets over which it is not possible to identify our parameter of interest $\gamma_{c,j,t}$. *Ceteris paribus*, this disproportionately generates a higher number of $\widehat{\gamma}_{c,j,t} = 0$, which decreases the average $\widehat{\gamma}$ for firm j.

[28] Tables 29 and 30 in Appendix A.3.1 show that similar qualitative results are obtained when we focus on our "outflow" measure of ILM activity, i.e. on the excess probability to originate from an affiliated firm for a worker who finds a job in that firm's group, over the probability to originate from that firm if the worker finds a job outside the group.

5.2 ILMs and human capital: high-skill versus low-skill occupations

We next explore whether the internal labor market for high-skilled employees works differently from the ILM for blue-collars and other low-skilled workers. This may happen because external labor market frictions are likely to vary considerably across different occupational categories. On the one hand, the external labor market for high skilled employees is characterized by higher hiring costs, which may be substantially reduced when expanding group-affiliated firms draw human capital from the internal labor market. On the other hand, both firing costs and the demand for employment insurance are likely to be more pronounced for low-skilled employees, who are more unionized and are not self-insured through their human capital.

To this aim, based on the 2-digit occupational categories available in the DADS (see Table 1), we build four broad categories that are associated to decreasing degrees of human capital and skill: *Managers/High-Skill* (managerial and superior intellectual occupations), *Intermediate* (technicians and other intermediate administrative jobs), *Clerical Support*, and *Blue Collar* occupations. We then turn to the estimated parameters $\widehat{\gamma}_{c,j,t}$ at the triplet level $\{o, z, j\}$ for each year t: as our dependent variable is now the excess probability $\widehat{\gamma}_{c,j,g(j),t}$ defined for a given occupational pair $\{o, z\}$, firm j and group g in year t, we can augment the specification laid out in equation (7) by adding dummies for the occupation of origin and occupation of destination.

Results in Table 7 indicate that the activity of internal labor markets varies significantly across occupational categories, and is most intense for high-skill occupations. Columns 1 and 2 show that the excess probability to hire an employee from the group's ILM rather than from the external labor market is significantly higher in the case of managers and other high-skill employees (the excluded category), as compared to Intermediate Occupations, Clerical workers and Blue Collars (both for the occupation of origin and destination).[29] Consistently with results in Table 3, we also observe that the excess probability is lower when the occupation of origin coincides with the occupation of destination, suggesting that ILM activity can be *in part* ascribed to vertical career moves. Even when focusing on *horizontal* job moves, we observe a more intense ILM activity for high-skill versus low-skill occupations (column 3). This suggests that search costs and informational frictions play an important role in explaining groups' reliance on internal labor markets.

[29] In Appendix A.2 we present rankings of the disaggregated parameters $\gamma_{c,j,t}$ estimated for the triplets $\{o, z, j\}$, and the same clear pattern emerges: ILM activity is stronger for high-skill occupations (such as top managers, engineers, high-level technicians and lawyers) and weaker for unskilled occupations (blue collars, drivers and shop assistants).

In columns 4 to 7 we explore more in depth the role of sectoral diversification. In column 6 we document that diversification only boosts *horizontal* ILM activity, as captured by the *Same Occupation* dummy interacted with *Diversification*. This provides further support to the hypothesis that groups rely on the *horizontal* ILM as an insurance mechanism across firms, as opposed to the vertical ILM which is instrumental to the design of employee careers. Columns 5 and 7 suggest that the positive effect of diversification on ILM intensity is stronger for Blue Collars and Clerical Support workers as compared to managers and other high-skill professionals. This might be due to the fact that skilled human capital is industry-specific and thus difficult to redeploy across sectors (see Neal (1995)). Moreover, this evidence is in line with the idea that more diversified groups rely on the ILM to offer employment insurance to those workers who value it most (see Section 6.2).

6 The effect of firm closures on ILM activity

In this section we investigate whether groups intensify their ILM activity in response to idiosyncratic shocks leading to a firm or plant closure. The idea is to exploit exogenous variation in the labor demand of group affiliated firms in order to understand whether the response is channeled through the internal labor market.[30]

We identify as closures all episodes in which firms experience a drop in employment from one year to the next by 90% or more. In order to avoid identifying as closures situations in which firms/plants simply change identifier, we remove all the cases in which more than 70% of the lost employment ends up in a single other firm/plant. Table 8 shows the number of closing firms we identify by firm size. Consistent with figures from INSEE, we find that the incidence of closures among firms with more than 10 employees is approximately 4%, while the incidence of closures among very small firms is twice as large.[31] The data also confirm that the effect on the real economy of the 2008 financial crisis materializes in 2009, with an increase in the closure rate.

We analyze the effect of closures in two different ways. In Section 6.1 we study how our measure of ILM activity – the excess probability of hiring a worker if she was originally employed in the same group – responds to firm or plant closures occurring within the group, and ask whether such response varies across different occupations. In Section 6.2 we use closures as a shock in a diff–in–diff framework.

[30] As argued in section 3.2, as long as groups do not selectively close affiliated firms with the aim of redeploying their workers within the group, closure events do generate some exogenous variation useful to explore the functioning of ILMs.

[31] See Royer (2011) for a detailed study on closures in the French economy using DADS.

This allows us to achieve identification in a different way and at the same time to investigate different aspects of the ILM.

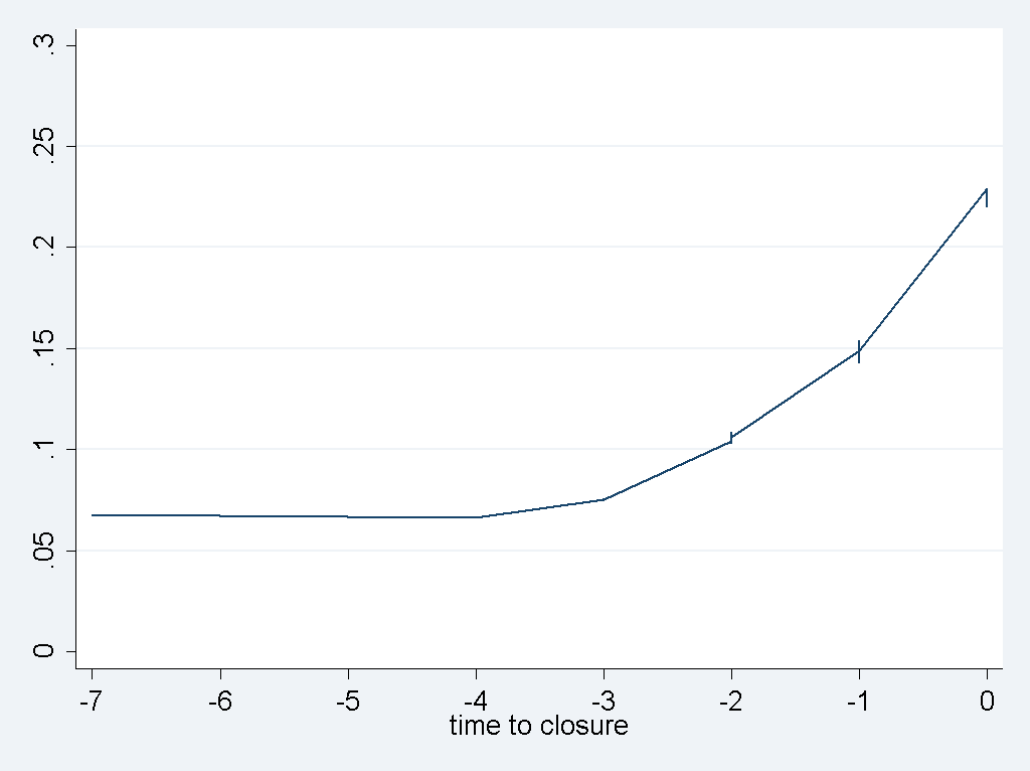
6.1 Effect of closures on excess probabilities

In Table 9 the dependent variable is the estimated $\widehat{\gamma}_{j,t}$ averaged at the firm level. Columns (1), (2), (5) and (6) show that the ILM activity increases in the year following the closure of at least one firm/plant in the group.[32] Our results also show that closure is partially anticipated: the ILM activity also increases the year before closure, though to a smaller extent: column (3), (4), (7) and (8) show that in year t a firm has a more pronounced tendency to hire workers who in $t-1$ were employed by its group affiliates, when at least one group firm/plant closes down in year t (and thus in year $t-1$ was one year away from closure). Column (9) studies instead the outflows of workers from group-affiliated firms: we find that the excess probability to originate from a group-affiliated firm for a worker who finds a job in that firm's group, as opposed to a worker who finds a job outside that group, increases by 8.6 percentage points at the time when her/his firm of origin closes down. Figure 1 displays the evolution of this excess probability for closing firms as time to closure approaches and shows that it starts increasing two years before closure.

In Table 10 we turn to the excess probability $\widehat{\gamma}_{c,j,t}$ estimated at the triplet level $\{o, z, j\}$ for each year t as a dependent variable. We investigate whether the internal labor market for managers and other high-skilled employees reacts differently to firm and plant closures occurring within the group, with respect to the ILM for other occupational categories. Interestingly, closures spur ILM activity for lower-ranked categories – mostly for Clerical Support workers and Blue Collars – but reduce ILM intensity for the Managerial/High-Skilled labor force (column 4). This may be because managers and other high-skilled employees have better outside options on the external labor market, while low-skill employees have worse outside options available; furthermore, groups may be more keen to redeploy internally workers belonging to more unionized occupational categories to avoid union-driven conflicts generated by large layoffs of low-skilled workers after a closure. Finally, we also observe that plant and firm closures within a group have a stronger positive effect on *horizontal* ILM activity (column 5), particularly so in the case of lower-skilled occupations (column 6).

[32] More precisely, since "year of closure" denotes the last year of activity of the firm/plant before it loses at least 90% of its workforce, our results show that in year t a firm has a more pronounced tendency to hire workers who in year $t-1$ were employed by its group affiliates when *at least one* firm/plant in the group closes down (i.e. is in its last year of activity) in year $t-1$.

FIGURE 1. Excess probability to originate from an affiliated firm for a worker who finds a job in that firm's group, as opposed to a worker who finds a job outside the firm's group: evolution as firm-of-origin closure approaches.



In sum, we observe that a plant or a firm closure "activates" the internal labor market. This leads us to investigate further whether groups rely on the ILM to coordinate the employment response of affiliated firms to shocks calling for large layoffs, thus saving firing costs and providing employment insurance to workers.

6.2 Closures in a diff–in–diff framework

We now move to a difference-in-difference strategy based on firm closures to identify and study the ILM effect. As described in Section 3.2, for each group-affiliated firm i in our sample that closed during the period 2002-2010, we consider as potential destinations for its displaced workers its previous internal *and* external labor market partners. Thus, our unit of observation is a pair – firm of origin/firm of destination – in a given year, in which the firm of origin is a group-affiliated firm that eventually closes down within our sample period. We analyze the evolution of bilateral employment flows at closure relative to normal times (i.e. at least four years before closure) in pairs that belong to the same group and thus are ILM partners – as opposed to pairs that do not belong to the same group, i.e. external

labor market partners.[33] Table 11 provides descriptive evidence on the flows of workers originating from firms that eventually close: while the average flow of workers towards each external labor market partner is pretty stable across years, the average flow towards ILM partners increases dramatically in the year before closure and at closure. This evidence suggests that firm closures boost ILM activity. To confirm that this result also holds when controlling for firms' characteristics, we estimate equation 5: Table 12, column 2 presents estimates from our baseline specification with pair (firm of origin $\times$ firm of destination) fixed effect.

The diff-in-diff approach confirms the descriptive evidence: at closure (relative to normal times), the fraction of displaced workers redeployed to an internal labor market partner increases by 11 percentage points more than the fraction redeployed to a non affiliated firm. Given that at closure the average flow to an external labor market partner is 0.039 (see table 11), our estimates imply that the additional increase in flows due to BG affiliation is almost three times as large as the average external flow. In column 1 we also present results obtained from an alternative specification which includes only firm-of-origin fixed effect.[34]

Results in columns 3 and 4 show that the closure shock has heterogeneous effects across different occupational categories, confirming the results obtained in Section 5.2. In this case the dependent variable f_{ijtk} is the proportion of employees of occupational category k (in the firm of origin) moving from firm i to firm j in year t relative to the total number of job-to-job movers that leave firm i in year t. As in Section 5.2, we consider four occupational categories: managers, intermediate occupations, clerical support and blue collars, with blue collars being the excluded category. Results are similar across the two specifications: firm closure intensifies ILM activity most for blue collar workers and to a lesser extent for the other occupational categories. More precisely, at closure the fraction of blue collar workers (the excluded category) redeployed to an affiliated firm increases more than the fraction redeployed to a non-affiliated firm, as indicated by the positive and significant coefficient of *Closure* $\times$ *Same Group*. The triple interactions of *Closure* $\times$ *Same Group* with the other occupational categories are all negative, showing that the stronger effect of the closure shock on internal flows as compared to

[33] The evidence in Figure 1 supports our definition of "normal times," to the extent that ILM activity seems to pick up three years ahead of the actual firm closure.

