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Termination of employment contracts by mutual consent and labor market fluidity *

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Abstract

In many countries, the termination of employment contracts has to be either on employer initiative or on employee initiative. In 2008, the French government introduced a change in doctrine: it became possible to terminate employment contracts by mutual consent at a lower cost. We show that the reform was followed by a very significant increase of about 20% in outflow of permanent workers as well as by the replacement of around 10% of dismissals for cause by terminations by mutual consent. By promoting terminations by mutual consent, the reform has improved labor market fluidity and reduced the risks of labor disputes.

JEL Classification: J23, J52, J63.

Keywords : employment termination, dismissal, quit, labor litigation, severance payment.

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1 Introduction

In many countries, especially in Europe, the termination of employment contracts can be either on employer initiative or on employee initiative, there is little alternative[1]. Furthermore, the cost of the procedure is borne mainly by the contracting party who initiate the separation. For example, when an employee takes the initiative and decides to quit, he or she typically loses eligibility to receive unemployment benefits, whereas the employer bears no direct costs. By contrast, when an employer decides to dismiss an employee, the employer has typically to observe a notice period, pay a severance package and be able to prove that the circumstances of the dismissal correspond to circumstances under which it is legally possible to dismiss workers. Eventually, the employer bears the risks of being sued for unfair dismissal, especially when the dismissal cannot be justified by clear economic difficulties.

These legal constraints on job separation aim at protecting each one of the two contracting parties from the various problems involved by enduring an unexpected separation. One issue with these constraints, however, is that they may discourage worker reallocation and hamper productivity growth[2]. Also, because they make it difficult to share the costs and liability of separations, existing rules can be a source of conflicts between the two contracting parties. In particular, when employers take the initiative, they cannot avoid stigmatizing the employees that they dismiss, especially when these dismissals cannot be motivated by economic problems, but only by performance-related problems (Gibbons and Katz (1991), Okatenko (2010). The vast majority of labor litigations are actually about dismissals for cause and about their justifications (Guillonneau (2015)).

With the objective of reducing litigations and facilitating worker reallocation, the French government introduced in 2008 a new legal procedure for terminating indefinite-term employment contracts, called *rupture conventionnelle* (hereafter, termination by agreement). The new procedure makes it possible for employers to terminate employment contracts without any justification, provided that they get the consent of employees and accept to grant severance payments at least as high as the severance payments granted to dismissed workers. For employers, the new procedure has the advantage of reducing dramatically the risk of being sued in labor court. With respect to employees, it makes it possible to leave one's employer without losing eligibility to receive severance payments and unemployment benefits (which would not be the case after a quit) and without enduring the stigmatization associated with dismissals.

[1] An overview of employment termination procedure in Europe can be found in European Commission (2006). For a broader discussion and description of the various employment regulations across the world (i.e., European-type doctrine vs US "employment at-will" doctrine) see ILO (2015) or OECD (2013).

[2] On these issues see, e.g., Autor et al. (2007), Boeri and Jimeno (2005), Bassanini et al. (2009), OECD (2010) Haltiwanger et al. (2013), Martin and Scarpetta (2012).

Once the 2008 reform was adopted, terminations by agreement only spread gradually in the economy. One year after the reform, only about 30% of French establishments had started to use terminations by agreement. Six years after the reform, the same proportion was about 80%.

From a theoretical viewpoint, the rise in terminations by agreement may simply be due to the fact that they represent an option which is less risky for employer and less stigmatizing for employees than dismissals, especially dismissals for cause. In this scenario, the rise in terminations by agreement would merely coincide with a decline in dismissals of a similar magnitude. But the rise in terminations by agreement may also reflect that, before 2008, some employees stayed with their employers only because the sole ways to become unemployed (and have time to look for another job) involved either losing eligibility to receive benefits or enduring the stigmatization of dismissals. After the reform, termination by agreement may represent the best option for both these would-be movers and their employers. In this second scenario, the rise in terminations by agreement would mainly coincide with an increase in outflow of permanent workers.

To test these assumptions, our paper builds on an establishment-level dataset with detailed information on workers' entries and exits across the 2004-2014 period. These data reveal that the introduction of terminations by agreement in an establishment mainly coincides with a very significant increase of about 20% in permanent workers' overall exit rates. This increase is even stronger for younger workers and women, who are also the categories for which we observe the largest increase in terminations by agreement. The data also reveal that the introduction of terminations by agreement is followed by the replacement of about 10% of dismissals for cause by terminations by agreement. However, the substitution of terminations by agreement for dismissals explains only a very small part of the total increase in terminations by agreement in the economy.

Generally speaking, our results are suggestive that terminations by agreement were used mostly in situations where no separation at all would have occurred pre-reform, consistent with the assumption that (pre-reform) a significant number of permanent workers (especially young ones and women) were staying with their employer only because it was impossible to become unemployed without either losing eligibility to unemployment benefit or enduring the stigmatization associated with dismissals. The reform induced a decline in termination costs for these would-be movers and this appears to have been the main driver of the diffusion of terminations by agreement in the economy.

When we further compare the number of employees of establishments before and after they start using termination by agreements, we find no evidence that the adoption of the new procedure was followed by an increase in employment levels, we even find some evidence of a marginally significant decrease in employment levels

after the reform. The introduction of termination by agreement coincides with a large increase in outflow of permanent workers, but no real increase in employment levels.

Eventually, relying on an alternative employer-employee dataset, we provide evidence that permanent workers who have the opportunity to sign terminations by agreement with their employers end up back in jobs for which they are better paid. By helping would-be movers to leave their employers and move to other jobs, the reform appears to have contributed to improving the quality of matches between employees and employers.

Our paper contributes to the literature exploring the impact of employment termination regulations on firms' behaviors and flow of workers. Most existing literature focuses on reforms which entail reductions in dismissal costs either for groups of firms defined by their size or for groups of workers defined by their age or their seniority level[3]. Such reforms are in general strongly contested if only because they tend to increase unemployment risks for workers who are not willing to lose their job (and would likely have a hard time in getting re-employed). The change in doctrine analysed in this paper is an attempt to circumvent this problem by promoting separation by mutual consent and reducing termination costs for a specific group of workers only, namely workers who are willing to leave their employers but cannot afford losing eligibility to unemployment benefits. Consistent with the assumption that there exists a significant number of such would-be movers, our results reveal that this change in doctrine is able to improve long-term worker reallocation while at the same time reducing dismissals for cause and labor litigation risks.

The paper is organized as follows: section 2 describes the 2008 reform while section 3 develops our analytical framework. Section 4 describes our administrative dataset and our working sample. Sections 5 and 6 provide graphical and econometric evidence on why terminations by agreements were adopted by employers, using an event study methodology. Section 7 further explores the impact of the reform on worker mobility, using an alternative matched employer-employee dataset. Eventually, section 8 concludes.

2 Institutional context

This section first describes the institutional context that prevailed in France before the 2008 reform, when termination by mutual consent was not really an option and when the termination of an employment contract had to represent the last resort,

[3]See e.g. Dias et al. (2013), Behaghel et al. (2008), Marinescu (2009), Garibaldi and Pacelli (2008). In these papers, the impact of change in separation costs is identified by comparing targeted and untargeted groups before and after the reform, the identifying assumption being that indirect effects on untargeted groups can be neglected. For an early analysis of separation costs using the same administrative data as those used in this paper, see Goux et al. (2001).

the *ultima ratio*. Second, we describe how the reform contributed to promote a new doctrine, by providing employers and employees with the possibility to terminate employment contract by mutual consent, at potentially lower cost than dismissal or quit.

2.1 Institutional context before 2008

Before 2008, indefinite term labor contracts can be terminated in France either on employers' initiative (dismissals) or on employees' initiative (quits), there is no third option. Furthermore, the costs of the procedure are mainly borne by the contracting party who initiate the procedure.

Employees who choose to quit lose their eligibility to receive a severance package as well as their eligibility to receive unemployment benefits[4]. Employers who decide to dismiss employees have to justify their decisions and run the risk of being sued for unfair dismissal. This risk is often painted as one reason for the sclerosis of the French labor market.

Dismissals can be justified by economic reasons. In such a case, the employer has to prove the seriousness of its economic problems and has to pay severance payments. In case of collective dismissals for economic reasons, the employer has also to justify the choice of who is dismissed and who is not. French labor laws ask employers to dismiss lower seniority workers first, as well as workers with lower family responsibility (see article 1233-5 of French labor laws).

Dismissals can also be justified by non-economic reasons (dismissals for cause), most notably when employers consider that employees are guilty of misconduct. There are three levels of misconduct, namely simple, serious or very serious misconduct[5]. Employers have to pay severance payments, except in case of serious or very serious misconduct (article L.1234-9 of French Labor law). The vast majority of litigations follow dismissals for cause[6]. Between 1996 and 2003, about 25% of these non-economic terminations have been challenged in French courts (Fraisse et al. (2015)).

[4]Specifically, employees who choose to quit can become eligible to receive unemployment benefits only after 4 months out of the labor force and only after obtaining a specific agreement from a regional committee of employer and employee representatives (called *Instance Paritaire Regionale*).

[5]Serious misconducts include insubordination (refusal to perform tasks listed in the labor contract), abandonment of post, negligence (e.g. the night watchman sleeping during his shift), safety rule violation (drunk driving), violence in the workplace, harassment, theft. Very serious misconducts involve the wish to harm: deliberate deterioration, disloyalty (leaking intelligence to the competitor), embezzlement, etc.

[6]According to the French Ministry of Justice, there are about 200,000 labor litigations each year in France. Close to 80% are about the justifications of dismissals for cause while close to 15% are about unpaid wages. Only a very small fraction (about 2%) are about dismissals justified by economic reasons (see Guillonneau (2015)).

2.2 The 2008 reform

In June 2008, the French government introduced a third type of labor contract termination, called *rupture conventionnelle* (hereafter, termination by agreement). When an employer and an employee opt for such a termination, the liability is shared and the consent is mutual.

For employees, terminations by agreement bring several advantages compared to quits. After a termination by agreement, employees remain eligible to receive a severance package at least as important as the one they receive in case of an employer-initiated termination. They also remain eligible to receive unemployment benefits. To the best of our knowledge, France is the first country who introduced a procedure of termination by mutual agreement which does not entail, for employees, the loss of eligibility to receive unemployment benefits and severance packages.

For employers, the main advantage of terminations by agreement over dismissals is that terminations by agreement need not be justified. Termination by agreements do not exempt employers from giving layoff notices or paying severance package, but save them from having to explain why they wish to terminate the labor contract[7]. This alone reduces dramatically the risk of subsequent litigation[8] and, consequently, the termination costs expected by employers, especially in periods where terminations cannot be motivated by clear economic problems.

As shown by Figure 1, many employers and employees started to use the new procedure very soon after the reform and the number of termination by agreement has kept increasing since then. At the end of 2014, we observe about 30,000 terminations by agreement each month, namely twice as many terminations by agreement as dismissals for economic reasons. Building on administrative data, the Figure also confirms that the vast majority of these terminations by agreement are followed by a period of receipt of unemployment benefits. In the remainder of the paper, our basic research question is to understand the causes of this rise in terminations by agreement after 2008. Does it simply reflect the substitution of terminations by agreement for for other forms of terminations? Or does it reflect an overall increase in separations and a more fundamental change in employment dynamics?

[7]The procedure involves a preliminary interview as well as the writing and signing of an agreement where the contract termination date and the amount of the severance pay are made explicit. After a period of 15 days (during which cancellation is possible), the agreement is sent for approval to local labor authorities. Local authorities have 15 days to either reject or approve the agreement. If not rejected after this period, the agreement is deemed valid. For more detail see Articles L. 1237-11 to L. 1237-16 of French Labor laws. See also: https://www.service-public.fr/particuliers/vosdroits/F19030.

[8]According to Berta et al. (2012), only about 0.1% of termination by agreement lead to a litigation.

3 Potential effects of the reform : a conceptual framework

Compared to dismissals, terminations by agreements represent an option which is less risky for employers and less stigmatizing for employees. Hence, we can hypothesize that the 2008 reform induced the substitution of terminations by agreements for some dismissals. In fact we can expect such substitutions to be even more likely for dismissals for cause, since they represent by far the greatest risk of litigation and the most stigmatizing terminations for employees (Gibbons and Katz (1991), Okatenko (2010)).

Compared to quits, terminations by agreements represent an option which is much less costly for employees, but not for employers. Hence, we can hypothesize that the 2008 reform had much weaker substitution effects on quits than on dismissals for cause[9].

Eventually, terminations by agreement may in some cases represent an improvement over no termination at all, for both employers and employees. Before 2008, no termination at all means that dismissal would be too costly for the employer while quitting would be too costly for the employee. But, it does not rule out that some workers would prefer to be on unemployment rather than with their current employer: they choose to stay with their current employer because the only possible ways to leave their employer involve either stigmatization costs (dismissal) or the loss of eligibility to receive unemployment benefits (quit). If the number of such would-be movers is significant and if terminations by agreement are perceived by employers as less risky and costly than dismissals, the 2008 reform may induce a rise in overall separation rate, i.e., a rise in terminations by agreement signed by people who would have stayed with their employer before the reform.