[34] While our coefficient of interest does not change, it is interesting to compare the coefficient of *Same Group* across the two specifications. Controlling only for the firm of origin time-invariant characteristics, in normal times the fraction of workers flowing to an ILM partner is larger than the fraction of workers flowing to a non-affiliated destination firm, as indicated by the positive sign of the dummy variable *Same Group* in column 1. The sign of *Same Group* is instead negative in our baseline specification with pair fixed effects (column 2). Notice, however, that in this case the coefficient is identified only on the limited subset of pairs in which the firm of destination changes status and becomes (or stops being) affiliated with the same group as the firm of origin.

external flows is less pronounced for the other types of workers.[35] Note also that, in normal times, the opposite pattern emerges: the difference between the fraction of workers redeployed to an ILM partner with respect to the fraction redeployed to a non-affiliated firm is larger for managers and intermediate occupations relative to blue collars and clerical workers, as indicated by the coefficient of *Same Group* interacted with the different occupational categories.

Employment protection regulation and the ILM

As emphasized in Section 2, reliance on the ILM may be particularly valuable for firms facing more stringent employment protection regulation. In France, firms with 50 or more employees are subject to substantially more stringent labor regulation than smaller firms, both in terms of higher dismissal costs and stronger union power.[36] We therefore expect that for large group-affiliated firms that close down or engage in a mass layoff, the flow of workers to ILM partners (as opposed to the external labor market) increases more dramatically than for smaller firms.

Table 13 shows results from the estimation of equation (6). Column (1) includes firm-of-origin fixed effects, column (2) pair fixed effects and column (3) shows IV results (with pair fixed effects) using firm size in normal times as an instrument for size at closure. These first three columns restrict to closing firms between 40 and 60 employees. The remaining two columns show robustness checks using different size windows. The coefficient of the triple interaction *Closure*×*Same Group*×*Dummy empl*> 50, which measures the impact of closure on within group flows differentially for firms above and below 50 employees, is everywhere positive and significant, in Column (2) marginally so at 5%. This suggests that the additional termination costs imposed by French labor laws on larger firms do trigger ILM activity. Interestingly, the coefficient of *Closure*×*Same Group* is also positive and significant, indicating that closures intensify ILM activity also for closing firms with less than 50 employees, subject to lighter but non-negligible employment protection legislation. This shows that BG-affiliated firms hit by negative shocks increasingly rely on the ILM the more stringent are employment protection rules. This establishes a causal link between a specific labor market friction, namely employment protection legislation, and ILM activity.

[35] In column (3) and (4), the coefficients of the triple interactions are not significantly different from each other, but are significantly different from the coefficient of *Closure* × *Same Group* at 5%.

[36] In case of collective dismissals (i.e. dismissals of at least 10 workers during a 30 days period), firms with 50+ employees are required to formulate an "employment preservation plan" in close negotiation with union representatives. The aim of the plan is to lay out solutions to facilitate reemployment of terminated workers. In practice, the obligations entailed by the plan substantially increase termination costs both because of higher lay-off costs or/and higher union bargaining power. The "employment preservation plan" must be formulated also in the event of closure.

Employment insurance provided by the ILM

Our finding that closing group units extensively redeploy labor through the internal labor market suggests that workers employed in group-affiliated firms are provided with implicit employment insurance against adverse shocks hitting their company. To corroborate this hypothesis, we study whether upon closure group-affiliated firms have fewer employees become unemployed as compared with stand-alone firms. Table 14 displays the average ratio of a firm's employees moving to unemployment over the number of employees leaving the firm in the same year – in stand-alone versus group-affiliated firms. While in normal times groups' employees seem more vulnerable to unemployment than stand-alone firms' employees, the opposite is true when the employing firm closes down. This is confirmed by the regression results displayed in Table 15 column (1): the coefficient of *Closure* × *Firm of origin group affiliated* is negative and significant. At closure (relative to normal times) the fraction of workers employed in a group-affiliated firm that become unemployed increases almost 8 percentage points less than the fraction of workers employed in a stand-alone firm. In column (2) of Table 15 we investigate whether this effect differs across occupational categories: our results show that the effect is significantly larger for blue collar workers (the excluded category) and becomes weaker as we move up to the more skilled occupational categories. This adds further support to the view that ILMs allow groups to provide employment insurance to employees with fewer outside options and possibly stronger union support.

We then ask whether the preservation of employment ensured by the internal labor market comes at a cost for business groups' employees. To this aim, Table 16 examines the change in hours worked, in the hourly wage and in the annual wage, for workers transiting from firm i to firm j at time t: thus, the unit of observation is now the worker. The coefficient of *Closure* × *Same Group* indicates that closures have a more detrimental effect on hours worked (as well as the annual wage) for employees redeployed to an ILM partner as compared to employees that find a new job in the external labor market, with no differential impact on the hourly wage (in our baseline specification with pair fixed effects). By interacting *Closure* × *Same Group* with different occupational dummies, we find that these effects are similar across different occupational categories.[37] These results suggest that the higher job stability granted by the group does come at a cost: hours worked are reduced and so does

[37]Managers seem to enjoy an hourly wage premium when moving within the group (*Same Group* × *Managers*), almost completely dissipated upon closure (*Same Group* × *Closure* × *Managers*). Those effects vanish in column (4) in which we control for the pair fixed effect, suggesting that the wage premium in normal times is due to the managers (self) selecting into high-wage firms.

the annual wage.

6.2.1 Employment flows at closure and destination firms' characteristics

Our last aim is to exploit our difference-in-difference set-up to study the characteristics of those firms that absorb a closure shock by hiring the displaced workers through the ILM.[38] If group firms co-insure each other against shocks that may generate labor adjustment costs, one would expect the ILM to reallocate employees towards firms that are not experiencing an adverse shock, and ideally to firms that would benefit from absorbing the workforce of closing units, i.e. well managed firms with profitable growth opportunities. Absorbing firms must also have the necessary financial muscle to expand their workforce. We explore these issues in Tables 17 to 22.

In Table 17, we classify firms depending on whether they operate in a booming sector or one experiencing a downturn (columns 1 to 4),[39] and in low versus high growth sectors (columns 5-6). As for previous results, our main specification controls for pair fixed effects. Column (2) shows that ILM flows increase at closure time with respect to normal times by 3 percentage points more if the destination firm is in a booming sector. Column (4) shows that there is instead a negative – albeit non significant – differential effect if the destination firm is in a sector experiencing a recession. More interestingly, in columns (5) and (6) we find evidence that groups reallocate displaced workers from closing units more intensely towards group affiliates operating in high-growth sectors, where firms are more likely to have profitable investment opportunities, suggesting that ILMs are run efficiently.[40]

We explore this idea further in Table 21, where instead we measure destination firm characteristics at the firm level, and in "normal times" (i.e. before being affected by the closure of the firm of origin). We ask whether in response to closures, groups reallocate employees mainly towards more efficiently

[38] We can control for firm-level characteristics because we investigate the activity of ILMs within *groups* of affiliated firms. This is in contrast to work focusing on diversified firms, where ILMs reallocate workers across firm segments.

[39] *Destination firm in a Boom (bust)* is a dummy variable that takes value 1 if the firm of destination operates in a sector that is experiencing a boom (bust) in the year following the closure. Booms and busts are identified from the fluctuations of real sectoral sales, where nominal sales are deflated by 2-digit industry-specific price deflators (the lower number of observations are due to missing prices for some sectors), following the Braun and Larrain (2005) peak-to-trough criterion. Troughs occur when (the log of) real sales are below their trend (computed using a Hodrick-Prescott filter with a smoothing parameter of 100) by more than one standard deviation. For each trough, we go back in time until we find a local peak, which is defined as the closest preceding year for which (detrended) real sales are higher than in the previous and posterior year. A bust goes from the year after the local peak to the year of the trough. The same procedure is used to identify sectoral booms. A peak occurs when current real sales are more than one standard deviation above their trend. Once a peak is identified, we go back in time until we find a local trough, i.e., the closest preceding year for which (detrended) real sales are lower than in the previous and posterior year. The years falling between a local trough and a peak are labelled as a boom.

[40] Sectors are classified according to whether the growth rate of real sales over our sample period fall in the first decile, above the median, or in the top decile of the distribution.

run firms, as well as firms that have been expanding their property plant and equipment. Columns 4-5 show that following a closure in the group, the differential increase in ILM flows (*Closure* × *Same Group*) is 4 to 5 percentage points larger for destination firms that had engaged in larger capital expenditures well before the closure shock hit the group (i.e., in "normal times"). In columns 3-4 we classify destination firms according to their efficiency, as measured by estimated TFP.[41] We find that, following closures, ILM flows increase by 5 percentage points more at closure when destination firms have larger-than median TFPs.

The closure of a group-affiliated firm may well generate an expansion opportunity for its well-managed, high-growth affiliates, to the extent that hiring costs may be lower in internal labor markets. However, the ability to seize such opportunity relies on the availability of internal and external financing. This leads us to investigate whether the reallocation of displaced workers within groups also depends on the financial status of the potential ILM partners. To this aim, for each firm of destination in our dataset we build one measure of internal financing (cash holdings), and two measures of financial health: leverage (book value of debt over total assets) and coverage (EBITDA over interest expense).[42] Very high levels of financial leverage and very low coverage ratios may signal that a firm has limited financing capacity (possibly due to debt overhang and binding debt covenants), and thus does not enjoy the financial flexibility necessary to expand its workforce.

In Table 22 we study whether our diff–in–diff "ILM effect" ($Closure \times SameBG$) varies for firms of destination at different percentiles of the distribution of cash holdings, leverage and coverage.[43] Columns 1-4 show that our diff-in-diff effect is significantly smaller for destination firms whose leverage falls in the top decile of the distribution, and for destination firms whose coverage ratio falls in the bottom decile. Overall, this suggests that while upon closure of a group-affiliated firm ILM activity picks up with respect to normal times (with more displaced workers redeployed within the group as opposed to outside the group), highly levered and distressed group affiliates are less likely to account for this intensification of ILM activity. Finally, columns 5-6 show that closure events spur a more

[41] We estimate TFP following the method of Levinsohn and Petrin (2003) , which extends the Olley and Pakes (1996) approach using materials instead of investment to control for firm-level unobserved productivity shocks. Tables 18, 19 and 20 display labor and capital coefficients as well as estimated TFP for each one-digit sector. The coefficients reported in Table 18 are in line with those estimated by Garicano, LeLarge, and VanReenen (2013) on French manufacturing firms. Table 20 shows that group-affiliated firms across all sectors display larger TFP levels than stand-alone firms. (see Boutin, Cestone, Fumagalli, Pica, and Serrano-Velarde (2013) for a similar result).

[42] For every firm pair, the destination firm's financial status is measured in "normal times", i.e. by averaging, respectively, cash holdings, leverage and coverage over the period that dates *at least* four years before the firm of origin's closure. This is because a firm's closure is likely to affect the financial status of both its ELM and ILM partners.

[43] The dependent variable is now the ratio of employees moving in year t from a group-affiliated firm i to any ILM or ELM partner j *not* operating in the financial sector, over the total number of employees displaced by firm i in that year.

intense intra-group labor reallocation towards those group affiliates that held larger cash reserves on their balance sheets in "normal" times, and are thus able to rely on internal financing to fund a workforce expansion.

7 Conclusions

We exploited a matched employer-employee data set merged with information on firms' group affiliation, to investigate whether and why French business groups operate Internal Labor Markets. Our evidence supports the claim that groups rely on their ILMs to respond to shocks calling for labor adjustments that are costly to perform in frictional external labor markets. ILMs thus emerge as a mutual insurance mechanism across group-affiliated firms, allowing them to slash both firing and hiring costs. As a by-product of ILM activity, implicit employment insurance is provided to group workers.

We find that, even after accounting for the endogeneity of group structure, group-affiliated firms are significantly more prone to draw employees from the ILM than from the external labor market. More diversified groups – whose units are more likely to be exposed to unrelated shocks - display a more intense ILM activity. We then provide direct evidence that adverse shocks hitting some group units trigger ILM activity. Relying on a difference-in-difference strategy, we find that following closures and mass layoffs, the proportion of separating workers redeployed to group-affiliated units as opposed to external labor market partners increases dramatically. This effect is stronger when closure/mass layoffs affect group-affiliated firms subject to larger firing costs.

Our evidence also suggests that group ILMs operate efficiently: upon closure events, the ILM reallocates displaced workers more intensely towards group units that are more efficient and enjoy better growth opportunities. The intensity of this increase in ILM flows after a shock also depends on the financial health of the potential destination partners within the group, in line with the intuition that the ability to seize the opportunity to draw valuable human capital from the ILM is constrained by a firm's financing capacity.

Our study suggests that both separation costs and hiring costs are alleviated within internal labor markets. Indeed, we observe that in "normal times" group-affiliated firms rely on the ILM mainly to adjust their skilled human capital, which is typically characterized by high search and training costs. However, adverse shocks leading to closures and mass layoffs trigger most markedly the ILM

for lower-skilled occupations, for which firing costs and union pressure are likely to be larger.

Previous research on business groups and diversified firms has focused so far on the role of internal capital markets: in the presence of financial market frictions, the ability to redeploy capital internally allows affiliated units to better respond to shocks than stand-alone firms. Our paper highlights an analogous role for the internal labor markets. Thanks to ILMs, groups are better able to respond to shocks, as they can more easily redeploy human capital to its most productive use, bypassing the frictions that plague external labor markets.

References

Abowd, J. and F. Kramarz (2003). The costs of hiring and separations. *Labour Economics 10*, 499–530.

Almeida, H., C.-S. Kim, and H. B. Kim (2015). Internal capital markets in business groups: Evidence from the asian financial crisis. *Journal of Finance 70*(6), 2539–2586.

Atalay, E., A. Hortacsu, and C. Syverson (2014). Vertical integration and input flows. *American Economic Review 104*(4), 1120–1148.

Belenzon, S. and U. Tsolmon (2015). Market frictions and the competitive advantage of internal labor markets. *Strategic Management Journal Forthcoming*.

Blatter, M., S. Muehlemann, and S. Schenker (2012). The costs of hiring skilled workers. *European Economic Review 56*, 20–35.

Bloch, F. and E. Kremp (1999). Ownership and voting power in france. *Fondazione Eni Enrico Mattei Working Paper 62*.

Boutin, X., G. Cestone, C. Fumagalli, G. Pica, and N. Serrano-Velarde (2013). The deep-pocket effect of internal capital markets. *Journal of Financial Economics 109*(1), 122–145.

Cestone, G., C. Fumagalli, F. Kramarz, and G. Pica (2014). Internal labor markets and financial constraints. *Working Paper*.

Chen, D., D. Jiang, A. Ljungqvist, H. Lu, and M. Zhou (2015, February). State capitalism vs. private enterprise. Working Paper 20930, National Bureau of Economic Research.

Ellul, A. and M. Pagano (2014). Workers' protection in bankruptcy, corporate debt and wages. *Working Paper*.

Ellul, A., M. Pagano, and F. Schivardi (2015). Employment and wage insurance within firms: Worldwide evidence. Kelley School of Business Research Paper No. 2014-23.

Faccio, M., L. H. P. Lang, and L. Young (2001). Dividends and expropriation. *American Economic Review 91*(1), 54–78.

Faccio, M. and W. O'Brien (2015). Business groups and internal markets for human capital. Working Paper, Krannert School of Management Purdue University.

Friebel, G. and M. Raith (2013). Managers, training, and internal labor markets. Simon School Working Paper No. FR 13-31.

Garicano, L., C. LeLarge, and J. VanReenen (2013, February). Firm size distortions and the productivity distribution: Evidence from france. Working Paper 18841, National Bureau of Economic Research.

Gibbons, R. and M. Waldman (1999). Careers in organizations: Theory and evidence. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics*, Volume 3, pp. 2373–2437. Amsterdam: North Holland.

Gopalan, R., V. Nanda, and A. Seru (2007). Affiliated firms and financial support: Evidence from indian business groups. *Journal of Financial Economics 86*, 759–795.

Greenwald, B. C. (1986). Adverse selection in the labour market. *The Review of Economic Studies 53*(3), 325–347.

Guiso, L., L. Pistaferri, and F. Schivardi (2005, October). Insurance within the Firm. *Journal of Political Economy 113*(5), 1054–1087.

Ke, R., J. Li, and M. Powell (2014). Managing careers in organizations. Kellog School of Management, Northwestern University.

Khanna, N. and K. Palepu (1997). Why focused strategies may be wrong for emerging markets. *Harvard Business Review 75*, 41–51.

Khanna, T. and K. Palepu (1999). Policy shocks, market intermediaries, and corporate strategy: The evolution of business groups in chile and india. *Journal of Economics and Management Strategy 8*(2), 271–310.

Khanna, T. and Y. Yafeh (2007). Business groups in emerging markets: paragons or parasites? *Journal of Economic Literature 45*, 331–373.

Kramarz, F. and O. Nordström Skans (2014). When strong ties are strong: Networks and youth labor market entry. *Review of Economic Studies 81*(3), 1164–1200.

Kramarz, F. and D. Thesmar (2013). Networks in the boardroom. *Journal of the European Economic Association 11*(4), 780–807.

La Porta, R., F. Lopez-de Silanes, and A. Shleifer (1999). Corporate ownership around the world. *Journal of Finance 54*(2), 471–517.

Lazear, E. (1999). Personnel economics: Past lessons and future directions. *Journal of Labor Economics 17*, 199–236.

Leonardi, M. and G. Pica (2013). Who pays for it? the heterogeneous wage effects of Employment Protection Legislation. *The Economic Journal 123*(573), 1236–1278.

Levinsohn, J. and A. Petrin (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies 70*(2), 317–341.

Maksimovic, V. and G. M. Phillips (2013). Conglomerate firms, internal capital markets, and the theory of the firm. *Annual Review of Financial Economics 5*(1), 225–244.

Neal, D. (1995). Industry-specific human capital: Evidence from displaced workers. *Journal of Labor Economics 13*(4), 653–677.

Olley, S. and A. Pakes (1996). The dynamics of productivity in the telecommunications industry. *Econometrica 6*, 1263–1297.

Ouimet, P. and R. Zarutskie (2013). Acquiring labor.

Royer, J.-F. (2011). Évaluation des effets des brusques fermetures d'établissements sur les trajectoires salariales. *Économie et statistique 446*, 45–65.

Sharpe, S. A. (1994, September). Financial market imperfections, firm leverage, and the cyclicality of employment. *American Economic Review 84*(4), 1060–74.

Silva, R. (2013). Internal labor markets and investment in conglomerates. Working papers, U.S. Census Bureau, Center for Economic Studies.

Sraer, D. and D. Thesmar (2007). Performance and behavior of family firms: Evidence from the french stock market. *Journal of the European Economic Association 5*(4), 709–751.

Tate, G. and L. Yang (2015a, August). The bright side of corporate diversification: Evidence from internal labor markets. *Review of Financial Studies 28*(8), 2203–2249.

Tate, G. A. and L. Yang (2015b). The human factor in acquisitions: Cross-industry labor mobility and corporate diversification. Working Paper.

Waldman, M. (2012). Theory and evidence in internal labor markets. In R. Gibbons and J. Roberts (Eds.), *Handbook of Organizational Economics*. Princeton University Press.

TABLE 2. Inflows - CS Classification

			Percentiles					
Year	Mean	St.Dev.	10	25	50	75	90	N
	Unweighted firm-level aggregation							
2003	0.089	0.231	-0.001	0.000	0.000	0.010	0.333	37475
2004	0.093	0.237	-0.001	0.000	0.000	0.012	0.333	36691
2005	0.093	0.237	-0.001	0.000	0.000	0.012	0.333	38870
2006	0.093	0.237	-0.001	0.000	0.000	0.011	0.333	41868
2007	0.087	0.229	-0.001	0.000	0.000	0.007	0.333	44362
2008	0.084	0.226	-0.001	0.000	0.000	0.006	0.332	47356
2009	0.096	0.242	-0.001	0.000	0.000	0.012	0.364	40736
2010	0.095	0.244	-0.001	0.000	0.000	0.009	0.349	42045
	Weighted firm-level aggregation							
2003	0.083	0.227	-0.001	0.000	0.000	0.010	0.250	37475
2004	0.087	0.233	-0.001	0.000	0.000	0.011	0.308	36691
2005	0.087	0.232	-0.001	0.000	0.000	0.011	0.324	38870
2006	0.086	0.232	-0.001	0.000	0.000	0.011	0.300	41868
2007	0.081	0.224	-0.001	0.000	0.000	0.008	0.250	44362
2008	0.078	0.221	-0.001	0.000	0.000	0.007	0.250	47356
2009	0.090	0.238	-0.001	0.000	0.000	0.013	0.333	40736
2010	0.090	0.240	-0.001	0.000	0.000	0.010	0.333	42045

Note: The year appearing in the first column indicates the year in which workers transiting from one job the other were hired by the affiliated firm j. In this table we restrict to set c to be the set of all transitions occurring between occupation o and occupation z that originate from the same departments in France where firm j's group is active. The upper panel of the table presents simple averages. The bottom panel shows weighted averages where the weight associated to each $\gamma_{c,j}$ is the ratio of the number of transitions from occupation o to occupation z that originate from fim j's group to the total number of transitions (for all the occupation pairs associated with firm j) that originate from j's group.

TABLE 3. Inflows - 2-digit Same Occupation

			Percentiles					
Year	Mean	St.Dev.	10	25	50	75	90	N
	Unweighted firm-level aggregation							
2003	0.066	0.202	-0.001	0.000	0.000	0.000	0.199	34971
2004	0.069	0.209	-0.001	0.000	0.000	0.001	0.222	34103
2005	0.070	0.210	-0.001	0.000	0.000	0.000	0.211	36134
2006	0.070	0.210	-0.001	0.000	0.000	0.000	0.213	39069
2007	0.065	0.201	-0.001	0.000	0.000	0.000	0.177	41403
2008	0.065	0.202	-0.001	0.000	0.000	0.000	0.166	44542
2009	0.075	0.218	-0.001	0.000	0.000	0.001	0.250	38213
2010	0.073	0.217	-0.001	0.000	0.000	0.000	0.249	39329
	Weighted firm-level aggregation							
2003	0.062	0.198	-0.001	0.000	0.000	0.001	0.150	34971
2004	0.065	0.205	-0.001	0.000	0.000	0.001	0.166	34103
2005	0.065	0.205	-0.001	0.000	0.000	0.001	0.166	36134
2006	0.065	0.204	-0.001	0.000	0.000	0.001	0.166	39069
2007	0.061	0.196	-0.001	0.000	0.000	0.000	0.143	41403
2008	0.061	0.197	-0.001	0.000	0.000	0.000	0.142	44542
2009	0.070	0.213	-0.001	0.000	0.000	0.001	0.199	38213
2010	0.068	0.212	-0.001	0.000	0.000	0.001	0.175	39329

Note: The year appearing in the first column indicates the year in which workers transiting from one job the other were hired by the affiliated firm j. In this table we restrict to set c to be the set of all transitions occurring between occupation o and occupation z in which occupation o is equal to occupation z. Moreover, we consider all the transitions that originate from the same departments in France where firm j's group is active. The upper panel of the table presents simple firm-level averages. The bottom panel shows weighted averages where the weight associated to each $\gamma_{c,j}$ is the ratio of the number of transitions from occupation o to occupation z, with $o = z$, that originate from fim j's group to the total number of transitions (for all the occupation pairs associated with firm j) that originate from j's group.

TABLE 4. Descriptive Statistics

	Mean	**St.dev.**	**Min**	**Max**	**N**
$\overline{\gamma}_{jt}$	0.091	0.23	-0.63	1	289,689
Firm size (empl.)	157.83	1468.45	0.005	217640	289,689
Rest of the group size (empl.)	10955	29375.43	0.001	349038	289,689
Number of 4 digit sectors	11.52	18.57	1	92	289,689
Number of macrosectors	1.88	0.99	1	6	289,689
Number of regions	5.4	6.45	1	22	289,689
Diversification (macro sectors)	-0.87	0.18	-1	-0.26	289,689
Diversification (4-digit sectors)	-0.58	0.27	-1	-0.08	289,689
Diversification (Paris)	-0.85	0.19	-1	-0.5	289,689
Diversification (Regions)	-0.71	0.30	-1	-0.08	289,689
% of firms that close	0.015	0.12	0	1	289,689
# of firm closures in the rest of the group (in year t)	1.76	5.45	0	68	289,689
# of firm closures in the rest of the group (in year t-1)	1.98	5.75	0	68	289,689
% of firms affiliated with groups in which at least one (other) firm closes down (in year t)	0.28	0.45	0	1	289,689
% of firms affiliated with groups in which at least one (other) firm closed down (in year t-1)	0.32	0.46	0	1	289,689
# of plant closures in the group (in year t)	16.23	92.27	0	2149	289,689
# of plant closures in the group (in year t-1)	18.9	101.92	0	2149	289,689
% of firms affiliated with groups in which at least one (other) plant closes down (in yeat t)	0.45	0.50	0	1	289,689
% of firms affiliated with groups in which at least one (other) plant closed down (in yeat t-1)	0.50	0.50	0	1	289,689

Note: *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *Diversification (macrosectors)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given macrosectors over the total employment of the group. Macrosectors are agriculture, service, finance, manifacturing, energy, automotive. *Diversification (4-digit)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given 4-digit sector to the total employment of the group. *Diversification (Paris Area)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in the Paris Area/outside the Paris Area over the total employment of the group. *Diversification (Region)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given region over the total employment of the group. We denote as firm/plant closure a situation in which a firm/plant sees its employment drop by more than 90% from one year to the other. We do not consider as closures all the cases in wihch more than 70% of the lost employment ends up in the same firm/plant. We consider as year of the closure the last year of activity of a given firm/plant, before it loses at least 90% of its workforce. For a given affiliated firm j, *# of firm closures in the rest of the group (in year t)* measures the number of firms in the rest of the group that close in year t, i.e. that are in their last year of activity in year t. *# of firm closures in the rest of the group (in year t-1)* measures the number of firms in the rest of the group that closed in year $t-1$, i.e. that were in their last year of activity in year $t-1$.