In Appendix B, we develop a simple labor demand model that makes more precise how the introduction of terminations by agreement may affect firms' hiring and termination decisions. Assuming that terminations by agreement are actually less risky and costly than dismissals, the model shows that the introduction of terminations by agreement may or may not entail a rise in overall termination rates depending on the number of would-be movers and on how the magnitude of adverse labor demand shock (denoted Δ) compares to exogenous outflows of workers (denoted S).

In a nutshell, when Δ is larger than S, the difference $\Delta - S$ represents the downward adjustment that the firm would like to perform when it is hit by an adverse shock. In practice, the firm performs this downward adjustment only if labor adjustment costs are not too high. Hence, if the adjustment costs associated with terminations by agreement are sufficiently low compared to the adjustment

[9]We cannot exclude, however, that some firms end up agreeing to sign terminations by agreement rather than keeping unmotivated potential quitters in their staff.

costs associated with layoffs and if there exists a sufficiently large number of would-be movers, it may become possible for firms to make the $\Delta - S$ adjustment after the reform (using termination by agreements) whereas no adjustment would have been seen pre-reform (because of layoff costs).

In the remainder of this paper, we will build on an administrative establishment-level dataset with exhaustive quarterly information on flow of workers to test these different assumptions and to explore the consequences of the 2008 change in employment doctrine.

4 Data

We use administrative data from the "Declarations des Mouvements de Main d'Oeuvre" (DMMO) collected between the first quarter of 2004 and the last quarter of 2014[10]. For each quarter and each establishment with 50 employees or more, the DMMO provide the number of entries and exits of workers for each type of hiring and termination. In particular, we have quarterly information on the number of dismissals for economic reasons, the number of dismissals for cause, the number of quits as well as on the number of retirements and (after 2008) the number of terminations by agreement. Our empirical analysis will mostly focus on the panel of 7085 establishments continuously observed throughout the 2004-2014 period. For each one of these establishments, we are able to precisely identify whether (and when) it starts using terminations by agreement. Table A.1 in the appendix provides some descriptive statistics about the establishments in this working sample. They have on average 163 employees and 50% are in the service sector. About 18% have still not used terminations by agreement by the end of 2014. Pre-reform, dismissals for cause represent on average, each quarter, about 0.5% of total employment, whereas dismissals justified by economic reasons represent about 0.1% and quits about 1.1% of total employment.

4.1 Terminations by agreement and establishments' survival

As mentioned above, the basic advantage of focusing on a balanced panel of establishments is that we are able to precisely identify whether (and when) each one of them starts using terminations by agreement. It makes it possible to identify the effect of adopting terminations by agreement by comparing those who start using the new procedure early after the reform with those who start later, through an event analysis. One potential issue, however, is that selection into the balanced panel may be endogenous to the date on which establishments start using terminations

[10]Several papers have already used the DMMO to analyze flow of workers in France, see e.g. Abowd et al. (1999) or Goux et al. (2001).

by agreement. For example, it may be that establishments which start using terminations by agreement early after the reform tend to have a stronger probability to survive and, consequently, a stronger probability to be seen in our balanced panel. In such a case, the comparison of changes in behavior of early starters and late beginners may not necessarily isolate the effect of using termination by agreement ; it may also reflect differential sample selection.

To explore this issue, we have tested whether the probability to be selected in the balanced panel was dependent on whether (and when) establishments start using terminations by agreements. Specifically, for each possible date of adoption t_0 of terminations by agreement, we have compared the selection probability of establishments which survived until t_0 and started using terminations by agreement on t_0 with the selection probability of establishments which survived until t_0, but did not start using terminations by agreement on t_0. Figures A.1 and A.2 in the online Appendix show that the survival rates and sample selection probabilities are on average very similar for these two groups of establishments. The rate of survival on t_0+k (with $k = 1, ..., 12$ quarters) is on average slightly stronger for establishment who starts using terminations by agreement on t_0, but the difference between the two groups is only about one percentage point and not significantly different from zero at standard level.

Overall, the date on which establishments start using terminations by agreement does not seem to have any significant influence on the probability to survive and be selected in the balanced panel, so that sample selection appears to be negligible. However, as a robustness check, we will replicate most of our regression analysis on a much larger unbalanced panel (N=17,965), which include all the establishments for which information on flow of workers are available for 80% (or more) of the quarters of the 2004-2014 period under consideration. As discussed below, we obtain very similar results with the unbalanced panel and with the balanced one.

Eventually, in the last section of the paper, we test for the impact of terminations by agreement on workers' mobility using an alternative data source which links social security data (called DADS) to unemployment insurance data (called FH). The corresponding matched dataset is referred to as the FH-DADS panel. The first dataset (DADS) comes from social security records that are filled by employers each year for each of their employees and that are used to compute social security contributions. It contains information on employees' level and duration of benefits for each unemployment spell. These two datasets have been matched for a subsample of the French population (1/12th) from 2002 to 2012, resulting in a matched employer-employee panel dataset which allows to track individual career path and transitions from employment to unemployment. We augmented this database with information (from DMMO) on the quarter in which employers began using terminations by agreement.

5 Terminations by agreement and establishments' exit flows: a graphical analysis

The 2008 reform introduced an entirely new and relatively complex termination procedure. Moreover, it can only be implemented in very specific situations, when neither the employer nor the employee have the capacity to take the initiative to break the labor contract on their own. In this context, the use of terminations by agreement can only have spread very gradually, as opportunities to sign terminations by agreement (and to pay the cost of adapting to the new procedure) gradually emerged.

To illustrate this fact, Figure 2 focuses on our balanced panel and shows the cumulative proportion of establishments which began to use terminations by agreement between 2008 and t, for each quarter t between 2008-Q1 and 2014-Q4. The Figure confirms that in 2009, one year after the reform, only about 30% of establishments had already signed a termination by agreement. In 2014, the same percentage was still not 100%, but about 80%.

To take one step further, Figure 3 focuses on establishments which began to use terminations by agreement at some point between 2008 and 2014 and shows the evolution of their number of terminations by agreement per employee over time, with the date of the first termination by agreement being taken as the origin of the time scale. The Figure shows that the number of terminations by agreement per employee jumps almost immediately after the first one. Afterward, it remains stable. This result is suggestive that, once the cost of adapting to the new procedure has been paid, the flow of terminations by agreement almost immediately reaches an equilibrium level.

In the remainder of this section, our first purpose is to explore graphically whether the date on which an establishment starts using terminations by agreement also coincides with a decline in the other forms of terminations. As discussed above, terminations by agreement represent an option which is likely to be less stigmatizing for employees and which involve much less litigation risks for employers than dismissals for cause. On the other hand, terminations by agreement entail adjustment costs that are stronger for employers than those entailed by quits or retirements, and as strong as those entailed by dismissal for economic reasons. Therefore, to the extent that the risks of labor disputes are effectively taken into account by employers, we expect the date of adoption of terminations by agreement to coincide with a decline in the number of dismissals for cause per employee, but not in the other forms of terminations.

5.1 Terminations by agreement as a substitute for other forms of terminations

To test these assumptions, Figures 4 and 5 compare the number of dismissals for cause per employee observed in establishments that started using terminations by agreement between 2008 and 2011 (early adopters) with those observed at the same dates, in the same industries, in establishments that had not yet started using terminations by agreement in 2014 (late adopters). Specifically, the solid line in Figure 4 shows the evolution of dismissals for cause in the first group of establishments, before and after the date on which they first use terminations by agreement (the date of first use is taken as the origin of the time scale). The dotted line in the same Figure shows the evolution of the same variable in the second group of establishments[11]. The Figure reveals that the date around which early adopters start using terminations by agreement (i.e., $t = 0$) coincides with a significant decrease in their use of dismissals for cause whereas no change is seen in the use of these terminations in late adopters. The solid line stays above the dotted line until early adopters start using terminations by agreement. After that date, the situation is reversed. To take one step further, Figure 5 shows the evolution of the difference between the solid and the dotted lines of Figure 4. The Figure confirms that this difference declines at about the same time that early adopters start using terminations by agreement. These results are clearly consistent with the assumption that terminations by agreement entail adjustment costs for employers that are lower than those entailed by dismissals for cause and represent a potential substitute for these dismissals.

It is possible to develop a similar analysis for dismissals justified by economic reasons (see Figures 6 and 7). This analysis shows no variation in the difference between the two groups of establishments after the date when early adopters start using terminations by agreement. There is no evidence that terminations by agreement were used as a substitute for dismissals justified by economic reasons, consistent with the fact that terminations by agreement are not necessarily easier to bargain and implement than dismissal for economic reasons during a downturn. They are not less costly either, since the severance packages associated to terminations by agreement have to be as generous as those associated to dismissals.

Eventually, Figures A.3 to A.6 in online appendix compare the evolution of quits and retirements in early and late adopters. Again, they do not show any variation in the difference between the two groups of establishments after the date when early

[11] To be very specific, for each date t and each establishment j in the first group, it is possible to define (a) the distance between t and the date $t_0(j)$ at which j starts using terminations by agreement and (b) Y_{jt} the number of dismissals per employee in j at t and (c) $\overline{Y_{jt}}$ the average number of dismissals per employee at t in establishments of the second group (i.e., same industry as j, but the date of the first termination by agreement is after 2014). The Figure shows the evolution of the average of Y_{jt} et $\overline{Y_{jt}}$ conditional on d, for d between -12 to +12. The two groups are defined so that each given observation contributes to either the solid line or the dotted line, never to both lines.

adopters start using termination by agreement. Put differently, there is no evidence that terminations by agreement were used as an early retirement device or as a substitute for quits. Terminations by agreement entail the payment of severance packages and, as such, are more costly for employers than quits or retirements. In this context, it is not surprising that we do not see any significant decline in quits or retirement after the adoption of terminations by agreement

5.2 Terminations by agreement and overall separation rates

The previous subsection provides suggestive evidence that terminations by agreement are used as a substitute for dismissal for cause. As discussed in the previous sections, it is also likely that terminations by agreement make it possible to terminate permanent contracts in circumstances when no terminations would have been possible before the reform. To explore this last assumption, we looked at whether the introduction of terminations by agreement was followed by an increase in the overall number of terminations of indefinite-term contracts, as measured, each quarter, by the sum of dismissals, quits, retirements and (after 2008) terminations by agreement. Figures 8 and 9 confirm that this is the case. When we compare the group of early adopters with the group of late adopters, we see that the overall number of terminations per employee increases in the first group (but not in the second one) just after it starts using terminations by agreement. When economic conditions are not particularly bad and do not justify downsizing, dismissals are difficult to justify and our results confirm that terminations by agreement represent an interesting alternative option for employers who are willing to reorganize their staff, i.e., destroy some old jobs and create new ones. The DMMO do not provide direct evidence on the number of new indefinite term contracts which are signed, each quarter, in each establishment[12]. Hence, it is not possible to rigorously assess whether the adoption of terminations by agreement is also followed by an increase in the number of new indefinite-term contracts signed each quarter. It remains possible, however, to test whether the rise in terminations coincide with a decline in the overall number of employees. Figures A.7 and A.8 in the online Appendix suggest that this is not the case. the date on which an establishment starts using terminations by agreement does not appear to coincide with any specific decline in its number of employees.

6 Regressions analysis

The previous section provides graphical evidence suggesting that the date on which an establishment starts using terminations by agreement coincides with a significant

[12] A significant fraction of indefinite-term contracts correspond to the transformations of temporary contracts into permanent ones (see, e.g., Goux et al. (2001)). The DMMO do not provide information on these transformations.

rise in the overall rate of terminations of indefinite-term contracts in this establishment. By contrast, the date on which an establishment starts using terminations by agreement does not seem to coincide with any significant change in its level of employment. In this section, we develop a regression analysis to test the robustness of these findings as well as whether they hold true in all industries and for all types of workers. We focus on the panel of establishments who starts using terminations by agreement between 2008 and 2014 and we assume the following two-way fixed effects model,

$$Y_{jt} = \gamma Post_{jt} + \alpha_j + \tau_t + \epsilon_{jt} \tag{1}$$

where Y_{jt} represents the outcome under consideration in establishment j during quarter t whereas $Post_{jt}$ is a dummy variable indicating whether quarter t is before or after the quarter $t_0(j)$ during which establishment j starts using terminations by agreement. Parameters α_j et τ_t represent a full set of quarter and establishment fixed effects. Eventually, ϵ_{jt} represents unobserved factors which affect j during t, but which variations over time are assumed uncorrelated with the dates at which establishments start using termination by agreement.