TABLE 5. **ILM activity and group sectoral diversification (Inflows)**

Variables	(1)	(2)	(3)	(4)	(5)
(Log) Firm size	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	0.001	0.001	0.000	0.001	0.004*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
(Log) Number of affiliated firms	-0.084***	-0.084***	-0.085***	-0.085***	-0.088***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.025	-0.025	-0.020	-0.024	-0.009
	(0.024)	(0.024)	(0.022)	(0.023)	(0.017)
Foreign control	-0.043	-0.043	-0.038	-0.042	-0.029
	(0.026)	(0.026)	(0.026)	(0.026)	(0.021)
Diversification (Macrosectors)		-0.006	-0.009		
		(0.007)	(0.007)		
Diversification × Rest of the group size			0.012***		
			(0.003)		
Diversification (4 digit)				0.014*	0.030***
				(0.006)	(0.006)
Diversification (4d) × Rest of the group size					0.022***
					(0.003)
N	289,689	289,689	289,689	289,689	289,689
Firm × Group and year fixed effect	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of hiring a worker if she originates from the same group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. *Diversification (macrosectors)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given macrosectors over the total employment of the group. Macrosectors are agriculture, service, finance, manifacturing, energy, automotive. *Diversification (4-digit)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given 4-digit sector to the total employment of the group. The variables *Rest of the group size*, *Number of firms in the group*, *Diversification* is normalised to have zero mean. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 6. **ILM activity and group geographical diversification (Inflows)**

Variables	(1)	(2)	(3)	(4)
(Log) Firm size	0.009***	0.009***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	0.001	0.001	0.002	0.004*
	(0.001)	(0.001)	(0.001)	(0.002)
(Log) Number of affiliated firms	-0.085***	-0.087***	-0.087***	-0.090***
	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.024	-0.016	-0.025	-0.013
	(0.023)	(0.021)	(0.022)	(0.018)
Foreign control	-0.044	-0.039	-0.043	-0.035
	(0.026)	(0.023)	(0.025)	(0.021)
Diversification (Paris Area)	0.039***	0.022*		
	(0.008)	(0.009)		
Diversification × Rest of the group size		0.024***		
		(0.004)		
Diversification (Region)			0.043***	0.040***
			(0.007)	(0.007)
Diversification (Reg.) × Rest of the group size				0.027***
				(0.004)
N	289,689	289,689	289,689	289,689
Firm × Group and year fixed effect	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of hiring a worker if she originates from the same group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. *Diversification (Paris Area)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in the Paris Area/outside the Paris Area over the total employment of the group. *Diversification (Region)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given region over the total employment of the group. The variables *Rest of the group size*, *Number of firms in the group*, *Diversification* are normalised to have zero mean. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 7. **Heterogeneity of ILM activity by occupation (Inflows)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(Log) Firm Size	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(Log) Number of affiliated firms	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.011**	-0.011**	-0.011**	-0.011**	-0.011**	-0.011**	-0.011**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Foreign Control	-0.031***	-0.031***	-0.030***	-0.031***	-0.031***	-0.031***	-0.031***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Occupation of destination (Managers/High-Skill excluded)							
Intermediate Occupation	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clerical Support	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Blue Collar	-0.004***	-0.004***	-0.003***	-0.004***	-0.005***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Occupation of origin (Managers/High-Skill excluded)							
Intermediate Occupation	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clerical Support	-0.006***	-0.006***	-0.005***	-0.006***	-0.006***	-0.006***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Blue Collar	-0.005***	-0.005***	-0.004***	-0.005***	-0.004***	-0.005***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Same Occupation		-0.002***	0.001***			-0.002***	-0.000
		(0.000)	(0.000)			(0.000)	(0.000)
Same Occupation × Intermediate Occupation			-0.002***				-0.000
			(0.000)				(0.000)
Same Occupation × Clerical Support			-0.005***				-0.000
			(0.000)				(0.001)
Same Occupation × Blue Collar			-0.007***				-0.004***
			(0.000)				(0.001)
Diversification (4-digit)				-0.004	-0.022**	-0.008	-0.022*
				(0.007)	(0.008)	(0.007)	(0.008)
Div. × Intermediate Occupation (dest.)					0.015***		0.013***
					(0.002)		(0.002)
Div. × Clerical Support (dest.)					0.028***		0.023***
					(0.003)		(0.003)
Div. × Blue Collar (dest.)					0.028***		0.023***
					(0.003)		(0.003)
Diversification × Same Occupation						0.009***	-0.003
						(0.001)	(0.002)
Div. × Int. Occ. × Same Occ.							0.011***
							(0.001)
Div. × Clerical Support × Same Occ.							0.024***
							(0.002)
Div. × Blue Collar × Same Occ.							0.032***
							(0.002)
N	8,992,670	8,992,670	8,992,670	8,992,670	8,992,670	8,992,670	8,992,670
Firm × Group and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of hiring a worker transiting from occupation o to occupation z if she originates from the same group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. The occupational categories are the ones indicated in Table 1. The category Managers/High-Skill groups category 2 and 3. *Same Occupation* is a dummy variable taking the value 1 if the (2-digit) occupation of origin is equal to the (2-digit) occupation of destination. *Diversification (4-digit)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given 4-digit sector to the total employment of the group. The variables *Diversification* is normalised to have zero mean. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 8. **Firm closures**

	Number of closing firms			Percentage of closing firms		
	All firms	< 10 employees	≥ 10 employees	All firms	< 10 employees	≥ 10 employees
2002	134398	117898	16500	9.03	10.25	4.87
2003	130538	114079	16459	8.68	9.78	4.88
2004	135848	123211	12637	8.92	10.30	3.73
2005	123244	109912	13332	8.13	9.38	3.88
2006	128429	114978	13451	8.21	9.49	3.82
2007	136002	121576	14426	8.54	9.91	3.95
2008	115529	105122	10407	7.15	8.40	2.74
2009	158014	139456	18558	9.63	10.99	5.01

Note: We denote as closure a drop in employment from one year to the next by 90% or more. In order to avoid denoting as a closure a situation in which a firm simply changes identifier, we remove all the cases in which more than 70% of the lost employment ends up in a single other firm.

TABLE 9. **Effect of firm/plant closures in the group on ILM activity**

Variables	Inflows (1)	Inflows (2)	Inflows (3)	Inflows (4)	Inflows (5)	Inflows (6)	Inflows (7)	Inflows (8)	Outflows (9)
(Log) firm size	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Log) rest of the group size	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
(Log) number of affiliated firms	-0.084***	-0.084***	-0.085***	-0.085***	-0.084***	-0.084***	-0.085***	-0.085***	-0.081***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.023	-0.025	-0.025	-0.025	-0.025	-0.025	-0.025	-0.026	-0.005
	(0.022)	(0.021)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.021)
Foreign Control	-0.034	-0.036	-0.040	-0.040	-0.041	-0.038	-0.043	-0.040	-0.001
	(0.024)	(0.024)	(0.025)	(0.025)	(0.026)	(0.025)	(0.026)	(0.025)	(0.050)
Firm closure in rest of the group (in t-1)	0.017***								
	(0.001)								
Between 1 and 5		0.017***							
		(0.001)							
More than 5		0.026***							
		(0.003)							
Firm closure (in t)			0.009***						
			(0.001)						
Between 1 and 5				0.008***					
				(0.001)					
More than 5				0.012***					
				(0.003)					
Plant closure (in t-1)					0.015***				
					(0.001)				
Between 1 and 5						0.015***			
						(0.001)			
More than 5						0.020***			
						(0.002)			
Plant closure (in t)							0.007***		
							(0.001)		
Between 1 and 5								0.006***	
								(0.001)	
More than 5								0.013***	
								(0.002)	
Own closure									0.086***
									(0.006)
N	289,689	289,689	289,689	289,689	289,689	289,689	289,689	289,689	279,433
Firm × Group and year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable in columns (1)-(8): Excess probability of hiring a worker if she originates from the same group as compared to a worker not originating from the same group. Dependent variable in column (9): Excess probability of originating from affiliated firm j for workers landing into the same group as compared to workers landing outside the group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. We denote as firm/plant closure a situation in which a firm/plant sees its employment drop by more than 90% from one year to the other. We consider as year of the closure the last year of activity of a given firm/plant, before it loses at least 90% of its workforce. We do not consider as closures all the cases in which more than 70% of the lost employment ends up in the same firm/plant. *Firm closure in the rest of the group (in year t-1)* is a dummy variable that takes the value 1 if in year $t-1$ at least one firm in the rest of the group closes, i.e. it undertakes its last year of activity in yeat $t-1$. *Firm closure (year t)* is a dummy variable that takes the value 1 if al least one firm in the group closes in year t. Similarly for plant closure. *Own closure* is a dummy variable that takes the value 1 if firm j closes in year t. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 10. **Heterogeneity of ILM activity by occupation (Inflows): the differential role of closures**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(Log) Firm Size	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(Log) Number of affiliated firms	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.015***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.011**	-0.011**	-0.010**	-0.010**	-0.010**	-0.010**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
Foreign Control	-0.031***	-0.031***	-0.027***	-0.027***	-0.027***	-0.026***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
Occupation of destination (Managers/High-Skill excluded)						
Intermediate Occupation	-0.002***	-0.002***	-0.002***	-0.011***	-0.002***	-0.010***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Clerical Support	-0.005***	-0.005***	-0.005***	-0.022***	-0.005***	-0.020***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Blue Collar	-0.004***	-0.004***	-0.004***	-0.022***	-0.004***	-0.017***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Occupation of origin (Managers/High-Skill excluded)						
Intermediate Occupation	-0.003***	-0.003***	-0.003***	-0.002***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Clerical Support	-0.006***	-0.006***	-0.006***	-0.005***	-0.006***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Blue Collar	-0.005***	-0.005***	-0.005***	-0.004***	-0.005***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Same Occupation		-0.002***			-0.011***	-0.004***
		(0.000)			(0.001)	(0.001)
At least one closure in the group (in t-1)			0.005***	-0.008***	0.002***	-0.008***
			(0.001)	(0.001)	(0.001)	(0.001)
At least one closure × Int. Occ. (dest.)				0.011***		0.010***
				(0.001)		(0.001)
At least one closure × Clerical (dest.)				0.020***		0.018***
				(0.001)		(0.001)
At least one closure × Blue Coll.(dest.)				0.021***		0.016***
				(0.001)		(0.001)
At least one closure (in t-1) × Same Occ.					0.012 ***	0.004***
					(0.001)	(0.001)
Same occupation × Int. Occ.						-0.003***
						(0.001)
Same occupation × Clerical						-0.007***
						(0.001)
Same occupation × Blue Coll.						-0.016***
						(0.001)
Same occupation × Int. Occ. × Closure						0.004***
						(0.001)
Same occupation × Clerical × Closure						0.009***
						(0.001)
Same occupation × Blue Coll. × Closure						0.016***
						(0.001)
N	8,992,670	8,992,670	8,992,670	8,992,670	8,992,670	8,992,670
Firm × Group and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of hiring a worker transiting from occupation o to occupation z if she originates from the same group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. The occupational categories are the ones indicated in Table 1. The category Managers/High-Skill groups category 2 and 3. *Same Occupation* is a dummy variable taking the value 1 if the (2-digit) occupation of origin is equal to the (2-digit) occupation of destination. We denote as firm closure a situation in which a firm sees its employment drop by more than 90% from one year to the other. We consider as year of the closure the last year of activity of a given firm, before it loses at least 90% of its workforce. We do not consider as closures all the cases in which more than 70% of the lost employment ends up in the same firm. *Firm closure in the rest of the group (in year t-1)* is a dummy variable that takes the value 1 if in year $t-1$ at least one firm in the rest of the group closes, i.e. it undertakes its last year of activity in yeat $t-1$. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 11. **Bilateral flows: descriptive statistics**

Years to closure	Extra-group flows	Within-group flows
-7	0.025	0.103
	(0.112)	(0.246)
	[57209]	[1728]
-6	0.023	0.090
	(0.100)	(0.247)
	[101167]	[3240]
-5	0.026	0.101
	(0.115)	(0.242)
	[152979]	[5339]
-4	0.026	0.101
	(0.116)	(0.241)
	[224543]	[7423]
-3	0.029	0.108
	(0.123)	(0.252)
	[281617]	[9869]
-2	0.034	0.117
	(0.133)	(0.259)
	[328681]	[12251]
-1	0.037	0.284
	(0.142)	(0.380)
	[362870]	[15611]
0	0.041	0.362
	(0.152)	(0.402)
	[229778]	[9665]

Note: The years to closure indicate the number of years before the firm of origin closes down. For each year we report, separately for non-affiliated and affiliated destination firms, the average ratio of employees moving from an affiliated firm of origin i to a firm of destination j in year t to the total number of job-to-job movers that leave the firm of origin in the same year. Standard deviations are reported in parentheses and the number of observations in square brackets.

TABLE 12. **Bilateral flows: closures vs. normal times**

Variables	(1)	(2)	(3)	(4)
Firm of destination group affiliated	-0.0013***	0.0011	-0.0021***	0.0015***
	(0.0003)	(0.0007)	(0.000)	(0.000)
Same Group	0.0334***	-0.0122**	0.0018	-0.0096***
	(0.0019)	(0.0041)	(0.001)	(0.001)
Closure × firm of destination group affiliated	0.0004	0.0025***	-0.0001	0.0005
	(0.0004)	(0.0006)	(0.000)	(0.000)
Closure × Same Group	**0.1487*** **	**0.1187*** **	**0.0452*** **	**0.0378*** **
	(0.0039)	(0.0050)	(0.002)	(0.002)
Same Group × Managers			0.0161***	0.0161***
			(0.002)	(0.002)
Same Group × Intermediate Occupations			0.0093***	0.0093***
			(0.001)	(0.001)
Same Group × Clerical Support			0.0010	0.0010
			(0.001)	(0.001)
Closure × Same Group × Managers			**-0.0082****	**-0.0082****
			(0.002)	(0.002)
Closure × Same Group × Intermediate Occupations			**-0.0129*** **	**-0.0129*** **
			(0.002)	(0.002)
Closure × Same Group × Clerical Support			**-0.0112*** **	**-0.0112*** **
			(0.002)	(0.002)
N	1,171,552	1,171,552	4,686,112	4,686,112
Firm of origin FE	YES	NO	YES	NO
Firm of origin × firm of destination FE	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES

Note: Dependent variable in Columns (1) - (2): fraction of employees moving from affiliated firm i to firm j in year t to the total number of job-to-job movers that leave firm i in year t. Dependent variable in Columns (3) - (4): fraction of employees originally undertaking occupation k moving from affiliated firm i to firm j in year t to the total number of job-to-job movers that leave firm i in year t. The occupational categories are the ones indicated in Table 1. The category Managers groups category 2 and 3. Firm i is a firm that eventually closes within our sample period. *Firm of destination group affiliated* is a dummy variable that takes the value 1 if firm j is group affiliated. *Same Group* is a dummy variable taking the value 1 if firm i and firm j belong to the same group. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. All relevant second and third level interactions are included. In columns (3) and (4) the coefficients of the interactions involving the occupational dummies do not vary across the two specifications because the (either firm-of-origin or pair) fixed effect is defined at the firm level and does not affect the differential effect of the occupational categories. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

TABLE 13. **Bilateral flows and Employment Protection Legislation**

Variables	Origin FE 40-60 (1)	Pair FE 40-60 (2)	IV Pair FE 40-60 (3)	IV Pair FE 35-65 (4)	IV Pair FE 45-55 (5)
Same Group	0.0381***	0.0073	0.0325**	0.0165	0.0135
	(0.0093)	(0.0198)	(0.0113)	(0.0097)	(0.0165)
Firm of destination group affiliated	-0.0023	-0.0027	-0.0029	0.0020	0.0051
	(0.0019)	(0.0045)	(0.0052)	(0.0047)	(0.0084)
Closure × firm of destination group affiliated	0.0018	0.0080*	0.0072	-0.0013	-0.0131
	(0.0027)	(0.0037)	(0.0042)	(0.0042)	(0.0075)
Closure × Same Group	0.1211***	0.0785***	0.0810***	0.0970***	0.0933***
	(0.0158)	(0.0222)	(0.0107)	(0.0106)	(0.0171)
Closure × dummy empl>50	0.0016	0.0007	-0.0092	-0.0136	-0.0129
	(0.0036)	(0.0054)	(0.0235)	(0.0517)	(0.0163)
Firm of destination group affiliated × dummy empl>50	-0.0019	0.0026	0.0024	-0.0044	-0.0113
	(0.0032)	(0.0072)	(0.0090)	(0.0085)	(0.0143)
Same Group × dummy empl>50	-0.0023	-0.0127	-0.0499**	-0.0241	-0.0274
	(0.0153)	(0.0295)	(0.0185)	(0.0173)	(0.0278)
Closure × firm of destination group affiliated × dummy empl>50	0.0028	0.0010	0.0024	0.0140	0.0317**
	(0.0046)	(0.0056)	(0.0074)	(0.0075)	(0.0121)
Closure × same group × dummy empl>50	0.0515*	0.0705	0.0817***	0.0421*	0.0647*
	(0.0261)	(0.0370)	(0.0182)	(0.0195)	(0.0312)
N	53,544	53,544	40,795	56,387	17,855
Firm of origin FE	YES	NO	NO	NO	NO
Firm of origin × firm of destination FE	NO	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES	YES

One star 5% significance, two stars 1% significance, and three stars 0.1% significance.

TABLE 14. **Flows to unemployment: descriptive statistics**

	Stand-alones	**BG-affiliated firms**
Normal times	0.18818	0.2410
	(0.3184)	(0.2643)
	[312,284]	[22,975]
Closure	0.2294	0.2188
	(0.3566)	(0.2837)
	[1,226,615]	[44,360]

Note: *Closure* indicates the year of firm closure and the previous year. *Normal times* indicates more than four years before closure. We compute the average ratio of employees moving from a firm of origin i to unemployment in year t to the total number of employees that leave the firm of origin in the same year. Firm of origin i is a firm that eventually closes within our sample period. The table reports the average of ratio over the closure period and in normal times, separately for stand-alone and affiliated firms. Standard deviations are reported in parentheses and the number of observations in square brackets.

TABLE 15. **Flows to unemployment: closures vs. normal times**

	(1)	(2)
Firm of origin group affilliated	0.0538***	0.0143***
	(0.0030)	(0.0015)
Closure × Firm of origin group affiliated	**-0.0785*** **	**-0.0376*** **
	(0.0030)	(0.0016)
Closure × Firm of origin affiliated × Managers		**0.0324*** **
		(0.0020)
Closure × Firm of origin affiliated × Intermediate Occ.		**0.0218*** **
		(0.0020)
Closure × Firm of origin affiliated × Clerical Support		**0.0171*** **
		(0.0021)
N	1,606,734	6,593,384
Firm of origin FE	YES	YES
Year dummies	YES	YES
Time to closure dummies	YES	YES

Note: Dependent variable in column (1): fraction of employees moving from firm i to unemployment in year t to the total number of employees that leave firm i in year t. Firm i is a firm that eventually closes within our sample period. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. *Firm of origin group affiliated* is a dummy variable taking the value 1 if the firm of origin is group affiliated. Dependent variable in column (2): fraction of employees originally undertaking occupation k and moving from i to unemployment in year t to the total number of employees that leave firm i in year t. The occupational categories are the ones indicated in Table 1. The category Managers groups category 2 and 3. All relevant second and third level interactions are included. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

TABLE 16. **Wage changes: closures vs. normal times by occupational categories**

	Change in Hours Worked		**Hourly Wage Change**		**Annual Wage Change**	
	Origin	Pair	Origin	Pair	Origin	Pair
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Firm of destination group affiliated	0.0904***	0.0483	0.0426***	0.0295	0.1357***	0.0724
	(0.018)	(0.055)	(0.006)	(0.032)	(0.018)	(0.055)
Same Group	0.1667***	0.0482	0.0174	-0.0157	0.1873***	0.0374
	(0.033)	(0.046)	(0.017)	(0.028)	(0.035)	(0.054)
Closure × firm of destination group affiliated	-0.0008	0.0353	-0.0123	-0.0142	-0.0136	0.0229
	(0.024)	(0.053)	(0.008)	(0.031)	(0.025)	(0.054)
Closure × Same Group	**-0.0962***	**-0.1005***	**0.0160**	**-0.0079**	**-0.0806**	**-0.1104***
	(0.043)	(0.044)	(0.019)	(0.026)	(0.045)	(0.051)
Male	0.0391***	0.0240***	0.0040**	0.0006	0.0437***	0.0246***
	(0.004)	(0.003)	(0.001)	(0.002)	(0.004)	(0.003)
Age	0.0438***	0.0304***	-0.0013	-0.0064***	0.0420***	0.0239***
	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Age squared	-0.0005***	-0.0004***	0.0000	0.0001***	-0.0005***	-0.0003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duration	-0.0045***	-0.0039***	0.0003***	0.0003***	-0.0042***	-0.0036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Same Group × Managers	-0.0985*	0.0045	0.1079***	0.0491	0.0157	0.0629
	(0.049)	(0.044)	(0.026)	(0.038)	(0.050)	(0.053)
Same Group × Intermediate Occupations	-0.0214	0.0934	0.0370*	0.0142	0.0086	0.1085
	(0.044)	(0.062)	(0.018)	(0.024)	(0.046)	(0.065)
Same Group × Clerical Support	-0.0364	-0.0104	0.0091	0.0216	-0.0261	0.0109
	(0.057)	(0.067)	(0.022)	(0.029)	(0.062)	(0.070)
Closure × Same Group × Managers	**0.0830**	**0.0141**	**-0.0840****	**-0.0330**	**-0.0092**	**-0.0280**
	(0.051)	(0.044)	(0.028)	(0.039)	(0.051)	(0.053)
Closure × Same Group × Intermediate Occupations	**-0.0098**	**-0.0888**	**-0.0262**	**0.0019**	**-0.0280**	**-0.0873**
	(0.046)	(0.063)	(0.019)	(0.025)	(0.048)	(0.065)
Closure × Same Group × Clerical Support	**0.0415**	**-0.0047**	**-0.0238**	**-0.0175**	**0.0187**	**-0.0211**
	(0.069)	(0.068)	(0.025)	(0.031)	(0.071)	(0.071)
N	905,089	905,089	905,087	905,087	909,556	909,556
Firm of origin FE	YES	NO	YES	NO	YES	NO
Firm of origin × firm of destination FE	NO	YES	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES	YES	YES

Note: In columns (1)-(2) the dependent variable is the percentage change in the number of hours worked of a worker, originally undertaking occupation k, transiting from affiliated firm i to firm j in year t. In columns (3)-(4) the dependent variable is the percentage change in the hourly wage of a worker transiting from affiliated firm i to firm j in year t. In columns (5)-(6) the dependent variable is the percentage change in the annual wage of a worker transiting from affiliated firm i to firm j in year t. The occupational categories are the ones indicated in Table 1. The category Managers groups category 2 and 3. *Firm of destination group affiliated* is a dummy variable that takes the value 1 if firm j is group affiliated. *Same Group* is a dummy variable taking the value 1 if firm i and firm j belong to the same group. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. *Duration* measures the number of days spent by the worker in the firm of origin. All relevant second and third level interactions are included. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

TABLE 17. **Bilateral flows: closures vs. normal times by sectoral booms and busts and by sectoral growth.**

Variables	Origin (1)	Pair (2)	Origin (3)	Pair (4)	Origin (5)	Pair (6)
Firm of destination group affiliated	-0.0158***	-0.004	-0.0157***	-0.0004	-0.0020*	-0.0107***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.0009)	(0.0026)
Same Group	0.0534***	-0.0291***	0.0550***	-0.0240***	0.0349***	-0.0345***
	(0.003)	(0.006)	(0.004)	(0.007)	(0.0068)	(0.0157)
Closure × firm of destination group affiliated	-0.0011	-0.0007	-0.0011	-0.0007	-0.0011	0.0084***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.0018)	(0.0025)
Closure × same group	**0.1593*** **	**0.1499*** **	**0.1688*** **	**0.1662*** **	**0.1096*** **	**0.1255*** **
	(0.005)	(0.008)	(0.006)	(0.009)	(0.0149)	(0.0187)
Destination firm in Boom	-0.0013*	-0.0001				
	(0.001)	(0.001)				
Destination in Boom × Closure	-0.0009	-0.0007				
	(0.001)	(0.001)				
Destination in Boom × Same Group	0.0115	-0.0028				
	(0.007)	(0.009)				
Destination in Boom × Closure × Same Group	**0.0025**	**0.0314***				
	(0.011)	(0.014)				
Destination firm in Bust			0.0007	-0.0011		
			(0.000)	(0.001)		
Destination in Bust × Closure			0.0004	0.0005		
			(0.001)	(0.001)		
Destination in Bust × Same Group			-0.0004	-0.0141		
			(0.005)	(0.009)		
Destination in Bust × Closure × Same Group			**-0.0172***	**-0.0159**		
			(0.008)	(0.013)		
Sector Growth of Real Sales below 10pct × Closure × Same Group					**-0.0497***	**-0.0317***
					(0.0203)	(0.0135)
Sector Growth of Real Sales above 50pct × Closure × Same Group					**0.0121**	**-0.0098**
					(0.0133)	(0.0153)
Sector Growth of Real Sales above 90pct × Closure × Same Group					**0.0587*** **	**0.0318***
					(0.0092)	(0.0143)
N	688,390	688,390	688,390	688,390	844,031	844,031
Firm of origin FE	YES	NO	YES	NO	YES	NO
Firm of origin × firm of destination FE	NO	YES	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES	YES	YES

Note: Dependent variable: fraction of employees moving from affiliated firm i to firm j in year t to the total number of job-to-job movers that leave firm i in year t. Firm i is a firm that eventually closes within our sample period. *Firm of destination group affiliated* is a dummy variable that takes the value 1 if firm j is group affiliated. *Same Group* is a dummy variable taking the value 1 if firm i and firm j belong to the same group. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. *Destination firm in a Boom (bust)* is a dummy variable that takes value 1 if the firm of destination operates in a (3-digit) sector that is experiencing a boom (bust) in the year following the closure. Booms and busts are identified from the fluctuations of real sectoral sales, where nominal sales are deflated by industry-specific price deflators, following the Braun and Larrain (2005) peak-to-trough criterion. Troughs occur when (the log of) real sales are below their trend (computed using a Hodrick-Prescott filter with a smoothing parameter of 100) by more than one standard deviation. For each trough, we go back in time until we find a local peak, which is defined as the closest preceding year for which (detrended) real sales are higher than in the previous and posterior year. A bust goes from the year after the local peak to the year of the trough. The same procedure is used to identify sectoral booms. A peak occurs when current real sales are more than one standard deviation above their trend. Once a peak is identified, we go back in time until we find a local trough, i.e., the closest preceding year for which (detrended) real sales are lower than in the previous and posterior year. The years falling between a local trough and a peak are labelled as a boom. *Sector Growth of Real Sales* is a variable that measures the growth rate of real sales over the sample period in each 3-digit sector. *Sector Growth of Real Sales below 10pct* is a dummy variable that takes the value 1 if the destination firm j operates in a (3-digit) sector that belongs to the bottom decile of the distribution of *Sector Growth of Real Sales*. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

TABLE 18. **TFP: Coefficient of labor and capital in the production function**

Sector	Labor Coefficient	Capital Coefficient
Accommodation and food services	0.3186	0.1690
Administrative services	0.7085	0.0506
Arts, entertainment and recreation	0.4840	0.0774
Construction	0.4771	0.0847
Educational services	0.5466	0.0419
Healthcare and social assistance	0.2331	0.0201
ICT	0.7183	0.0582
Manufacturing	0.5420	0.0982
Mining, quarrying and oil and gas extraction	0.5015	0.0566
Other services	0.5485	0.0897
Professional, scientific and technical services	0.6747	0.0186
Real estate	0.5852	0.1083
Retail and wholesale trade	0.5340	0.0855
Transportation and warehousing	0.5441	0.1075
Utilities	0.3851	0.2275
Water production and distribution	0.4804	0.1625

Note: Labor and capital coefficients are estimated following Levinsohn and Petrin (2003) separately for each 1-digit sector (NAF 2008 classification) on the universe of French firms between 2002 and 2010. We deflate value added and materials using 2-digit sector prices and the gross capital stock using a 2-digit sector capital goods deflator. The empirical specification includes year dummies.