Following Abraham and Sun (2020), it is possible to cast model (1) in a potential outcomes setting where treatment effects are defined (for each establishment j, each potential date of treatment e and each date t) as the difference between outcomes that would be observed at t if establishment j started using the new procedure on e and outcomes that would be observed at t if establishment j never started. In this framework, Abraham and Sun (2020) show that a "parallel trend" and a "non-anticipation" assumption are sufficient for the two-way fixed effects estimator of parameter γ in model (1) to capture an average treatment effect. The "parallel trend" assumption states that - had terminations by agreement not been introduced - outcomes would have followed similar trends in establishments who start using terminations by agreement early after the reform and in establishments who start later. The "non-anticipation" assumption states that - had terminations by agreement not been introduced- we would have observed the same outcomes in the period before establishments start using terminations by agreement. Put differently, we assume that the reform did not induce establishments to adapt their behavior in anticipation, namely before they actually start using terminations by agreement. Under these two assumptions, the two-way fixed effects estimator of parameter γ recovers a weighted average of cohort-specific average treatment effects, where cohorts are defined by the date of introduction of termination by agreement. Assuming treatment homogeneity across cohorts, parameter γ can simply be interpreted as the difference between the average outcome observed after the introduction of terminations by agreement and the average outcome that would be observed in the same establishments, had

terminations by agreement not been made available[13].

Generally speaking, the Figures presented in the previous section are consistent with our two identifying assumptions. As it turns out, when we compare establishments who start using terminations by agreement at a given date with establishments who will start only later, Figures do not show any significant divergence in their behavior in the period before the first group starts using termination by agreement[14].

6.1 Regression results

Consistent with our graphical analysis, the regression results in the panel A of Table 1 confirm that the introduction of terminations by agreement in an establishment mainly coincides with a significant increase in outflow of permanent workers. Specifically, the estimated effect ($\gamma \approx 0.35^{***}$ percentage points) corresponds to an increase of about 20% in overall separation rate and is about as strong as the estimated increase in the number of terminations by agreement per employee that follows the introduction of the new procedure ($\gamma \approx 0.41^{***}$). Most of the increase in termination by agreement appears to be a response to employees' desire to change employers, which was too costly to satisfy before the reform.

Regression results also confirm that the introduction of terminations by agreement is followed by a significant decline in the number of dismissals for cause per employee ($\gamma \approx -0.03^{***}$), but has little effect on quits, retirement or on dismissals justified by economic reasons. The estimated effect suggests that about 10% of dismissals for cause are replaced by terminations by agreement after the introduction of the procedure.

Panels B and C of Table 1 show our regression results when we look separately at establishments in the manufacturing industries and establishments in the service sector. They show that terminations by agreement induce a very significant rise in aggregate separation rates in both sectors. By contrast, the decline in dismissals for cause is mainly seen in the service sector, which is also the sector where this type of terminations is, by far, the most used[15]. Eventually, when we look separately

[13]When treatment effects are heterogeneous across cohorts of adoption, the two-way fixed effects estimator of parameter γ can be more difficult to interpret since it recovers a linear combination of cohort-specific average treatment effects where weights are not necessarily positive, as shown by Abraham and Sun (2020). In Appendix C, we build on the recent work by Cengiz et al. (2019) to show that our results are robust to the presence of heterogeneous treatment effects.

[14]As discussed above, the only exception is seen for dismissals for cause : the decline in these dismissals starts a little before establishments actually starts using terminations by agreement. To further test the robustness of our results, however, we replicated our regression analysis on the sample obtained after dropping for each establishment the observations that correspond to the two quarters before the quarter at which it starts using termination by agreement (i.e., two observations that may be affected by anticipation effects). As discussed below, we obtain very similar results on this subsample and on the main sample.

[15]It likely reflects that the quality of employees' work is more likely to be subject to different interpretations in the service sector than in the manufacturing industry, maybe because service

at manufacturing and service industries, the small negative impact on employment levels appears to be significant at conventional levels in neither sector.

To take one step further, Table A.2 in Appendix A shows the results of replicating our econometric analysis after dropping - for each establishment - the observations which correspond to the two quarters before the establishment starts using terminations by agreement, so as to minimize anticipation effects. We find very similar regression results with this subsample as with the main sample, namely a positive effect on aggregate separation rates and a smaller negative effect on dismissals for cause. However, when we work with this subpanel, the negative effect of terminations by agreement on employment levels is not significant at standard level anymore.

Eventually, to further test the robustness of our results, we consider establishments for which DMMO information is available for 80% of more of the quarters (i.e. 36 quarters or more, out of 44) and we replicated our econometric analysis on this much larger unbalanced panel (see Table A.3 in the appendix). Generally speaking, we obtain similar results with this unbalanced panel as with the balanced one.

6.2 An augmented specification

The results so far suggest that terminations by agreement are used partly as a substitute for dismissals for cause and partly as a means of terminating labor contracts that employers and employees find unsatisfactory, but which would be too costly to break.

If this interpretation is correct, the decline in dismissals for cause and the rise in overall separation rates that coincide with the adoption of terminations by agreement should be observed within firms for the same categories of workers as the rise in terminations by agreement. It is possible to test this prediction using the information available in our establishment-level data on the age, sex and occupation of employees exiting firms each quarter.

If, for example, Y_{kjt} represents the rate of termination by agreement signed in establishment j on year t by workers of type k (with $k = 0$ for women and $k = 1$ for men, for example), we can begin by estimating the following augmented version of model (1):

$$Y_{kjt} = \theta Post_{jt} \times I_k + \mu_{jt} + \mu_{kt} + \mu_{kj} + e_{kjt} \tag{2}$$

where I_k is a dummy indicating that $k = 1$ and where parameter θ captures the difference in exposure to terminations by agreement between men and women within establishments.[16]

tasks tend to be more difficult to codify and evaluate.

[16]There is no information on job stocks by categories of workers in the DMMO database, there is only information on worker flows. In order to construct exit rates by categories of workers,

Table 2 shows the results of estimating model (2) for the different types of exit rates (terminations by agreement, quits, etc.) when we contrast male and female workers (panel A), executives and non-executives workers (panel B) or workers aged less than 40 and workers aged 40 years of more (panel C). With respect to terminations by agreement, the first column of the table shows that their diffusion within establishments was significantly stronger for female workers than for male workers as well as for executive workers than for non-executive ones. It was also stronger for younger workers than for older workers, consistent with the fact that younger workers are more likely to be in an employment situation that they feel could still be improved. Given this reality, the question becomes whether the rise in separations and the decline in dismissals are also more pronounced for younger workers than for older workers, for female workers than for male workers, or for executives than for non-executives. The columns (2) to (6) of Table 2 show that it is the case. Specifically, the stronger rise in terminations by agreement observed for executives within establishments coincides mostly with a stronger decline in their exposition to dismissals for cause while the stronger rise in terminations by agreement observed within establishments for female workers or for younger workers coincides mostly with a stronger rise in their overall separation rates. The introduction of terminations by agreement has enabled a number of younger workers and female workers to avoid having to stay with an employer that only the costs associated with resignations and dismissals prevented them from leaving. It has also enabled a number of executives who were in conflict with their employers to avoid the stigma of dismissal[17].

7 Termination by agreement and worker mobility

Using quarterly establishment-level data, the previous sections are suggestive that the adoption of terminations by agreement by an establishment facilitates worker mobility. In this last section, we provide an alternative test of this assumption using different data, namely matched employer-employee (annual) data which cover the 2002-2012 period and make it possible to look at whether workers' situation in 2012 (as well as workers' labor market transitions between 2008 and 2011) depend on whether their employer in 2008 adopted terminations by agreement relatively early or relatively late.

Specifically, we focus on the sample of workers who are employed in 2008 in an establishment that will come to adopt terminations by agreement between 2008 and

the flows obtained from the DMMO were divided by the stocks obtained from the social security records (DADS).

[17] A typical conflict between executives and their employers concerns transfers to other regions that employers may seek to impose. Where such transfers are permitted by the employment contract, the employee's refusal may justify dismissal for cause.

2011 and we consider five basic dependent variables: (a) a dummy variable indicating whether the worker signed a termination by agreement between 2008 and 2011, (b) a dummy variable indicating whether the worker went through a period of unemployment between 2008 and 2011, (c) a variable indicating the number of different jobs the worker held between 2008 and 2011, (d) a variable indicating whether the worker is employed in 2012, (e) a variable indicating workers' hourly wage in 2012 (conditional on employment in 2012). Table 3 shows the result of regressing these dependent variables on a variable Q indicating the number of quarters between the date on which the 2008 employer adopted terminations by agreement and 2011[18]. The estimated impact of Q captures the effect of one additional quarter of potential exposure to terminations by agreement.

Comfortingly, the Table confirms that workers who were employed in 2008 by an establishment which adopted terminations by agreement earlier have a stronger probability of signing a termination by agreement between 2008 and 2011 as well as a significantly stronger probability of transiting on the labor market and changing job between 2008 and 2011. Their probability of being employed in 2012 is however not significantly different from that of workers who were employed in 2008 by a firm which adopted terminations by agreement later. These results are consistent with the main finding of our previous establishment-level analysis, namely the finding that the adoption of terminations by agreement is followed by a rise in overall separation rate, without any significant consequences on their employment level. The last column of Table 3 further focuses on workers who were employed in 2012, so as to look at whether their 2012 hourly wage depends on whether their employer in 2008 adopted terminations by agreement relatively early or relatively late. It reveals that workers who were employed in 2008 by an early adopter tend to earn significantly higher hourly wage[19].

Eventually, Table A.4 in the online appendix shows the result of placebo regressions where we use 2008 hourly wages (or labor market transitions observed between 2004 and 2007) as dependant variables. Comfortingly, the Table does not reveal any significant correlation between these pre-reform outcomes and the date of adoption of terminations by agreement.

Taken together, the results in Table 3 (and Table A.4) are suggestive that workers who sign terminations by agreement with their employers end up back in jobs for which they are better paid, and probably more productive. By helping would-be movers to actually leave their employers, the reform seems to have contributed to improving the quality of matches between employees and employers.

[18] In these regressions, we also control for employees' age, sex and education as well as for the size, average wage, share of skilled workers of their employers in 2008.

[19] In this analysis, we exclude the 5% observations with reported hourly wages below 8 euros/hour (i.e.,less than 0.85 $\times$ the minimum wage).

8 Conclusion

In 2008, French labor laws introduced a new employment termination procedure, called *rupture conventionnelle*, and it became possible to terminate employment contracts by mutual consent at lower costs. By comparing employers who started to use the new procedure just after the reform with those who started a little later, we show that the adoption of termination by agreement coincides with a significant increase of about 20% in overall separation rates. This finding is suggestive that pre-reform many employment contracts were not broken only because termination costs could not be shared. We also provide evidence that workers who benefit from terminations by agreement are able to return to better-paid jobs, which suggests that terminations by agreement contribute to a better match between employees and employers.

In addition, we show that the adoption of the new procedure coincides with a small, but statistically significant decline of dismissals for cause, namely a decline in the form of termination that carries the greatest risk of labor disputes. This result confirms that the risks of labor disputes represent an important element of the costs of terminating employment contracts and that reducing these risks can contribute to speeding up worker reallocation.

Overall, our paper reveals that a reduction in separation costs does not necessarily come at the price of increased conflicts between employees and employers, even when it is followed by an actual increase in separation rates. As it happens, by changing employment doctrine and promoting separations by mutual consent, the 2008 reform induced an increase in separation rates, a reduction in litigation risks and an improvement in the quality of the matches between employees and employers. Eventually, we do not see any significant change in firms' employment levels after the reform, which suggests that the increase in overall separation rates induced by the reform was offset by a symmetrical increase in hiring rates, consistent with standard model of labor demand dynamics.