TABLE 19. **Estimated TFP across sectors**

Sector	Mean	Median	N
Accommodation and food services	3.3811	3.4205	1,009,928
Administrative services	3.8606	3.8805	221,507
Arts, entertainment and recreation	3.8149	3.8371	62,995
Construction	4.0717	4.0943	1,385,275
Educational services	3.9390	3.9696	95,362
Healthcare and social assistance	4.9364	4.9011	518,821
ICT	3.9940	4.0661	184,040
Manufacturing	3.9310	3.9080	730,105
Mining, quarrying and oil and gas extraction	5.2440	5.2614	3,101
Other services	3.3666	3.4194	472,083
Professional, scientific and technical services	4.4120	4.4710	622,463
Real estate	3.7624	3.8288	219,777
Retail and wholesale trade	3.8601	3.9246	2,116,558
Transportation and warehousing	3.9705	4.0094	263,143
Utilities	4.0681	4.2005	2,207
Water production and distribution	3.9865	4.0195	27,761

Note: TFP is estimated following Levinsohn and Petrin (2003) separately for each 1-digit sector (NAF 2008 classification) on the universe of French firms between 2002 and 2010. We deflate value added and materials using 2-digit sector prices and the gross capital stock using a 2-digit sector capital goods deflator. The empirical specification includes year dummies.

TABLE 20. **Estimated TFP across sectors: stand-alone firms vs. BG-affiliated firms**

Sector	Stand-alone firms	BG-affiliated firms
Accommodation and food services	3.3419	4.6067
	(3.3982)	(4.6328)
	[978,639]	[31,289]]
Administrative services	3.7760	4.4867
	(3.8209)	(4.4407)
	[195,140]	[26,367]
Arts, entertainment and recreation	3.7278	5.0297
	(3.7747)	(5.0658)
	[58,779]	[4,216]
Construction	4.0377	5.0369
	(4.0756)	(5.0476)
	[1,338,107]	[47,168]
Educational services	3.9043	4.8340
	(3.9480)	(4.8836)
	[91,805]	[3,557]
Healthcare and social assistance	4.9179	6.2063
	(4.8928)	(6.1766)
	[511,342]	[7,479]
ICT	3.8715	4.7082
	(3.9680)	(4.7418)
	[157,084]	[26,956]
Manufacturing	3.8068	4.7573
	(3.8201)	(4.7800)
	[634,690]	[95,415]
Mining, quarrying and oil and gas extraction	4.9059	5.6995
	(4.8949)	(5.7519)
	[1,780]	[1,321]
Other services	3.3561	4.1942
	(3.4142)	(4.1483)
	[466,132]	[5,951]
Professional, scientific and technical services	4.3742	4.9070
	(4.4421)	(4.9050)
	[578,319]	[44,144]
Real estate	3.7045	4.4790
	(3.7954)	(4.5085)
	[205,235]	[14,542]
Retail and wholesale trade	3.7937	4.6031
	(3.8741)	(4.6445)
	[1,942,897]	[173,661]
Transportation and warehousing	3.8714	4.7013
	(3.9368)	(4.7272)
	[231,731]	[31,412]
Utilities	3.7417	4.9382
	(3.8070)	(4.9274)
	[1,605]	[602]
Water production and distribution	3.8085	4.6712
	(3.8872)	(4.6985)
	[22,073]	[5,728]

Note: is estimated following Levinsohn and Petrin (2003) separately for each 1-digit sector (NAF 2008 classification) on the universe of French firms between 2002 and 2010. We deflate value added and materials using 2-digit sector prices and the gross capital stock using a 2-digit sector capital goods deflator. The empirical specification includes year dummies. Median values are reported in parenthesis, and the number of observations in squared brackets.

TABLE 21. **Bilateral flows: closures vs. normal times by firm of destination's size, TFP, and investment**

Variables	Origin (1)	Pair (2)	Origin (3)	Pair (4)	Origin (5)	Pair (6)
Firm of destination group affiliated	0.0022	0.0059	0.0006	-0.0019	-0.0015	0.0012
	(0.0024)	(0.0042)	(0.0013)	(0.0028)	(0.0009)	(0.0021)
Same Group	0.0385**	-0.0132	0.0250**	-0.0205	0.0242***	-0.0055
	(0.0131)	(0.0228)	(0.0095)	(0.0181)	(0.0058)	(0.0127)
Closure × firm of destination group affiliated	0.0034	0.0020	0.0030	0.0042	0.0065***	0.0050**
	(0.0033)	(0.0039)	(0.0020)	(0.0024)	(0.0015)	(0.0018)
Closure × same group	**0.0658****	**0.0562***	**0.0707*****	**0.0622****	**0.0991*****	**0.0933*****
	(0.0246)	(0.0256)	(0.0176)	(0.0218)	(0.0124)	(0.0155)
TA below 10pct × Closure × Same Group	**0.0488**	**-0.0188**				
	(0.0721)	(0.0925)				
TA above 50pct × Closure × Same Group	**0.0456***	**0.0561***				
	(0.0196)	(0.0216)				
TA above 90pct × Closure × Same Group	**0.0517*****	**0.0570*****				
	(0.0101)	(0.0118)				
TFP below 10pct × Closure × Same Group			**-0.0429**	**-0.0296**		
			(0.0497)	(0.0674)		
TFP above 50pct × Closure × Same Group			**0.0430***	**0.0528***		
			(0.0198)	(0.0245)		
TFP above 90pct × Closure × Same Group			**0.0260***	**0.0187**		
			(0.0127)	(0.0145)		
CAPEXbelow 10pct × Closure × Same Group					**-0.0460***	**-0.0290**
					(0.0198)	(0.0253)
CAPEX above 50pct × Closure × Same Group					**0.0427****	**0.0528****
					(0.0145)	(0.0179)
CAPEX above 90pct × Closure × Same Group					**0.0020**	**-0.0122**
					(0.0020)	(0.0104)
N	705,413	705,413	495,042	495,042	788,004	788,004
Firm of origin FE	YES	NO	YES	NO	YES	NO
Firm of origin × firm of destination FE	NO	YES	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES	YES	YES

Note: The dependent variable is the fraction of employees moving from affiliated firm i to firm j in year t to the total number of job-to-job movers that leave firm i in year t. Firm i is a firm that eventually closes within our sample period. *Firm of destination group affiliated* is a dummy variable that takes the value 1 if firm j is group affiliated. *Same Group* is a dummy variable taking the value 1 if firm i and firm j belong to the same group. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. The variable *TA* measures the (average) book value of total assets of destination firm j in normal times, i.e. more than four years before the closure of firm i. Since a destination firm j can be the labor market partner of different firms of origin, each identifying different 'normal times', the normal time value is averaged over all the possible pairs involving firm j. *TA below* 10*pct* is a dummy variable taking the value 1 if the destination firm j belongs to the bottom decile of the distribution of *TA*. *TA above* 50*pct* is a dummy variable taking the value 1 if *TA* of the destination firm j is above the median value. *TA above* 90*pct* is a dummy variable taking the value 1 if the destination firm j belongs to the top decile of the distribution of *TA*. The same results hold if we measure firm size by the book value of Property, Plants and Equipment. The variable *TFP* measures the (average) value of TFP of destination firm j in normal times. Firm j's TFP is recovered from the labor and capital coefficients estimated using the Levinsohn and Petrin (2003) methodology by 1-digit sectors (according to the NAF 2008 classification). The estimation has been done on the population of French firms appearing in FICUS between 2002 and 2010. The variable *CAPEX* measures investment in tangible assets (excluding by acquisitions) of destination firm j. All relevant second and third level interactions are included. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

TABLE 22. **Bilateral flows: closures vs. normal times by firm of destination's financial health**

Variables	Origin (1)	Pair (2)	Origin (3)	Pair (4)	Origin (5)	Pair (6)
Firm of destination group affiliated	-0.0002	0.0020	-0.0012*	0.0017	0.0001	0.0019
	(0.0005)	(0.0011)	(0.0006)	(0.0016)	(0.0010)	(0.0025)
Same Group	0.0331***	-0.0086	0.0389***	-0.0062	0.0339***	-0.0307*
	(0.0028)	(0.0065)	(0.0038)	(0.0087)	(0.0057)	(0.0132)
Closure × firm of destination group affiliated	0.0028***	0.0023**	0.0024*	0.0008	0.0052**	0.0037*
	(0.0008)	(0.0009)	(0.0010)	(0.0011)	(0.0017)	(0.0019)
Closure × same group	**0.1477*** **	**0.1416*** **	**0.1502*** **	**0.1541*** **	**0.1013*** **	**0.1043*** **
	(0.0074)	(0.0081)	(0.0085)	(0.0094)	(0.0116)	(0.0140)
LEV below 10pct × Closure × same group	**-0.0401**	**-0.0456**				
	(0.0212)	(0.0236)				
LEV above 50pct × Closure × same group	**0.0095**	**0.0133**				
	(0.0103)	(0.0118)				
LEV above 90pct × Closure × same group	**-0.0715*** **	**-0.0483***				
	(0.0202)	(0.0233)				
COV below 10pct × Closure × same group			**-0.0404** **	**-0.0367** **		
			(0.0136)	(0.0107)		
COV above 50pct × Closure × same group			**0.0135**	**-0.0004**		
			(0.0116)	(0.0130)		
COV above 90pct × Closure × same group			**-0.0191**	**-0.0153**		
			(0.0139)	(0.0156)		
CASH below 10pct × Closure × same group					**0.0035**	**-0.0054**
					(0.0243)	(0.0288)
CASH above 50pct × Closure × same group					**0.0353***	**0.0334***
					(0.0142)	(0.0170)
CASH above 90pct × Closure × same group					**0.0318** **	**0.0210***
					(0.0104)	(0.0097)
N	700,253	700,253	637,665	637,665	705,353	705,353
Firm of origin FE	YES	NO	YES	NO	YES	NO
Firm of origin × firm of destination FE	NO	YES	NO	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time to closure dummies	YES	YES	YES	YES	YES	YES

Note: Dependent variable: fraction of employees moving from affiliated firm i to firm j in year t to the total number of job-to-job movers that leave firm i in year t. Firm i is a firm that eventually closes within our sample period. *Firm of destination group affiliated* is a dummy variable that takes the value 1 if firm j is group affiliated. *Same Group* is a dummy variable taking the value 1 if firm i and firm j belong to the same group. *Closure* is a dummy variable taking the value 1 in the last two years of firm i's activity. *LEV* is a variable that measures the (average) ratio of debt to total assets of destination firm j in normal times, i.e. more than four years before the closure of firm i. Since a destination firm j can be the labor market partner of different firms of origin, each identifying different 'normal times', the normal time value is averaged over all the possible pairs involving firm j. *LEV below* 10*pct* is a dummy variable taking the value 1 if the destination firm j belongs to the bottom decile of the distribution of *LEV*. *COV* is a variable that measures the (average) ratio of EBITDA to interest payments of destination firm j in normal times. *CASH* is a veriable that measures the (average) cash holdings of destination firm j in normal times. All relevant second and third level interactions are included. One star 5% significance, two stars 1% significance, and three stars 0.1% significance. Standard errors are clustered at the group level.

A Appendix

A.1 Equivalence between the coefficients estimated from equations (2)-(4) and those obtained from direct estimation of equation (1)

In this Section we show that the coefficient $\gamma_{c,j,t}$ estimated from equations (2)-(4) is equal to the coefficient obtained from direct estimation of equation (1).

Proof. The coefficient from the linear probability model in equation (1), estimated on a sample of N individuals, for given occupations of origin and destination, and a given firm of destination j, in year t (subscript t dropped), is the standard OLS coefficient:

$$\begin{aligned}\gamma_{c,j}^{OLS} &= \frac{Cov(E_{i,c,j}, BG_{i,j})}{Var(BG_{i,j})} = \frac{\sum_{i=1}^{N}(E_{i,c,j}-\overline{E}_{c,j})(BG_{i,j}-\overline{BG}_j)/N}{\sum_{i=1}^{N}(BG_{i,j}-\overline{BG}_j)^2/N} \\ &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j}{\sum_{i=1}^{N}BG_{i,j}^2/N - \overline{BG}_j^2} = \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j}{\overline{BG}_j - \overline{BG}_j^2} \end{aligned} \tag{8}$$

where N is the number of workers belonging to the set c.