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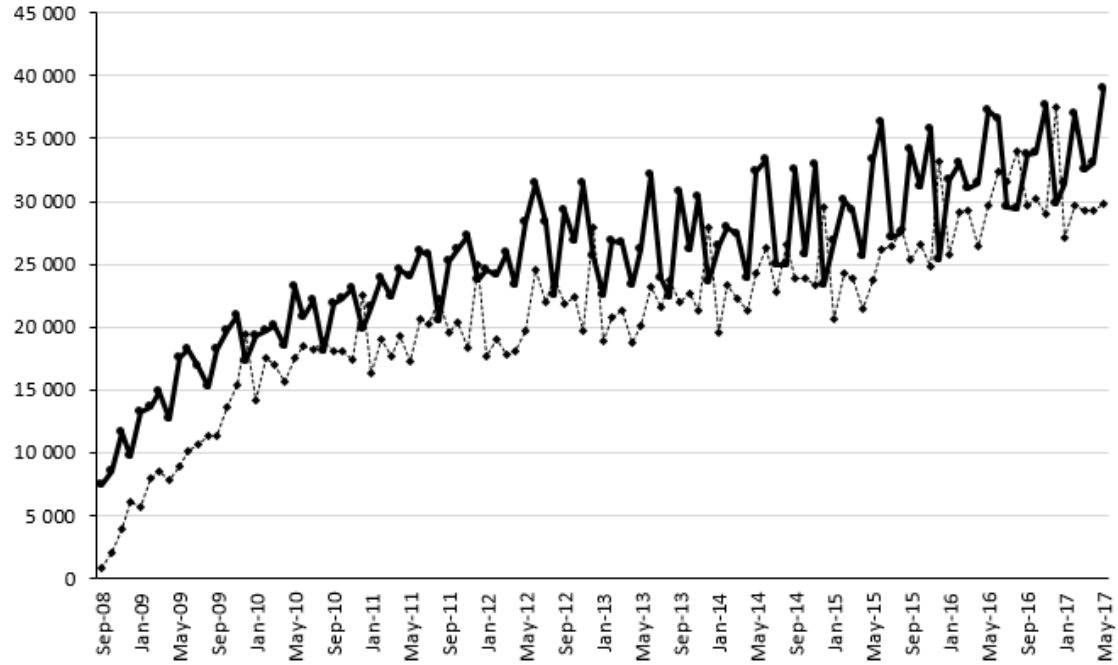
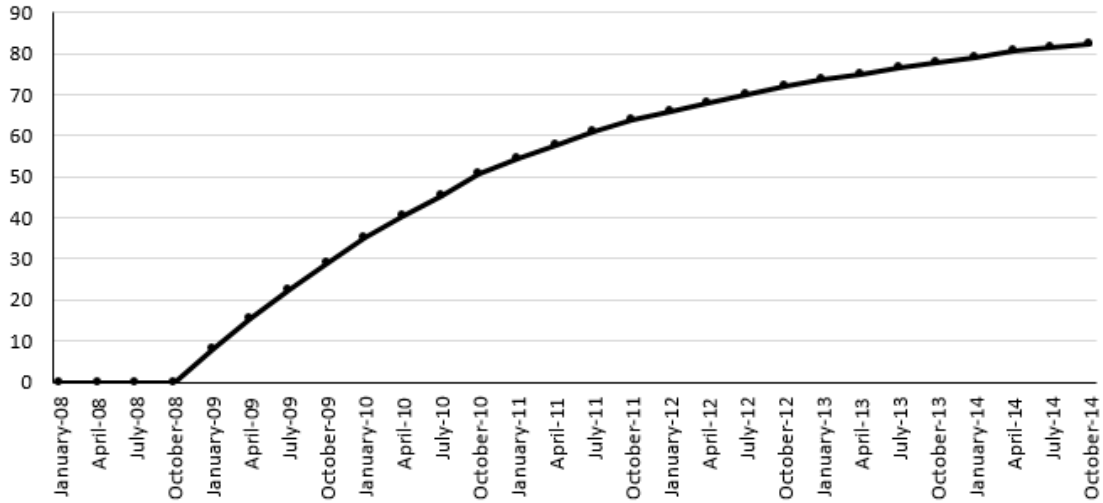
Figures and Tables

Figure 1: Number of terminations by agreement between 2008 and 2017



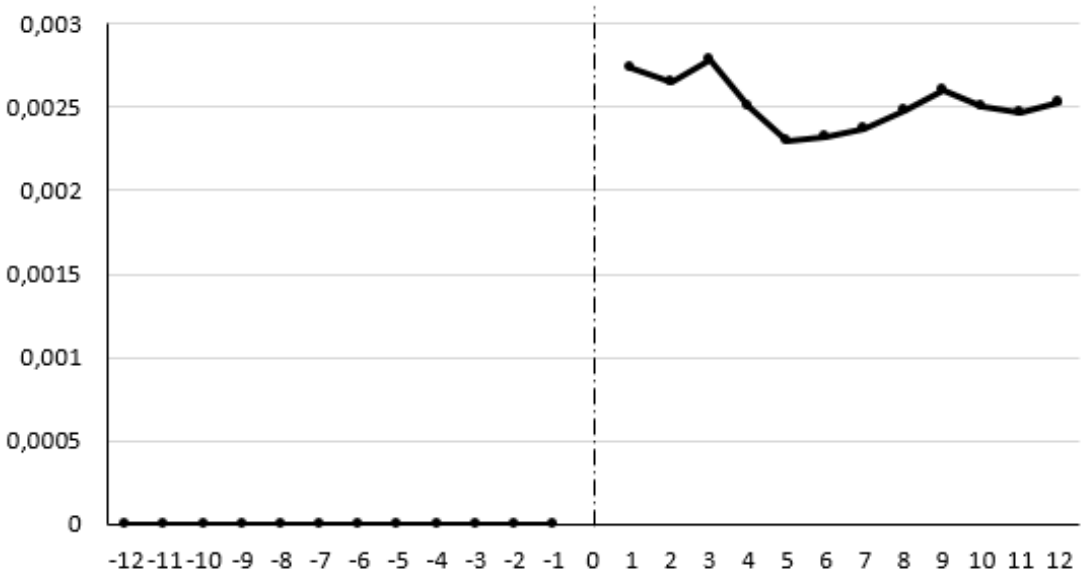
Note: The solid line shows the evolution of the number of terminations by agreement approved each month and the dotted line shows the evolution of the number of terminations by agreement which are followed by a registration into unemployment.

Figure 2: Cumulative proportion of establishments that have already used terminations by agreement



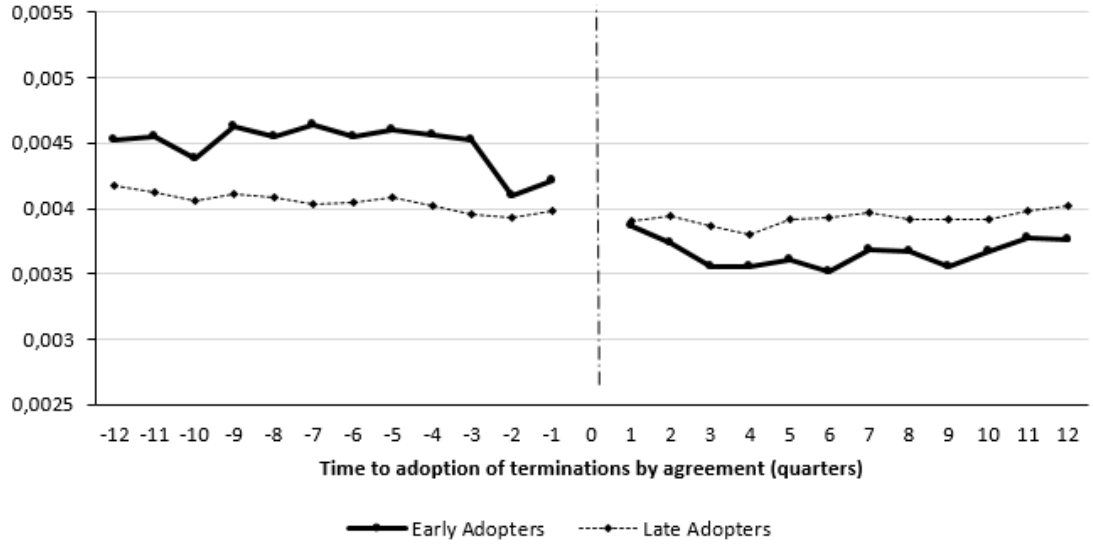
Note: The curve shows the evolution of the proportion of establishments in the balanced panel that have already used terminations by agreement. Reading: At the end of 2010, about 50% of establishments had already used terminations by agreement.

Figure 3: Rate of termination by agreement before and after the first use of the procedure



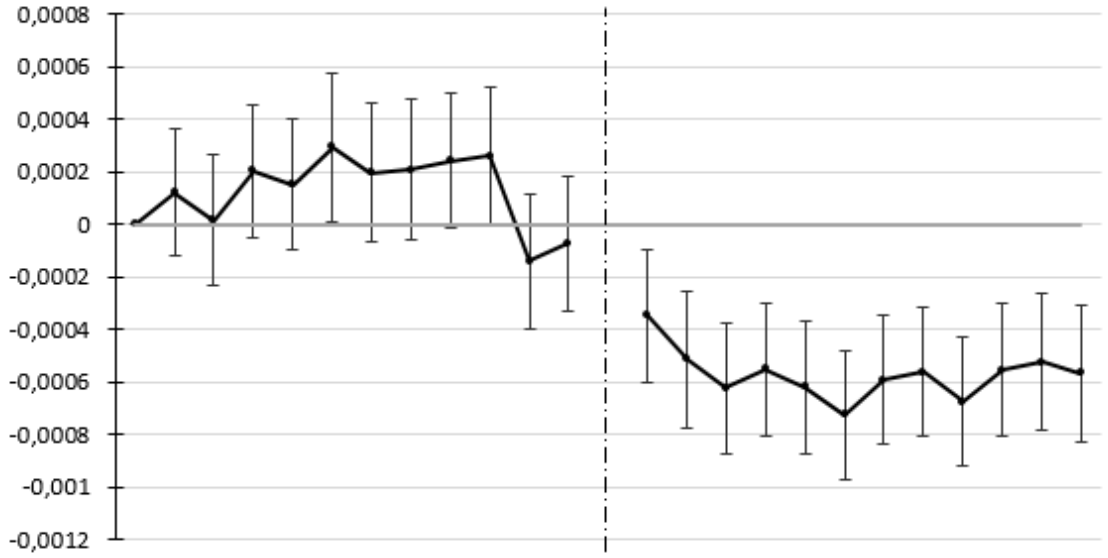
Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The curve shows the evolution of the number of terminations by agreement per employee and quarter, taking the quarter of the first termination by agreement as the origin of the time scale. Reading: Four quarters after the first termination by agreement, the number of terminations by agreement per employee is on average about .0025 each quarter.

Figure 4: Rate of dismissal for cause before and after the adoption of terminations by agreement.



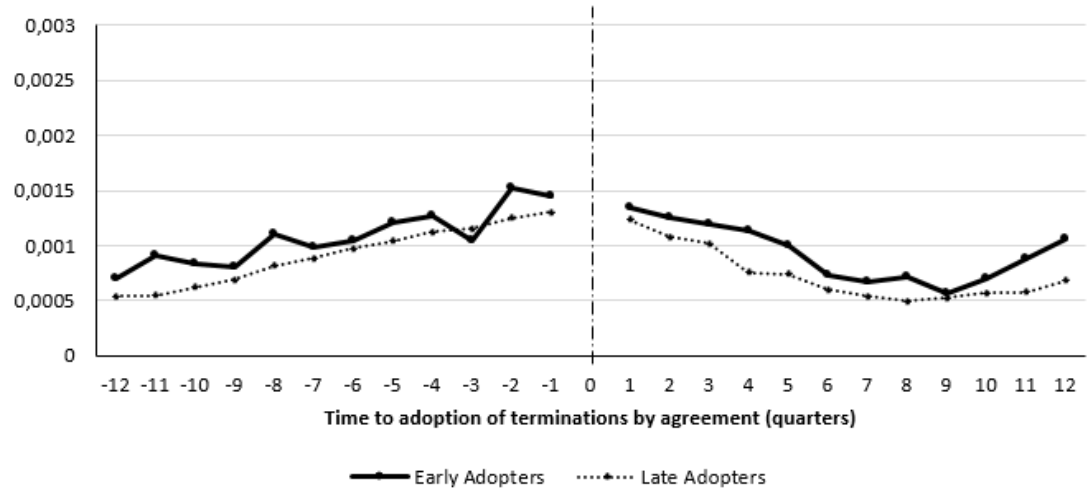
Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The solid line shows the evolution of the rate of dismissal for cause over a period of 6 years, taking the date of the first termination by agreement as the origin of the time scale. The dotted line shows the rate observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure 5: Difference in rates of dismissal for cause between early adopters and late adopters



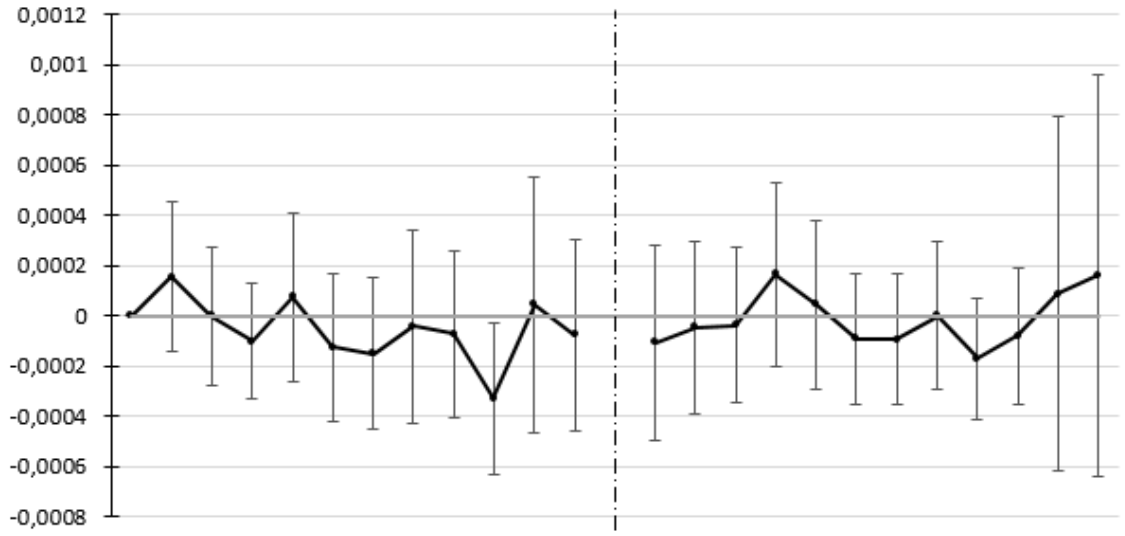
Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure 4. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure 4.