Since $\beta_{c,j}^{OLS} = \overline{E}_{c,j} - \gamma_{c,j}^{OLS}\overline{BG}_j$, we get:

$$\begin{aligned}\gamma_{c,j}^{OLS} + \beta_{c,j}^{OLS} &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j}{\overline{BG}_j - \overline{BG}_j^2} + \overline{E}_{c,j} - \gamma_{c,j}^{OLS}\overline{BG}_j \\ &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j + \overline{E}_{c,j}(\overline{BG}_j - \overline{BG}_j^2) - \gamma_{c,j}^{OLS}\overline{BG}_j(\overline{BG}_j - \overline{BG}_j^2)}{\overline{BG}_j - \overline{BG}_j^2} \\ &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j^2 - \gamma_{c,j}^{OLS}\overline{BG}_j(\overline{BG}_j - \overline{BG}_j^2)}{\overline{BG}_j - \overline{BG}_j^2} \\ &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{BG}_j^2(\overline{E}_{c,j} + \gamma_{c,j}^{OLS} - \gamma_{c,j}^{OLS}\overline{BG}_j)}{\overline{BG}_j - \overline{BG}_j^2} \\ &= \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{BG}_j^2(\beta_{c,j}^{OLS} + \gamma_{c,j}^{OLS})}{\overline{BG}_j - \overline{BG}_j^2}\end{aligned}$$

Hence,

$$(\overline{BG}_j - \overline{BG}_j^2)(\gamma_{c,j}^{OLS} + \beta_{c,j}^{OLS}) = \sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N - \overline{BG}_j^2(\beta_{c,j}^{OLS} + \gamma_{c,j}^{OLS}) \tag{9}$$

$$\gamma_{c,j}^{OLS} + \beta_{c,j}^{OLS} = \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}/N}{\overline{BG}_j} = \frac{\sum_{i=1}^{N}E_{i,c,j}BG_{i,j}}{\sum_{i=1}^{N}BG_{i,j}} \tag{10}$$

as in equation (2). Next, substituting (8) into $\beta_{c,j}^{OLS} = \overline{E}_{c,j} - \gamma_{c,j}^{OLS}\overline{BG}_j$, we get:

$$
\begin{aligned}
\beta_{c,j}^{OLS} &= \overline{E}_{c,j} - \frac{\sum_{i=1}^{N} E_{i,c,j} BG_{i,j}/N - \overline{E}_{c,j}\overline{BG}_j}{\overline{BG}_j - \overline{BG}_j^2}\overline{BG}_j \\
&= \frac{\overline{E}_{c,j}(1-\overline{BG}_j) - \sum_{i=1}^{N} E_{i,c,j} BG_{i,j}/N + \overline{E}_{c,j}\overline{BG}_j}{1-\overline{BG}_j} \\
&= \frac{\sum_{i=1}^{N} E_{i,c,j}(1-BG_{i,j})}{\sum_{i=1}^{N}(1-BG_{i,j})}
\end{aligned}
$$

as in equation (3). □

A.2 For which occupations is the ILM more active?

In this section we present detailed results on the intensity of internal labor market activity by occupation.

TABLE 23. Inflows - Rankings by occupation of origin/occupation of destination

Occupation of origin	Code	Mean	**Occupation of destination**	Code	Mean
Top managers of industrial/commercial firms with more than 10 employees	23	0.03623	Top managers of industrial/commercial firms with more than 10 employees	23	0.04009
Top managers of industrial/commercial firms with less than 10 employees	22	0.03183	Top managers of industrial/commercial firms with less than 10 employees	22	0.03539
Administrative and commercial managers	37	0.02567	Top managers/chiefs of handicraft firms	21	0.03080
Healthcare professionals, legal professionals and other professionals	31	0.02502	Administrative and commercial managers	37	0.02497
Engineers and technical managers	38	0.02485	Supervisors and 'agents de maitrise'	48	0.02463
Supervisors and 'agents de maitrise'	48	0.02287	Healthcare professionals, legal professionals and other professionals	31	0.02271
Top managers/chiefs of handicraft firms	21	0.02110	Engineers and technical managers	38	0.02223
Maintenance, repair and transport qualified workers	65	0.02173	Professors, researchers, scientific occupations	34	0.02179
Professors, researchers, scientific occupations	34	0.02134	Maintenance, repair and transport qualified workers	65	0.02142
Technicians	47	0.02106	Agricultural worker	69	0.02004
Teachers and other education, training and library occupations	42	0.01991	Technicians	47	0.01996
Intermediate administrative and commercial occupations in firms	46	0.01980	Intermediate administrative and commercial occupations in firms	46	0.01906
Agricultural worker	69	0.01979	Surveillance and security occupations	53	0.01857
Surveillance and security occupations	53	0.01836	Teachers and other education, training and library occupations	42	0.01823
Handicraft qualified workers	63	0.01735	Journalists, media, arts and entertainment occupations	35	0.01758
Clerical support in firms	54	0.01726	Industrial qualified workers	62	0.01753
Healthcare support occupations and social services occupations	43	0.01723	Clerical support in firms	54	0.01713
Industrial qualified workers	62	0.01716	Industrial non qualified workers	67	0.01679
Journalists, media, arts and entertainment occupations	35	0.01682	Healthcare support occupations and social services occupations	43	0.01679
Handicraft non qualified workers	68	0.01680	Handicraft non qualified workers	68	0.01652
Drivers	64	0.01603	Handicraft qualified workers	63	0.01644
Industrial non qualified workers	67	0.01494	Sales and related occupations	55	0.01544
Sales and related occupations	55	0.01479	Drivers	64	0.01466
Personal service occupations	56	0.01077	Personal service occupations	56	0.01448

Rankings are net of year effects and firm fixed effects (Department restriction)

TABLE 24. Inflows - Rankings by occupation pairs net of year and firm fixed effect: top ten, bottom ten (Department restriction)

TOP TEN

Occupation pair	Code	Mean
Professors, researchers, scientific occupations-Top managers of industrial/commercial firms with more than 10 employees	34-23	0.05179
Top managers of industrial/commercial firms with more than 10 employees -Professors, researchers, scientific occupations	23-34	0.04803
Top managers of industrial/commercial firms with more than 10 employees-Top managers of industrial/commercial firms with more than 10 employees	23-23	0.04408
Top managers/chiefs of industrial/commercial firms with less than 10 employees-Top managers of industrial/commercial firms with more than 10 employees	22-23	0.03798
Top managers of industrial/commercial firms with more than 10 employees-Administrative and commercial managers	23-37	0.03481
Top managers of industrial/commercial firms with more than 10 employees-Administrative and commercial managers	37-23	0.03410
Top managers/chiefs of industrial/commercial firms with less than 10 employees- Administrative and commercial managers	22-37	0.03320
Administrative and commercial managers-Top managers/chiefs of industrial/commercial firms with less than 10 employees	37-22	0.03201
Supervisors and 'agents de maitrise'-Supervisors and 'agents de maitrise'	48-48	0.03187

BOTTOM TEN

Occupation pair	Code	Mean
Personal service occupations-Clerical support in firms	56-54	0.0118
Handicraft non qualified workers- Handicraft qualified workers	68-63	0.01349
Industrial qualified workers-Industrial non qualified workers	62-67	0.01345
Sales and related occupations-Clerical support in firms	55-54	0.01231
Industrial non qualified workers-Industrial qualified workers	67-62	0.01203
Industrial qualified workers - Industrial qualified workers	62-62	0.01010
Handicraft qualified workers-Handicraft qualified workers	63-63	0.00984
Sales and related occupations-Sales and related occupations	55-55	0.00778
Personal service occupations-Personal service occupations	56-56	0.00608
Drivers-Drivers	64-64	0.00341

TABLE 25. Outflows - Rankings by occupation of origin/occupation of destination (Department correction and fixed effects)

Occupation of origin	Code	Mean	**Occupation of destination**	Code	Mean
Top managers of industrial/commercial firms with more than 10 employees	23	0.0370	Top managers/chiefs of industrial/commercial firms with less than 10 employees	22	0.0351
Top managers/chiefs of industrial/commercial firms with less than 10 employees	22	0.0268	Top managers of industrial/commercial firms with more than 10 employees	23	0.0350
Administrative and commercial managers	37	0.0248	Top managers/chiefs of handicraft firms	21	0.0320
Supervisors and 'agents de maitrise'	48	0.0230	Administrative and commercial managers	37	0.0237
Healthcare professionals, legal professionals and other professionals	31	0.0223	Healthcare professionals, legal professionals and other professionals	31	0.0228
Engineers and technical managers	38	0.0213	Supervisors and 'agents de maitrise'	48	0.0223
Top managers/chiefs of handicraft firms	21	0.0195	Professors, researchers, scientific occupations	34	0.0200
Intermediate administrative and commercial occupations in firms	46	0.0181	Engineers and technical managers	38	0.0199
Technicians	47	0.0179	Intermediate administrative and commercial occupations in firms	46	0.0176
Professors, researchers, scientific occupations	34	0.0177	Teachers and other education, training and library occupations	42	0.0176
Maintenance, repair and transport qualified workers	65	0.0172	Agricultural worker	69	0.0175
Surveillance and security occupations	53	0.0168	Technicians	47	0.0173
Teachers and other education, training and library occupations	42	0.0161	Maintenance, repair and transport qualified workers	65	0.0171
Agricultural worker	69	0.0151	Surveillance and security occupations	53	0.0161
Clerical support in firms	54	0.0151	Journalists, media, arts and entertainment occupations	35	0.0155
Journalists, media, arts and entertainment occupations	35	0.0150	Healthcare support occupations and social services occupations	43	0.0152
Industrial qualified workers	62	0.0145	Clerical support in firms	54	0.0151
Handicraft qualified workers	63	0.0144	Handicraft non qualified workers	68	0.0144
Healthcare support occupations and social services occupations	43	0.0144	Handicraft qualified workers	63	0.0143
Handicraft non qualified workers	68	0.0143	Drivers	64	0.0132
Drivers	64	0.0139	Sales and related occupations	55	0.0129
Sales and related occupations	55	0.0130	Industrial qualified workers	62	0.0128
Personal service occupations	56	0.0128	Personal service occupations	56	0.0122
Industrial non qualified workers	67	0.0101	Industrial non qualified workers	67	0.0107

TABLE 26. Outflows - Rankings by occupation pairs: top ten, bottom ten (Department correction and fixed effects)

TOP TEN

Occupation pair	Code	Mean
Top managers of industrial/commercial firms with more than 10 employees-Professors, researchers, scientific occupations	23-34	0.0591
Top managers of industrial/commercial firms with more than 10 employees-Top managers of industrial/commercial firms with more than 10 employees	23-23	0.0455
Top managers of industrial/commercial firms with more than 10 employees-Top managers/chiefs of industrial/commercial firms with less than 10 employees	23-22	0.0375
Administrative and commercial managers-Top managers/chiefs of industrial/commercial firms with less than 10 employees	37-22	0.0357
Top managers of industrial/commercial firms with more than 10 employees-Administrative and commercial managers	23-37	0.0356
Professors, researchers, scientific occupations Top managers of industrial/commercial firms with more than 10 employees	34-23	0.0344
Top managers of industrial/commercial firms with more than 10 employees-Clerical support in firms	23-54	0.0347
Administrative and commercial managers-Top managers of industrial/commercial firms with more than 10 employees	37-23	0.0332
Top managers of industrial/commercial firms with more than 10 employees-Journalists, media, arts and entertainment occupations	23-35	0.0321
Top managers of industrial/commercial firms with more than 10 employees-Engineers and technical managers	23-38	0.0312

BOTTOM TEN

Occupation pair	Code	Mean
Industrial non qualified workers -Handicraft non qualified workers	67-68	0.0102
Industrial non qualified workers - Clerical support in firms	67-54	0.0100
Handicraft qualified workers-Handicraft qualified workers	63-63	0.0077
Industrial qualified workers -Industrial non qualified workers	62-67	0.0065
Sales and related occupations-Sales and related occupations	55-55	0.0055
Industrial qualified workers -Industrial qualified workers	62-62	0.0050
Personal service occupations -Personal service occupations	56-56	0.0037
Industrial non qualified workers-Industrial qualified workers	67-62	0.0032
Drivers-Drivers	64-64	0.0027
Industrial non qualified workers-Industrial non qualified workers	67-67	-0.0005

A.3 Internal labor markets at work: outflows

In the paper, we show that group-affiliated firms are more likely to hire workers already employed in their own group rather than workers employed outside the group. We now measure the ILM activity by asking a different – albeit related – question: are workers who find a job in a group more likely - as compared to workers who find a job outside that group - to originate from an affiliated firm? To answer this question, we estimate the excess probability that a worker (transiting between two occupations) originates from firm j if she lands to an affiliated firm, over the probability that the worker originates from firm j while landing to a non-affiliated firm.

As earlier, we denote as c the set of workers in occupation o at $t-1$ who move to occupation z in any firm at time t. We model the probability that worker i moving from occupation o to occupation z separates from firm j as follows:

$$E^O_{i,c,j,t} = \beta^O_{c,j,t} + \gamma^O_{c,j,t} BG^O_{i,j,t} + \varepsilon^O_{i,j,t} \tag{11}$$

where $E^O_{i,c,j,t}$ takes value one if worker i moving from occupation o to occupation z separates from firm j at time t and zero otherwise. $BG^O_{i,j,t}$ takes value one if worker i's firm of destination belongs to the same group as the firm of origin j at time t and zero otherwise.