Figure 6: Rate of dismissal justified by economic reasons before and after the adoption of terminations by agreement



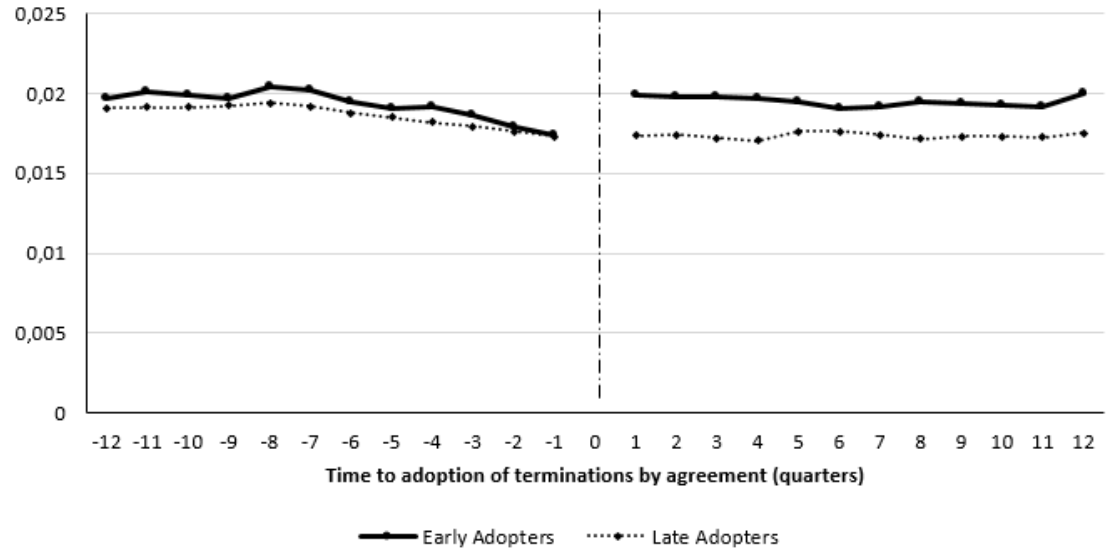
Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The solid line shows the evolution of the rate of dismissal for economic reasons over a period of 6 years, taking the date of the first termination by agreement as the origin of the time scale. The dotted line shows the rate observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure 7: Difference in rates of dismissal justified by economic reasons between early adopters and late adopters



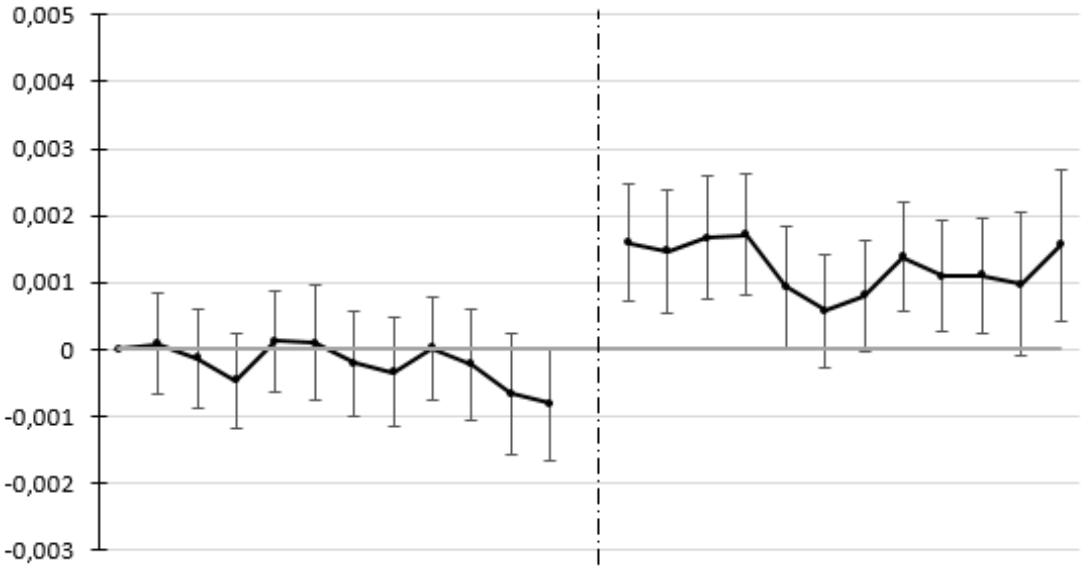
Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure 6. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure 6.

Figure 8: Overall rate of termination of permanent contracts before and after the adoption of terminations by agreement



Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The solid line shows the evolution of the overall rate of termination of permanent contracts over a period of 6 years, taking the date of the first termination by agreement as the origin of the time scale. The dotted line shows the overall termination rate observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure 9: Difference in overall rates of termination of permanent contracts between early adopters and late adopters



Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure 8. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure 8.

Table 1: The effect of adopting terminations by agreement on permanent contract terminations and number of persons employed

	Termination by agreement	Dismissal For cause	Quit	Economic Dismissal	Retirement	Overall termination	Nb Employees (log)
				A- All industries			
$Post_{jt}$	.413***	-.031***	.001	.004	.001	.348***	-.0081***
	(.005)	(.007)	(.013)	(.011)	(.006)	(.022)	(.0027)
Obs.	256739	256739	256739	256739	256739	256739	256739
m	0.12	0.41	0.99	0.09	0.37	1.92	4.85
				B- Construction and manufacturing			
$Post_{jt}$	.408***	-.012	.003	.000	-.001	.373***	-.0066
	(.006)	(.009)	(.012)	(.019)	(.009)	(.028)	(.0086)
Obs.	135309	135309	135309	135309	135309	135309	135309
m	0.11	0.34	0.67	0.13	0.40	1.65	4.90
				C- Service			
$Post_{jt}$	.424***	-.052**	-.014	-.000	-.003	.328***	-.0051
	(.008)	(.010)	(.025)	(.009)	(.008)	(.035)	(.0039)
Obs.	120202	120202	120202	120202	120202	120202	120202
m	0.12	0.46	1.36	0.05	0.35	2.23	4.80

Note: Panel A refers to the balanced panel of establishments which adopted terminations by agreement before the end of 2014. Panel B covers the subpanel of establishments in manufacturing and construction sectors whereas panel C refers to the service sector. The table shows the result of establishment-level regressions where the dependent variable is the quarterly rate of (a) dismissals for cause (column 1), (b) quits (column 2), (c) dismissals for economic reasons (column 3), (d) retirements (column 4) as well as the overall rate of termination of permanent workers (column 5) and (e) the number of employees (in log) (column 6). The set of regressors includes a $Post_{jt}$ dummy indicating that the observation is after the beginning of the use of terminations by agreement, as well as a set of establishment fixed effects (5837 establishments) and quarter fixed effects (44 quarters). We only report estimated impact of $Post_{jt}$. *** p<0.01, ** p<0.05, * p<0.1. All coefficients are multiplied by 100 (and represent effects in ppt).

Table 2: The effect of terminations by agreement on permanent contract terminations, by age, gender and occupational subgroups

	Termination by agreement	Non-econ. Dismissal	Quit	Economic Dismissal	Retirement	Overall termination
			A- Men vs. Women			
$Post_{jt} \times I_k$	-.106***	.016	-.034	.027	.007	-.104**
	(.010)	(.016)	(.027)	(.027)	(.017)	(.048)
Obs.	493812	493812	493812	493812	493812	493812
m	.11	.43	1.02	.12	.38	1.99
			B- Executives vs. non-executives			
$Post_{jt} \times I_k$	.252***	-.149***	-.050	-.015	.005	.033
	(.022)	(.045)	(.062)	(.020)	(.035)	(.102)
Obs.	413918	413918	413918	413918	413918	413918
m	.14	.49	1.04	.11	.45	2.25
			C- Older vs. Younger workers			
$Post_{jt} \times I_k$	-.090***	.009	-.025	.002	-.029*	-.137***
	(.009)	(.020)	(.031)	(.010)	(.014)	(.043)
Obs.	470162	470162	470162	470162	470162	470162
m	.11	.49	1.17	.10	.36	2.23

Note: The Table refers to the balanced panel of establishment which adopted terminations by agreement before the end of 2014. The Table shows the result of estimating model (2) when we contrast men and women (panel A), executive and non-executive workers (panel B), workers aged more than 40 and less than 40 (panel C). For each establishment j, subgroup k and quarter t, the dependent variable is the rate of terminations by agreement (column 1), the rate of dismissals for cause (column 2), the rate of quits (column 3), the rate of retirements (column 4) and the overall rate of termination of permanent workers (column 5). The Table reports the effect of ($Post_{jt} \times I_k$), namely the effect of the interaction between a dummy ($Post_{jt}$) indicating that the date of observation t is after the date of adoption of termination by agreement by establishment j and a subgroup dummy (I_k). The model also includes full sets of establishment × date, subgroup × date and establishment × subgroup fixed effects. *** p<0.01, ** p<0.05, * p<0.1. All coefficients are multiplied by 100 (and represent effects in ppt).

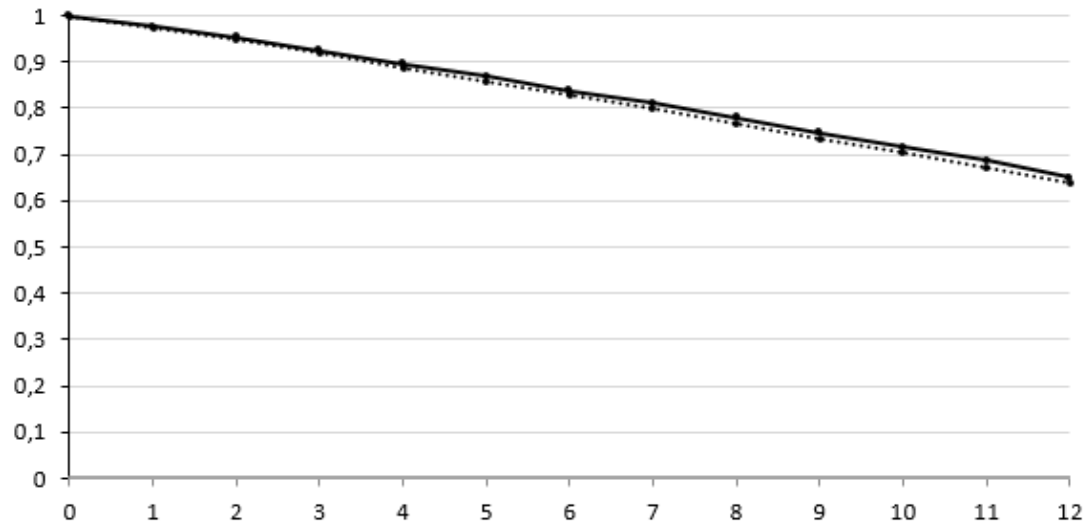
Table 3: Effect of potential exposure to terminations by agreement on workers' trajectories

	Termination by Agreement	Unemployment spell	Number of Jobs	Employment in 2012	Hourly Wage in 2012
Q_i	.00137***	.00215***	.00416***	-.00036	.00127***
	(.00012)	(.00029)	(.00090)	(.00029)	(.00035)
Obs.	142791	142791	142791	142791	119131

Note: The table refers to the sample of workers who are employed in 2008 and whose 2008 employer adopt terminations by agreement between 2008 and 2011. The table shows the result of regressing workers' post-reform outcomes on their number of quarters of potential exposure to terminations by agreement (as predicted by the date on which their 2008 employed adopted the new procedure). The dependent variable is a dummy indicating that the worker signed a termination by agreement between 2008 and 2011 (column 1), a dummy indicating that the worker went through a period of unemployment between 2008 and 2011 (column 2), the (log) number of different jobs held between 2008 and 2011 (column 3), a dummy indicating unemployment in 2012 (column 4) and the 2012 hourly wage (column 5). Controls include individual age, gender, education as well as the size, average wage and share of skilled worker of the 2008 employer. *** p<0.01, ** p<0.05, * p<0.1.

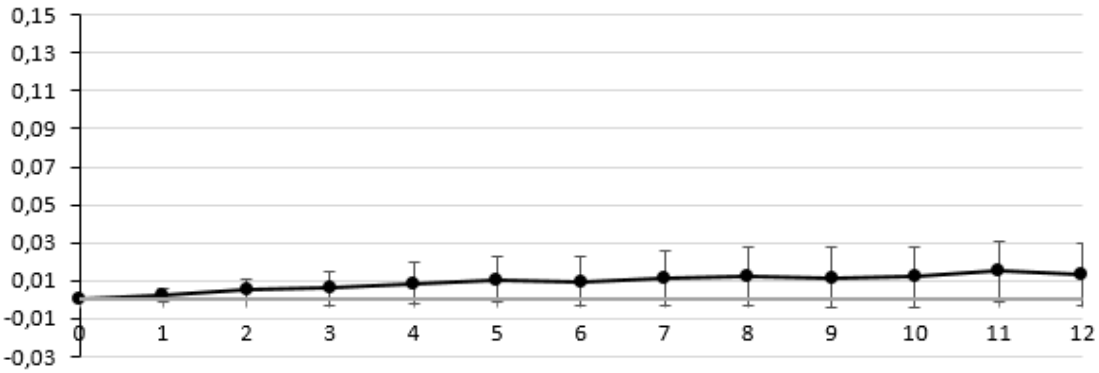
Appendix A Figures and Tables

Figure A.1: Adoption of terminations by agreement and establishments' survival in the balanced panel



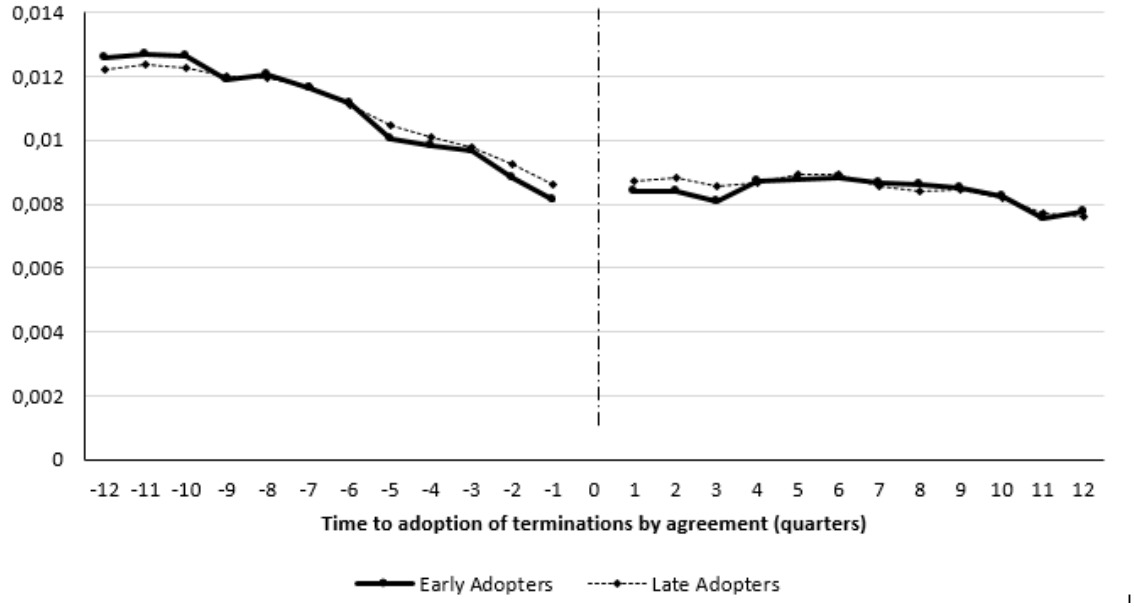
Note: For each potential date t_0 of adoption of terminations by agreement, it is possible to consider (i) establishments continuously present in the DMMO database from 2004-Q1 to t_0 and adopting terminations by agreement in t_0 and (ii) establishments continuously present in the database from 2004-Q1 to t_0, but not adopting terminations by agreement in t_0. For each of these two groups, it is then possible to compute the survival rate in the balanced panel k quarters after t_0. For $k = 1$ to 12, the solid line represents the average of the survival rates of the establishments in the first group across all possible t_0's while the dotted line represents the average of the survival rates of the establishments in the second group. Reading: 90% of the establishments that were present in the balanced panel at the time of their adoption of terminations by agreement are still in the balanced panel 4 quarters later. The survival rate is only slightly lower for institutions that were still in the balanced panel at the time the first adopted terminations by agreement, but had not yet adopted terminations by agreement at that time.

Figure A.2: Adoption of terminations by agreement and differential rate of survival the balanced panel



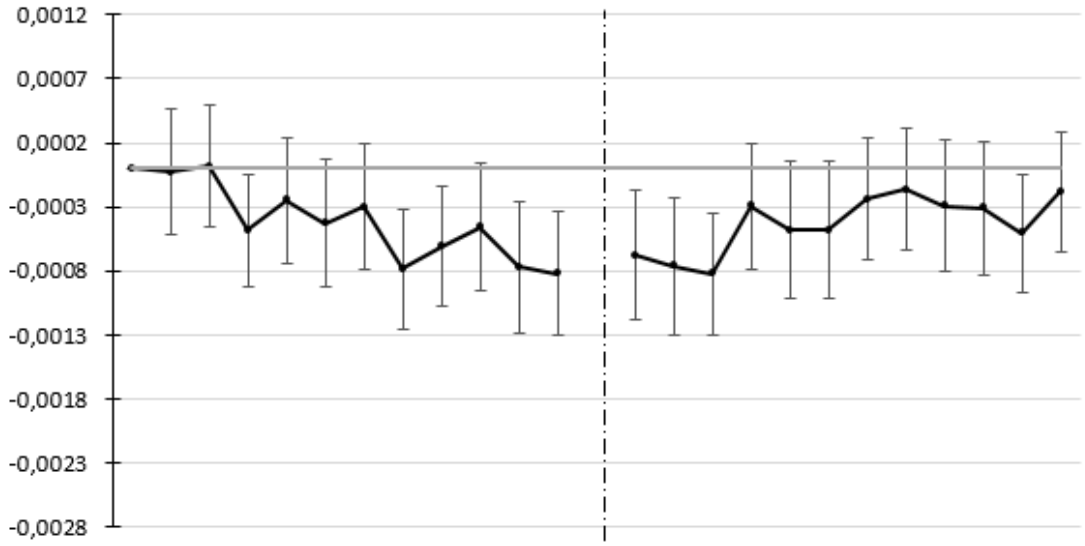
Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure A.1. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure A.1.

Figure A.3: Quit rate before and after the adoption of terminations by agreement



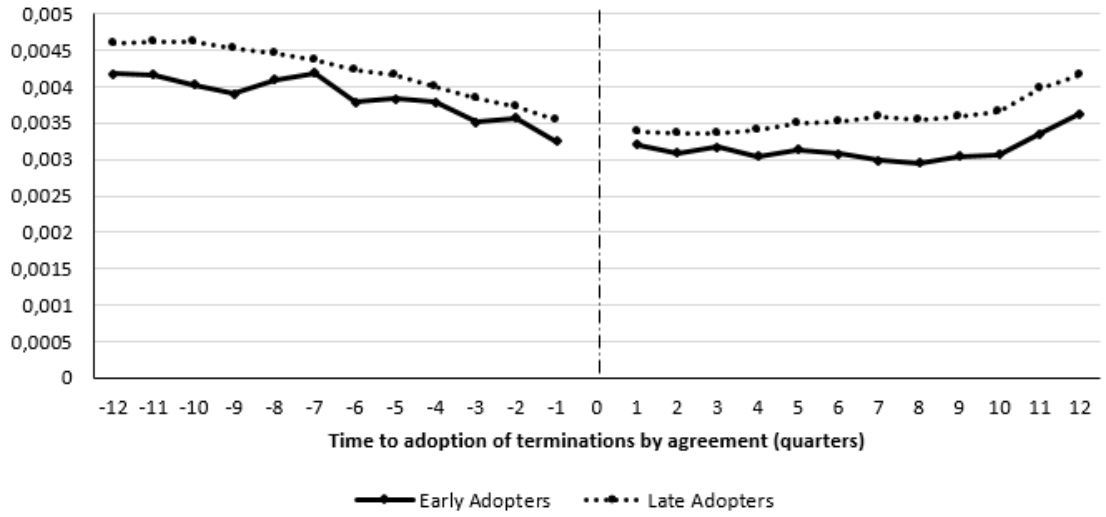
Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The solid line shows the evolution of the quit rate over a period of 6 years, taking the date of the first termination by agreement as the origin of the time scale. The dotted line shows the quit rate observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure A.4: Difference in quit rates between early adopters and late adopters



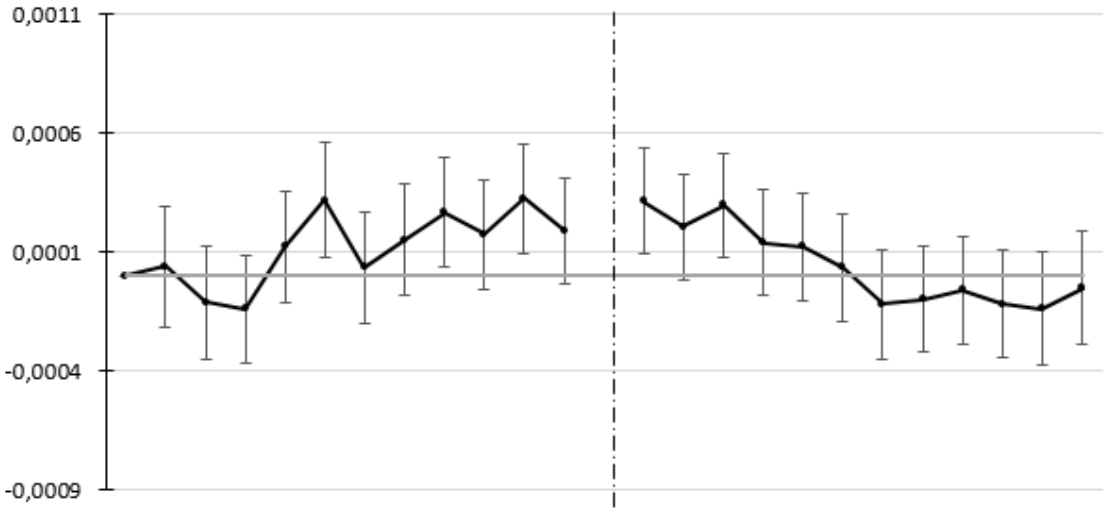
Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure A.3. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure A.3.

Figure A.5: Retirement rate before and after the adoption of terminations by agreement



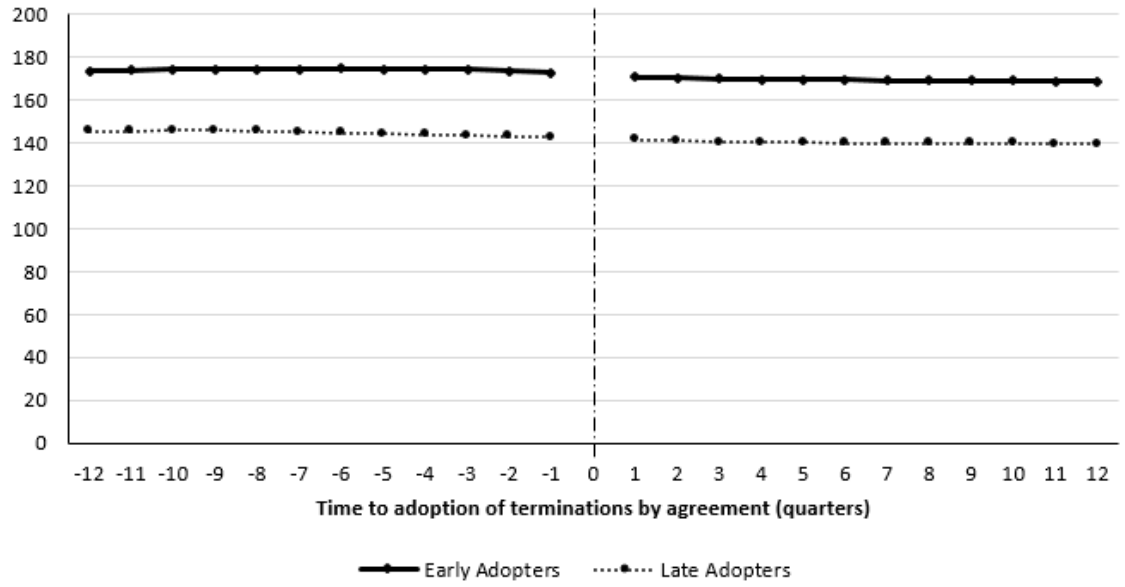
Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011.The solid line shows the evolution of the retirement rate over a period of 6 years, taking the date of first termination by agreement as the origin of the time scale. The dotted line shows the rate of retirement observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure A.6: Difference in retirement rates between early adopters and late adopters



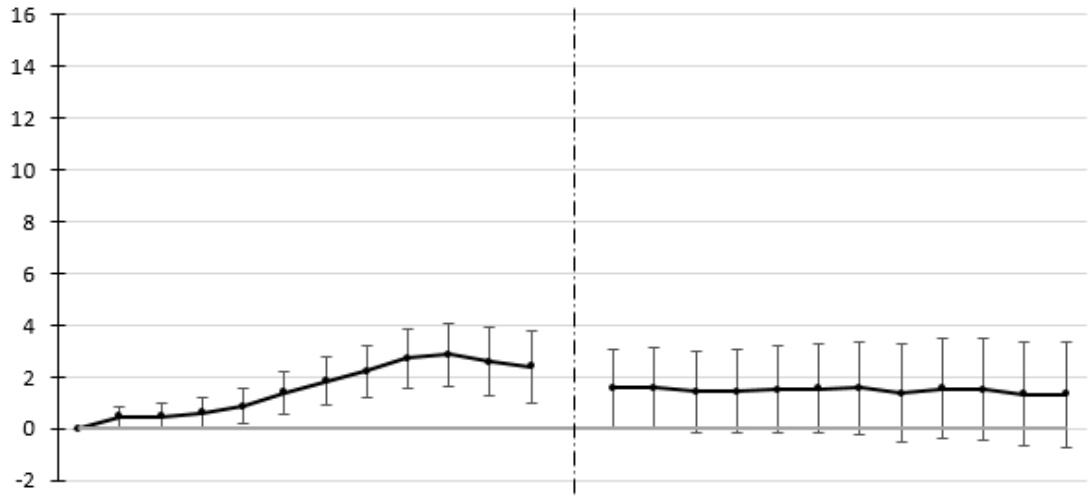
Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure A.5. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure A.5.