The term $\beta^O_{c,j,t}$ is a firm-occupation pair specific effect that captures the time-varying natural tendency of workers moving from occupation o to occupation z to originate from firm j. This may be high due to the fact that carrying out occupation o in firm j endows a worker with the skills that facilitate moving to occupation z in any other firm. Our parameter of interest is $\gamma^O_{c,j,t}$, that measures the *excess* probability of a worker moving from o to z to originate from firm j if she lands at time t to a firm affiliated with the same group as j, over the probability to originate from firm j if the worker lands to a firm not affiliated with j's group. The error term $\varepsilon^O_{i,j,t}$ captures all other factors that affect the probability that worker i moving from occupation o to occupation z originates from firm j.

Again, for computational purposes, we define:

$$R^{BG,O}_{c,j,t} = \frac{\sum_{i \in c} E^O_{i,c,j,t} BG^O_{i,j,t}}{\sum_{i \in c} BG^O_{i,j,t}} = \beta^O_{c,j,t} + \gamma^O_{c,j,t} + \widetilde{u}^{BG,O}_{c,j,t} \tag{12}$$

as the fraction of workers that originate from firm j among all workers moving from occupation o to z whose firm of destination belongs to the same group as firm j. As discussed earlier, this fraction may be high because workers performing occupation o in firm j have a high propensity to move to occupation z in other firms, and the group includes firms intensive in occupation z. Hence, the observation of many transitions from occupation o in firm j to occupation z within the group cannot necessarily be ascribed to the ILM activity.

We then compute the fraction of workers that originate from firm j among all workers moving from occupation o to z and whose firm of destination does not belong to the same group as firm j:

$$R^{-BG,O}_{c,j,t} = \frac{\sum_{i \in c} E^O_{i,c,j,t} (1 - BG^O_{i,j,t})}{\sum_{i \in c} (1 - BG^O_{i,j,t})} = \beta^O_{c,j,t} + \widetilde{u}^{-BG,O}_{c,j,t} \tag{13}$$

Taking the difference between the two ratios eliminates the firm-occupation pair fixed effect $\beta^O_{c,j,t}$:

$$G^O_{cj,t} = R^{BG,O}_{c,j,t} - R^{-BG,O}_{c,j,t} = \gamma^O_{c,j,t} + u^{G,O}_{i,j,t} \tag{14}$$

We estimate the parameter $\gamma^O_{c,j,t}$ for each occupation pair-firm as the difference between two probabilities: that of originating from firm j for workers (transiting between two occupations o and z) who land to an affiliated firm, and that of originating from firm j for workers (transiting between two

TABLE 27. Outflows - CS Classification

			Percentiles					
Year	Mean	St.Dev.	10	25	50	75	90	N
	Unweighted firm-level aggregation							
2002	0.090	0.232	-0.001	0.000	0.000	0.013	0.333	36555
2003	0.095	0.240	-0.001	0.000	0.000	0.016	0.344	35343
2004	0.098	0.243	-0.001	0.000	0.000	0.018	0.378	36707
2005	0.095	0.239	-0.001	0.000	0.000	0.015	0.355	40517
2006	0.090	0.234	-0.001	0.000	0.000	0.013	0.333	42203
2007	0.087	0.228	-0.001	0.000	0.000	0.010	0.333	45709
2008	0.095	0.242	-0.001	0.000	0.000	0.013	0.347	40695
2009	0.100	0.248	-0.001	0.000	0.000	0.016	0.407	39549
	Weighted firm-level aggregation							
2002	0.083	0.226	-0.001	0.000	0.000	0.012	0.258	36555
2003	0.088	0.235	-0.001	0.000	0.000	0.015	0.333	35343
2004	0.091	0.237	-0.001	0.000	0.000	0.016	0.333	36707
2005	0.088	0.233	-0.001	0.000	0.000	0.014	0.332	40517
2006	0.084	0.228	-0.001	0.000	0.000	0.013	0.266	42203
2007	0.080	0.222	-0.001	0.000	0.000	0.009	0.250	45709
2008	0.089	0.237	-0.001	0.000	0.000	0.013	0.333	40695
2009	0.093	0.243	-0.001	0.000	0.000	0.016	0.333	39549

The year appearing in the first column indicates the year in which workers transiting from one job the other left the affiliated firm j. In this table we restrict to set c to be the set of all transitions occurring between occupation o and occupation z that land to the same departments in France where firm j's group is active. The upper panel of the table presents simple averages. The bottom panel shows weighted averages where the weight associated to each $\gamma^O_{c,j}$ is the ratio of the number of transitions from occupation o to occupation z that land to fim j's group to the total number of transitions (for all the occupation pairs associated with firm j) that land to j's group.

occupations o and z) who land to a non-affiliated firm. As in the previous case, the sample analog of the $\gamma^O_{c,j,t}$'s estimated in equation (14) is the OLS estimate of equation (11).

A.3.1 Results on outflows

All the regressions discussed in Section 5 are replicated using $\gamma^O_{c,j,t}$ as our measure of ILM activity. Results are reported in the following tables.

TABLE 28. Outflows - 2-digit Same Occupation

			Percentiles					
Year	Mean	St.Dev.	10	25	50	75	90	N
	Unweighted firm-level aggregation							
2002	0.066	0.201	-0.001	0.000	0.000	0.001	0.185	34140
2003	0.071	0.211	-0.001	0.000	0.000	0.001	0.236	32966
2004	0.072	0.213	-0.001	0.000	0.000	0.001	0.248	34139
2005	0.071	0.210	-0.001	0.000	0.000	0.001	0.233	37950
2006	0.067	0.204	-0.001	0.000	0.000	0.001	0.205	39441
2007	0.659	0.202	-0.001	0.000	0.000	0.000	0.197	43033
2008	0.073	0.216	-0.001	0.000	0.000	0.001	0.250	38265
2009	0.075	0.217	-0.001	0.000	0.000	0.002	0.250	37070
	Weighted firm-level aggregation							
2002	0.061	0.197	-0.001	0.000	0.000	0.001	0.143	34110
2003	0.066	0.206	-0.001	0.000	0.000	0.002	0.166	32966
2004	0.067	0.208	-0.001	0.000	0.000	0.002	0.166	34139
2005	0.066	0.204	-0.001	0.000	0.000	0.001	0.166	37950
2006	0.063	0.198	-0.001	0.000	0.000	0.001	0.158	39441
2007	0.061	0.197	-0.001	0.000	0.000	0.001	0.143	43033
2008	0.069	0.211	-0.001	0.000	0.000	0.001	0.181	38265
2009	0.070	0.212	-0.001	0.000	0.000	0.002	0.197	37070

The year appearing in the first column indicates the year in which workers transiting from one job the other left the affiliated firm j. In this table we restrict to set c to be the set of all transitions occurring between occupation o and occupation z in which occupation o is equal to occupation z. Moreover, we consider all the transitions that land to the same departments in France where firm j's group is active. The upper panel of the table presents simple averages. The bottom panel shows weighted averages where the weight associated to each $\gamma^{O}_{c,j}$ is the ratio of the number of transitions from occupation o to occupation z, with $o = z$, that land to fim j's group to the total number of transitions (for all the occupation pairs associated with firm j) that land to j's group.

TABLE 29. **ILM activity and group sectoral diversification (Outflows)**

Variables	(1)	(2)	(3)	(4)
(Log) Firm size	0.006***	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	0.002	0.003*	0.002	0.007***
	(0.001)	(0.002)	(0.001)	(0.002)
(Log) Number of affiliated firms	-0.082***	-0.082***	-0.082***	-0.086***
	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.006	-0.003	-0.006	0.009
	(0.021)	(0.019)	(0.021)	(0.016)
Foreign control	-0.001	0.001	-0.001	0.012
	(0.050)	(0.050)	(0.049)	(0.048)
Diversification (Macrosectors)	0.015*	0.013		
	(0.007)	(0.007)		
Diversification × Rest of the group size		0.011***		
		(0.003)		
Diversification (4 digit)			0.012*	0.030***
			(0.006)	(0.006)
Diversification (4d) × Rest of the group size				0.023***
				(0.003)
N	279,433	279,433	279,433	279,433
Firm × Group and year fixed effect	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of originating from affiliated firm j for workers landing into the same group as compared to workers landing outside the group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. *Diversification (macrosectors)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given macrosectors over the total employment of the group. Macrosectors are agriculture, service, finance, manifacturing, energy, automotive. *Diversification (4-digit)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given 4-digit sector to the total employment of the group. The variables *Rest of the group size*, *Number of firms in the group*, *Diversification* are normalised to have zero mean. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 30. **ILM activity and group geographical diversification (Outflows)**

Variables	(1)	(2)	(3)	(4)
(Log) Firm size	0.006***	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	0.002	0.004**	0.001	0.008***
	(0.001)	(0.002)	(0.001)	(0.002)
(Log) Number of affiliated firms	-0.082***	-0.083***	-0.084***	-0.086***
	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.005	0.004	-0.005	0.009
	(0.021)	(0.019)	(0.020)	(0.017)
Foreign control	-0.002	0.003	-0.001	0.008
	(0.050)	(0.048)	(0.049)	(0.047)
Diversification (Paris Area)	0.029***	0.016		
	(0.008)	(0.008)		
Diversification × Rest of the group size		0.024***		
		(0.004)		
Diversification (Region)			0.035***	0.030***
			(0.007)	(0.007)
Diversification (Reg.) × Rest of the group size				0.027***
				(0.003)
N	279,433	279,433	279,433	279,433
Firm × Group and year fixed effect	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of originating from affiliated firm j for workers landing into the same group as compared to workers landing outside the group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. *Diversification (Paris Area)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in the Paris Area/outside the Paris Area over the total employment of the group. *Diversification (Region)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given region over the total employment of the group. The variables *Rest of the group size*, *Number of firms in the group*, *Diversification* are normalised to have zero mean. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.

TABLE 31. **Heterogeneity of ILM activity by occupation (Outflows)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(Log) Firm Size	0.004***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(Log) Rest of the group size	-0.006***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
(Log) Number of affiliated firms	-0.015***	-0.014***	-0.014***	-0.014***	-0.015***	-0.014***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State Control	-0.007	-0.011**	-0.011**	-0.011**	-0.011**	-0.011**
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Foreign Control	-0.030***	-0.031***	-0.030***	-0.031***	-0.031***	-0.030***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Occupation of destination (Managers/High-Skill excluded)						
Intermediate Occupation	-0.002***	-0.002***	-0.002***	-0.002***	-0.011***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
Clerical Support	-0.005***	-0.005***	-0.005***	-0.005***	-0.014***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Blue Collar	-0.005***	-0.004***	-0.004***	-0.005***	-0.014***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Occupation of origin (Managers/High-Skill excluded)						
Intermediate Occupation	-0.003***	-0.003***	-0.003***	-0.003***	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
Clerical Support	-0.006***	-0.006***	-0.005***	-0.006***	-0.012***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Blue Collar	-0.005***	-0.005***	-0.005***	-0.004***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Same Occupation		-0.003***	0.001			
		(0.000)	(0.000)			
Same Occupation × Intermediate Occupation			-0.002***			
			(0.000)			
Same Occupation × Clerical Support			-0.006***			
			(0.000)			
Same Occupation × Blue Collar			-0.007***			
			(0.001)			
Diversification (4-digit)				-0.010***		
				(0.005)		
Div × Intermediate Occupation (Origin)				0.018***		
				(0.002)		
Div × Clerical Support (Origin)				0.032***		
				(0.003)		
Div × Blue Collar (Origin)				0.033***		
				(0.004)		
Diversification (Region)					-0.016	
					(0.005)	
Div. × Intermediate occupation (Origin)					0.011***	
					(0.001)	
Div. × Clerical Support (Origin)					0.022***	
					(0.003)	
Div. × Blue Collar (Origin)					0.021***	
					(0.003)	
Own closure						0.024***
						(0.004)
N	8,804,083	8,804,083	8,804,083	8,804,083	8,804,083	8,804,083
Firm × Group and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: Excess probability of originating from affiliated firm j for workers transiting between occupation o and occupation z landing into the same group as compared to workers landing outside the group. *Firm size* is measured by (full time equivalent) total employment; *Rest of the group size* is measured by the (full time equivalent) total employment of all the other firms that are affiliated to the same group as firm j. *State Control* is a dummy variable taking the value 1 if the head of the group is state-owned. *Foreign Control* is a dummy variable taking the value 1 if the head of the group is foreign. The occupational categories are the ones indicated in Table 1. The category Managers/High-Skill groups category 2 and 3. *Same Occupation* is a dummy variable taking the value 1 if the (2-digit) occupation of origin is equal to the (2-digit) occupation of destination. *Diversification (4-digit)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given 4-digit sector to the total employment of the group. *Diversification (Region)* is computed as the opposite of the sum of the squares of the employment shares of all firms affiliated with a group, where each share is the ratio of the total employment of affiliated firms active in a given region over the total employment of the group. We denote as firm closure a situation in which a firm sees its employment drop by more than 90% from one year to the other. We consider as year of the closure the last year of activity of a given firm, before it loses at least 90% of its workforce. We do not consider as closures all the cases in which more than 70% of the lost employment ends up in the same firm. *Own closure* is a dummy variable that takes the value 1 if firm j closes in year t. One star denotes significance at the 5% level, two stars denote significance at the 1% level, and three stars denote significance at the 0.1% level.