Figure A.7: Number of employees before and after the adoption of terminations by agreement



Note: The figure focuses on establishments which began to use terminations by agreement between 2008 and 2011. The solid line shows the evolution of their number of employees over a period of 6 years, taking the date of the first termination by agreement as the origin of the time scale. The dotted line shows the number of employees observed at the same dates in establishments that had still not began to use terminations by agreement by the end of 2014.

Figure A.8: Difference in number of employees between early adopters and late adopters



Note: The curve shows the evolution of the difference between the solid line and the dotted line shown in Figure A.7. The vertical lines represent the confidence intervals. The source and field are the same as those used in Figure A.7.

Table A.1: Description of the balanced panel

	All	Adoption before 2014	No adoption before 2014
Nb of employees 2004-Q1	163	167	143
Manufacturing and construction (%)	49	52	34
Service (%)	50	47	65
Parisian region (%)	5.2	5.3	4.9
dismissals for cause 2004-Q1 (%)	.48	.49	.45
Quits 2004-Q1 (%)	1.10	1.09	1.17
Economic dismissals 2004-Q1 (%)	.09	.10	.06
Terminations of permanent workers, 2004-Q1 (%)	1.84	1.84	1.80
N	7085	5837	1248

Note: The table shows the main characteristics (as measured in 2004-Q1) of the establishments of the balanced panel, i.e., the establishments present in the DMMO database from 2004-Q1 to 2014-Q4. The characteristics under consideration are the number of employees, the industries (manufacturing/service), the location (Paris region/other) and finally the different rates of permanent contract separation. The Table gives the average characteristics for all the establishments in the sample (first column) and then separately for those which adopted terminations by agreement before the end of 2014 (second column) and for those that had not yet used terminations by agreement by the end of 2014 (third column). Reading: the establishments in the balanced panel had an average of 163 employees at the beginning of 2004 and 49% of these establishments were in industry. During the first quarter of 2004, 1.10% of the workforce quitted the establishments.

Table A.2: The effect of adopting terminations by agreement on permanent contract terminations and number of persons employed: an analysis on the subsample where the two quarters prior to the first termination by agreement are dropped.

	Non-econ. Dismissal	Quit	Economic Dismissal	Retirement	Overall termination	Nb Employees (log)
			A- All industries			
$Post_{jt}$	-.038***	-.006	.002	-.005	.315***	-.0056
	(.008)	(.015)	(.012)	(.007)	(.025)	(.0030)
Obs.	245070	245070	245070	245070	245070	245070
m	0.41	1.00	.09	0.37	1.93	4.85
			B- Construction and manufacturing			
$Post_{jt}$	-.017	-.006	-.001	-.003	.377***	-.0029
	(.010)	(.014)	(.021)	(.010)	(0.032)	(.0031)
Obs.	129112	129112	129112	129112	129112	129112
m	.38	.68	.13	.40	1.65	4.90
			C- Service			
$Post_{jt}$	-.059***	-.019	.004	.001	.333***	-.0031
	(.012)	(.028)	(.011)	(.010)	(.040)	(.0041)
Obs.	114782	114782	114782	114782	114782	114782
m	0.46	1.36	0,05	0.33	2.23	4.80

Note: the Table replicates the regression analysis of Table 1 when we drop (for each establishment) the two observations before the adoption of terminations by agreement. *** p<0.01, ** p<0.05, * p<0.1. All coefficients are multiplied by 100 (and represent effects in ppt).

Table A.3: The effect of adopting terminations by agreement on permanent contract terminations and number of persons employed: an analysis on the unbalanced panel.

	Non-econ. Dismissal	Quit	Economic Dismissal	Retirement	Overall termination	Nb Employees (log)
			A- All industries			
$Post_{jt}$	-.020***	.009	.013	-.008*	.415***	-.0081***
	(.005)	(.010)	(.008)	(.004)	(.018)	(.0020)
Obs.	617855	617855	617855	617855	617855	617855
m	.49	1.16	.11	.35	2.17	4.92
			B- Construction and manufacturing			
$Post_{jt}$	-.017*	-.019	-.017	-.003	.436***	-.0092***
	(.007)	(.011)	(.018)	(.006)	(.026)	(.0031)
Obs.	268393	268393	268393	268393	268393	268393
m	.40	.70	.16	.39	1.76	4.95
			C- Service			
$Post_{jt}$	-.023**	-.008	.005	-.005	.409***	-.0032
	(.008)	(.016)	(.007)	(.005)	(.026)	(.0027)
Obs.	345739	345739	345739	345739	345739	345739
m	.55	1.51	.06	.31	2.50	4.89

Note: the Table replicates the regression analysis of Table 1 for the unbalanced panel of establishment which adopted terminations by agreement before the end of 2014 and for which we have DMMO observations for 80% or more of the quarters between 2004 and 2014. *** p<0.01, ** p<0.05, * p<0.1. All coefficients are multiplied by 100 (and represent effects in ppt).

Table A.4: Effect of potential exposure to terminations by agreement on workers' trajectories - placebo regressions

	Unemployment spell 2004-2007	Number of Jobs 2004-2007	Hourly Wage in 2008
Q_i	.-.00003	.00050	.00001
	(.00029)	(.00109)	(.00033)
Obs.	142791	142791	142791

Note: The table refers to the same sample as Table 3. It shows the result of regressing workers' pre-reform outcomes on their number of quarters of potential exposure to terminations by agreement (as predicted by the date on which their 2008 employed adopted the new procedure). The dependent variables are a dummy indicating that the worker went through a period of unemployment between 2004 and 2007 (column 1), the (log) number of different jobs held between 2004 and 2007 (column 2), a dummy indicating unemployment in 2012 (column 4) and the 2008 hourly wage (column 3). Controls include individual age, gender, education as well as the size, average wage and share of skilled worker of the 2008 employer. *** p<0.01, ** p<0.05, * p<0.1.

Appendix B Conceptual Framework

In this appendix, we develop a simple conceptual framework to make precise how exactly the introduction of terminations by agreements may affect firms' behavior. We first develop a model for firms' behavior before the introduction of terminations by agreements. In a second step, we look at how (and when) the introduction of terminations by agreement entails a change in these behaviors.

B.1 Technology and adjustment costs

As regards technology, we assume that the production function (denoted F) depends on labor input only. Specifically, we assume that $y_{jt} = F(x_{jt}, \pi_{jt})$ where, for each time interval $[t, t+1]$, y_{jt} represents the output of firm j, x_{jt} the number of workers and π_{jt} a productivity parameter.

Entries and exits of workers are assumed to take place at the beginning of each time interval. We denote h_{jt} the number of hiring and l_{jt} the number of workers who are dismissed for economic reasons at the beginning of $[t, t+1]$. Also, we denote q_{jt} the number of workers who quit, f_{jt} the number of workers who are dismissed for cause and r_{jt} the number of workers who retire at the beginning of $[t, t+1]$.

Hiring and dismissals justified by economic reasons are assumed to be under the control of the firm whereas the flows of quits, dismissals for cause and retirements are assumed to be taken as given by the firm[20]. We denote $s_{it} = q_{it} + f_{it} + r_{it}$ the aggregate number of exogenous exits at the beginning of $[t, t+1]$. In this framework, the objective of the firm is to choose h_{jt} and l_{jt} as a function of π_{jt} and s_{jt} so as to maximize an objective function which can be written as,

$$V_{jt} = E_t\{\sum_{k \geq t} \delta^{k-t}(F(x_{jk}, \pi_{jk}) - w_{jk}x_{jk} - c_H h_{jk} - c_L l_{jk})\} \tag{3}$$

subject to conditions (a) $x_{jk} = x_{jk-1} + h_{jk} - l_{jk} - s_{jk}$, (b) $h_{jk} \geq 0$ and (c) $l_{jk} \geq 0$,

where w_{jt} represents the wage rate and where adjustment costs are assumed linear, with c_H representing the per unit hiring cost and c_L the per unit lay off costs. The discount rate δ is assumed to be less than one (i.e., $\delta \leq 1$).

B.2 First-order conditions and state variables

After dropping subscript j, the (three) first-order conditions can be written,

$$F'(x_t, \pi_t) - w_t - \lambda_t + E_t\{\lambda_{t+1}\} = 0, c_H + \lambda_t + \gamma_{Ht} = 0 \text{ and } - c_L - \lambda_t + \gamma_{Lt} = 0 \tag{4}$$

[20] The model assumes implicitly that dismissals for cause can occur only in very specific cases (serious misconduct, individual performance-related problems, etc.) and that, in these instances, firms cannot avoid terminating employment contracts (using either dismissals for cause or terminations by agreement). The fact that dismissals for cause do not really increase during economic downturn is consistent with their being difficult to manipulate.

where λ_t, γ_{Ht} and γ_{Lt} represent the Lagrange multipliers associated to constraints (a), (b) and (c). These Lagrange multipliers satisfy $\gamma_{Ht}h_t = \gamma_{Lt}l_t = 0$ so that, taken together, the two last first-order conditions imply that

$$(c_H + c_L)h_t l_t = 0 \tag{5}$$

It entails that hiring and layoffs for economic reasons cannot be strictly positive at the same time and that there are only three possible optimal responses at the beginning of each period. The first response involves some dismissals for economic reasons ($l_t > 0$), but no hiring ($h_t = 0$). It corresponds to periods of employment downsizing through both exogenous exits and layoffs for economic reasons. The second response involves neither hiring nor dismissals for economic reasons ($l_t = h_t = 0$). It corresponds to periods of employment downsizing through exogenous exits only. The last response involves some hiring ($h_t > 0$), but no dismissals ($l_t = 0$). It corresponds to periods of expansion (when the flows of hiring exceeds the flows of exogenous exits) or to periods of downsizing through partial replacement of quitters and retirees (when the flows of hiring are not as large as the flows of exogenous exits).

Eventually, given that $h_t l_t = 0$, both h_t and l_t depends only on $(x_t - x_{t-1})$, namely $h_t = (x_t - x_{t-1} + s_t)$ and $l_t = 0$ when $x_t - x_{t-1} + s_t \geq 0$ while $h_t = 0$ and $l_t = -(x_t - x_{t-1} + s_t)$ when $x_t - x_{t-1} + s_t < 0$. Hence the only endogenous state variable is x_t and the only question at the beginning of each period is to define the value of x_t which maximize the objective function as a function of present and past productivity shocks.

B.3 Pre-reform optimal strategies

To further analyze how firms choose between the different possible strategies, we are going to focus on the case where F can be proxied by a linear-quadratic function (i.e., $F(x, \pi) = \pi x - \frac{bx^2}{2}$) and where the shocks $\epsilon_t = \pi_t - w_t$ to the marginal profit per worker follow a two-state markovian chain. We denote ϵ^+ and ϵ^- the two values that $\epsilon_t = \pi_t - w_t$ can take over time and $p(q)$ will represent the probability of moving from ϵ^+ to ϵ^- (ϵ^- to ϵ^+) from one period to the next.

Parameter $\Delta = \frac{\epsilon^+ - \epsilon^-}{b}$ represents the magnitude of the downward shift in labor demand that would be observed after a bad shock if adjustment costs were negligible (i.e., if c_H and c_L were negligible). Eventually, we assume that exogenous exits are constant over time and we denote S their aggregate level. In this set up, it is possible to show that the optimal adjustment strategy of the firm depends not only on adjustment costs (as measured by c_H and c_L), but also on the $\Delta - S$ parameter, namely the magnitude of the downward adjustment that firm would find optimal to perform if adjustment costs were negligible.

Proposition 1 (pre-reform behavior):

Denoting $\Delta = \frac{\epsilon^+ - \epsilon^-}{b}$ the magnitude of labor demand shocks, $C_{pre} = \frac{c_H + c_L}{b}$ the magnitude of adjustment costs and S the aggregate flows of exogenous exits, the pre-reform behavior of firms depends on $\Delta - S$ and C_{pre}.

- If $\Delta - S < 0$ firms' employment level follows a two-state markovian chain and firms adjust to changes in economic context through changes in hiring rates only. Hiring is below the replacement level during economic slowdown, above the replacement level during economic recovery and at the replacement level the rest of the time.

- If $0 < \Delta - S < (1 + (1 - \delta)p)C_{pre}$, firms' employment level follows a three-state markovian chain and firms adjust to labor demand shocks either through changes in hiring rates or by staying put. Specifically, they stay put during economic slowdown and hires workers the rest of the time, with hiring being either below, above or at the replacement level depending on the economic context.

- If $\Delta - S > (1 + (1 - \delta)p)C_{pre}$, firms' employment level follows a three-state markovian chain and firms adjust to labor demand shocks either through changes in hiring rates or by dismissing workers. Specifically, they dismiss workers during economic slowdown and hires workers the rest of the time, with hiring being either below, above or at the replacement level depending on the economic context.

[Proof :

- If $\Delta - S < 0$, one checks that the two state markovian chain defined by $x(\epsilon_t) = \frac{\epsilon_t - c_H(1-\delta)}{b}$ satisfies the first-order conditions. Given that the return function is concave, first-order conditions are also sufficient, so that this plan represents the optimum. The firm adapt to shocks by setting $h_t = S + \frac{\epsilon_t - \epsilon_{t-1}}{b}$, namely by setting ht either above, below or at the replacement level S (depending on $\epsilon_t - \epsilon_{t-1}$).

- If $0 < \Delta - S < (1 + (1 - \delta)p)C_{pre}$, we can use a similar reasoning to show that the solution is now given by the three state markovian chain defined by $x_t = x(\epsilon_{t-1}, \epsilon_t)$ with: $x(\epsilon^+, \epsilon^+) = x(\epsilon^-, \epsilon^+) = \frac{\epsilon^+ - (1-\delta p)c_H + \delta(1-p)\lambda^{+/-}}{b}$; $x(\epsilon^+, \epsilon^-) = \frac{\epsilon^- + \delta c_H - \lambda^{\pm}}{b} = x(\epsilon^+, \epsilon^+) - S$ and $x(\epsilon^-, \epsilon^-) = \frac{\epsilon^- - (1-\delta)c_H}{b}$, where $\lambda^{+/-} = \frac{b(S-\Delta) + (1 + \delta(1-p)c_H)}{1+\delta(1-p)}$ is the Lagrange multiplier when $\epsilon_t = \epsilon^-$ and $\epsilon_{t-1} = \epsilon^+$. It is easy to check that $-c_L < \lambda^{\pm} < c_H$ which is the condition for both hiring and lay off to be zero when $\epsilon_t = \epsilon^-$ and $\epsilon_{t-1} = \epsilon^+$.

- Eventually, if $\Delta - S > (1 + (1 - \delta)p)C_{pre}$, the solution is given that the three-state markovian chain defined by $x_t = x(\epsilon_{t-1}, \epsilon_t)$ with : $x(\epsilon^+, \epsilon^+) = x(\epsilon^-, \epsilon^+) = \frac{\epsilon^+ - (1-\delta p)c_H - (1-p)\delta c_L}{b}$; $x(\epsilon^+, \epsilon^-) = \frac{\epsilon^- + \delta c_H + c_L}{b}$ and $x(\epsilon^-, \epsilon^-) = \frac{\epsilon^- - (1-\delta)c_H}{b}$.]

B.4 After the reform

After the reform, employers may first find of interest to sign terminations by agreement with workers that would otherwise be dismissed for cause. Among the f_t workers who are about to be dismissed for cause during $[t, t+1]$, we denote f_{rt} (with $f_{rt} \leq f_t$) the number of those with whom it is possible to sign a termination by agreement at a cost which is not as large as the expected cost of dismissing these workers for cause. For the sake of simplicity, we assume that f_{rt} is taken as given by the firm.

Some other workers are not about to be dismissed for cause, nor about to quit their firms, but are nonetheless ready to sign a termination by agreement. As discussed above, these workers are typically those who would like to leave their employer, but have no clear outside option yet. For them, signing a termination by agreement represents a better option than quitting, because it does not involve loosing eligibility to severance payments and unemployment benefits. Denoting c_R the cost for the employer of signing a termination by agreement with these workers and assuming that c_R is weaker than the cost of dismissing these workers for economic reason (denoted c_L), employers may find of interest to sign terminations by agreement with these workers . In the remainder, we denote rc_{mt} the number of such workers, which also represent the maximum number of terminations by agreement that the employer can sign with employees who are neither about to be dismissed for cause nor about to quit. We assume that rc_{mt} is taken as given by the firm, exactly as quits. For each time interval and each firm, we will keep on denoting h_t the number of hiring, l_t the number of layoffs and we will denote rc_{jt} the number of termination by agreement that are actually signed (with $rc_t \leq rc_{mt}$). With these notations, the post-reform objective of the firm becomes to choose h_{jt}, l_{jt} and rc_{jt} as a function of π_t and s_t so as to maximize an objective function which can be written as,

$$V_{jt} = E_t\{\sum_{k \geq t} \delta^{k-t}(F(x_k, \pi_k) - w_k x_k - c_H h_k - c_L l_k - c_R rc_k)\}, \tag{6}$$

subject to : $h_k \geq 0, l_k \geq 0, rc_{mk} \geq rc_k \geq 0$ and $x_k = x_{k-1} + h_k - l_k - rc_k - s_k$,

where δ, w_t, c_H and c_L represent the same economic variables and parameters as in the previous subsection and where c_R captures per unit cost of termination by agreements. We keep on assuming that exogenous outflows are constant over time (still denoted S) and, for the sake of simplicity, we further assume that rc_{mt} is constant over time (denoted R). Also, we still denote $\Delta = \frac{\epsilon^+ - \epsilon^-}{b}$ the magnitude of the downward shift in labor demand that would be observed after a bad shock if adjustment costs were negligible (i.e., if c_H, c_L and c_R were negligible), so that $\Delta - S$ still represents the magnitude of the downward adjustment that firms would find optimal to perform if adjustment costs were negligible. In this set-up, the optimal

strategy of the firm still depends on $\Delta - S$, but also on R.

Proposition 2 (firms' behavior after the reform)

Denoting $C_{post} = \frac{c_H + c_R}{b}$ a measure of post-reform adjustment costs and R the number of workers who are not about to quit or to be dismissed, but who are nonetheless ready to sign a termination by agreement, the behavior of firms after the reform is the same as before the reform only when R is negligible or when $\Delta - S$ is not too large. Specifically, we have,

- If $\Delta - S < 0$, the adjustment regime is the same after the reform as before the reform. Firms keep on adjusting labor input by setting the number of hiring either above, below or at the replacement level.

- If $0 < \Delta - S < (1 + \delta(1-p))C_{post}$, the adjustment regime is again the same after the reform as before the reform. The firms stay put during economic downturn and adjust the number of hiring the rest of the time.

- If $(1+\delta(1-p))C_{post} < \Delta - S < (1+\delta(1-p))C_{post} + R$, the optimal adjustment regime is not the same after and before the reform. For these values of $\Delta - S$, firms start using terminations by agreement during economic downturn whereas they would have stayed put pre-reform. For these values of $\Delta - S$, the reform induces a rise in separation rates, but no substitution of terminations by agreement for dismissals justified by economic reasons.

- If $R+(1+\delta(1-p))C_{post} < \Delta - S < (1+\delta(1-p))C_{pre} + R$, the optimal adjustment regime is not the same after and before the reform. For these values $\Delta - S$, firms use the maximum number of terminations (i.e., R) by agreement during economic downturn whereas they would have stayed put pre-reform. For these values of $\Delta - S$, the reform induces again a rise in separation rates, but no substitution of terminations by agreement for dismissals justified by economic reasons.

- For even larger value of $\Delta - S$, firms use terminations by agreement in contexts where, pre-reform, they would have used dismissals for economic reason only. For these larger values $\Delta - S$, the reform induced a rise in overall separation rates as well as substitution of terminations by agreement for dismissals justified by economic reasons.

[Proof: The proof follows the same line as the proof of proposition 1.

- When $\Delta - S < 0$ or when $0 < \Delta - S < (1 + \delta(1-p))C_{post}$, it is not difficult to check that the two-state and three-state markovian chains described at the beginning of the proof of Proposition 1 still remain optimal plans.

- By contrast, when $(1+\delta(1-p))C_{post} < \Delta - S < (1+\delta(1-p))C_{post} + R$, the optimal solution is given that the three-state markovian chain defined by $x_t = x(\epsilon_{t-1}, \epsilon_t)$ with : $x(\epsilon^+, \epsilon^+) = x(\epsilon^-, \epsilon^+) = \frac{\epsilon^+ - (1-\delta p)c_H - (1-p)\delta c_R}{b}$; $x(\epsilon^+, \epsilon^-) = \frac{\epsilon^- + \delta c_H + c_R}{b}$ and $x(\epsilon^-, \epsilon^-) = \frac{\epsilon^- - (1-\delta)c_H}{b}$.

- When $(1+\delta(1-p))C_{post} + R < \Delta - S < (1+\delta(1-p))C_{pre} + R$, the optimal solution is given by the three-state markovian chain defined by $x_t = x(\epsilon_{t-1}, \epsilon_t)$ with : $x(\epsilon^+, \epsilon^+) = x(\epsilon^-, \epsilon^+) = \frac{\epsilon^+ - (1-\delta p)c_H + \delta(1-p)\lambda^{+/-}}{b}$; $x(\epsilon^+, \epsilon^-) = \frac{\epsilon^- + \delta c_H - \lambda^{+/-}}{b} = x(\epsilon^+, \epsilon^+) - S - R$ and $x(\epsilon^-, \epsilon^-) = \frac{\epsilon^- - (1-\delta)c_H}{b}$, where $\lambda^{+/-} = \frac{b(S+R-\Delta) + (1+\delta(1-p)c_H)}{1+\delta(1-p)}$ is the Lagrange multiplier when $\epsilon_t = \epsilon^-$ and $\epsilon_{t-1} = \epsilon^+$.

- Eventually, when $(1+\delta(1-p))C_{pre} + R < \Delta - S$, the optimal solution is given that the three-state markovian chain defined by $x_t = x(\epsilon_{t-1}, \epsilon_t)$ with : $x(\epsilon^+, \epsilon^+) = x(\epsilon^-, \epsilon^+) = \frac{\epsilon^+ - (1-\delta p)c_H - (1-p)\delta c_L}{b}$; $x(\epsilon^+, \epsilon^-) = \frac{\epsilon^- + \delta c_H + c_L}{b}$ and $x(\epsilon^-, \epsilon^-) = \frac{\epsilon^- - (1-\delta)c_H}{b}$.]

In our set up, the difference $\Delta - S$ represents the magnitude of the downward adjustment that firms would like to perform when they are hit by adverse shocks. In practice, firms will perform these adjustments only if adjustment costs are not too large. Assuming that $c_R < c_L$ and that the number R of would-be movers is positive, it may become possible for firms to perform some downward adjustments after the reform (through terminations by agreements) in cases where no adjustments would have been seen pre-reform (because of layoff costs). In this scenario, the introduction of terminations by agreement coincides not only with a decline in dismissals for cause, but also with a rise in the overall number of separations. It is an empirical question, however, whether firms meet these conditions.

Appendix C A "stacked" difference-in-difference approach

In an event analysis with a staggered design (where all units are progressively treated, cohort by cohort), the two way fixed effect estimator of parameter γ in our main model may be difficult to interpret (see Abraham and Sun (2020), Goodman-Bacon (2018), De Chaisemartin and D'Haultfoeuille (2019)). Specifically, when treatment effects are heterogeneous across cohorts; this estimator recovers a linear combination of cohort specific average treatment effects where some weights can be negative, mostly because early and late cohorts are not observed on intervals of time of same length.

To test the robustness of our results to heterogeneous effects, we developed an event-by-event analysis in the spirit of Cengiz et al. (2019)). The first step of the procedure consists in estimating the impact of the treatment separately for each cohort, using cohort-specific sample covering time intervals of same length (so that effects for early and late cohorts are estimated on time intervals of same length). The second step consists in taking the average across these cohort-specific effects.

To be more specific, for each one of the twelve quarters e between e =2009-Q1 and e =2011-Q4, we first consider A_e the subset of establishments which introduced termination by agreements either in e or after $e+12$ (i.e., three or more years later). Secondly, for each establishment j in A_e, we consider S_{je} the sample of observations of establishment j made between $t = e - 12$ and $t = e + 12$, namely between three years before and three years after t_e. Eventually, for each t_e between 2009-Q1 and 2011-Q4, we define S_e, the union of the different S_{je} for j in A_e. For each e, sample S_e makes it possible to compare over the period $[e - 12, e + 12]$ the establishments that are treated in e with the establishments that will be treated three or more years later. Specifically, we re-estimated our main model (1) on each one of the twelve cohort-specific samples S_e so as to obtain twelve estimated parameters γ_e. Table C.5 shows the weighted average of these estimated γ_e for the different outcomes of interest, where weights are proportional to the size of the different S_e. Generally speaking, we obtain average effects that are very similar to those shown in Table 1.

Table C.5: The effect of adopting terminations by agreement on permanent contract terminations and number of employees: Event-by-event analysis.

	Non-econ. Dismissal	Quit	Economic Dismissal	Retirement	Overall termination
			A- All industries		
$Post_{jt}$	-.031***	.010	.004	-0.019*	0.272***
	(.008)	(.015)	(.011)	(.008)	(.024)
Obs.	1262349	1262349	1262349	1262349	1262349
m	.49	1.16	.11	.35	2.17

Note: The table shows the result the event-by-event analysis described above where the dependent variable is the quarterly rate of (a) dismissals for cause (column 1), (b) quits (column 2), (c) dismissals for economic reasons (column 3), (d) retirements (column 4) as well as the overall rate of termination of permanent workers (column 5). *** p<0.01, ** p<0.05, * p<0.1. All coefficients are multiplied by 100 (and represent effects in ppt).

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