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ABSTRACT

The Third Worker: Assessing the Trade-off between Employees and Contractors*

Firms make labour demand decisions not only between permanent and non-permanent employees but also increasingly more between employees and contractors. Indeed, this third work format can be attractive, also when employment protection law is restrictive. This paper examines empirically this scarcely researched trade-off drawing on a recent reform in Portugal that cut the severance pay of new employee hires while leaving unchanged the regulations affecting contractors. Our analysis draws on difference-in-differences methods and original high-frequency firm-level panel data on both employees and contractors. We find that the reduction in severance pay had a large relative positive effect on the wage bills and worker counts of employees compared to contractors. This result, robust to a number of checks, highlights the role of labour regulations as an additional driver of more flexible labour formats.

JEL Classification: J23, J41, J63

Keywords: employment law, segmentation, duality, future of work

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1 Introduction

Most firms make a large number of labour demand decisions on a regular basis. These decisions have received considerable attention in academic and policy circles, particularly choices focused on the quantity of labour demanded and the different employment contracts available, namely permanent or fixed term (Booth et al. 2002, Blanchard & Landier 2002, Bentolila et al. 2012, Addison et al. 2014, Charlot et al. 2016). This paper examines a complementary, increasingly important but far less researched labour demand decision: obtaining labour through employees or contractors (or, equivalently, through employment or service contracts) (Abraham & Taylor 1996, Houseman 2001, Garen 2006, Dube & Kaplan 2010).

Indeed, dependent and independent contractors have seen their numbers increase over the last decade, in the context of the growth of international trade, outsourcing, and new technology, all factors with relevant effects in the organisation of firms. For instance, the percentage of workers in the U.S. engaged in alternative work arrangements including contractors rose from 10.1% in 2005 to 15.8 % in 2015 (Katz & Krueger 2016). In particular, the internet has thickened markets in a large number of services, lowering asymmetric information, facilitating the matching between buyers and sellers and promoting more flexible labour arrangements. These developments have led to the emergence of the sometimes called 'gig' or the 'on demand' economy, which raises a number of new questions (Trottman 2015) and proposals (Harris & Krueger 2015) regarding worker's classification, tax collection, social security access, and product market competition.

In this paper, our focus is on a different potential driver of firm-level choices between employees and contractors other than those mentioned above: labour regulations (Lazear 1990, Besley & Burgess 2004, Boeri & Jimeno 2005, Martins 2009). These regulations cover a large number of aspects of labour relationships and vary considerably across countries and time (OECD 2014), leading to an ongoing debate about their effects. However, labour regulations critically apply only to employees, not contractors, despite the fact that the actual differences between the two types of labour relationships can be very slim in many cases. While previous research, cited above, focused on the case of the U.S. labour market - subject to little regulation, by international standards - highlighted the role of wages and benefits as a motivation for service contracts, it did not explicitly consider the role of employment protection.

More specifically, in this paper we are the first to examine the potential trade-off between

employees and contractors in a causal context, in our case drawing on exogenous variation in employment protection legislation. In particular, we study the effects on employees (in contrast to the case of contractors) of a recent labour law reform in Portugal that reduced significantly the severance pay of (permanent and fixed-term) employees (Hopenhayn & Rogerson 1993, Ljungqvist 2002, Holzmann et al. 2011, Fella 2012, Boeri et al. 2016). At the margin, as severance pay is lower (and wage rigidities are pervasive), obtaining work through employment contracts may be relatively more profitable for firms than through service contracts if the two labour formats are indeed substitutable. Our analysis is based on a difference-in-difference approach, taking contractors as the counterfactual (control group) to employees (treatment group). The analysis is made possible by on new high-frequency firm-level labour data that includes information on both employees and contractors (both their counts and their wage bills), unlike in other data sets (Abraham et al. 2013).

The paper also contributes to the question on whether labour market regulations should be adjusted in a more systematic way along the business cycle (Martins 2016*c*). To the extent that one may conclude that severance pay reductions can serve as an important positive driver of employment levels, in particular in terms of employment contracts, during downturns, one may want to consider greater flexibility in severance levels over the business cycle. In this case, such flexibility could act as a counter-cyclical force to dampen employment fluctuations, in particular when traditional (or even non-traditional) macroeconomic policies are less effective.

In our results, we find significant evidence of a trade-off between the two types of labour, with large implicit elasticities of labour demand, of at least -1. This finding is robust to a number of robustness checks, including a decomposition of the after and before periods - where we find a great overlap between the month when the new law came into force and the start of cumulative positive effects towards employment contracts -, different subsamples and a triple differences approach, considering the same relative periods three years before.

The structure of the remaining of the paper is as follows: the next Section presents the severance pay reform and provides some context on the labour market. Section 3 presents the social security data set used and a number of stylised facts about employees and contractors and descriptive statistics. The main results, both in terms of the wage bill and employment counts, are presented in Section 4, while Section 5 presents a number of robustness checks. Finally, Section 6 concludes.

2 The severance pay reform and its context

2.1 Labour institutions

As in several other countries, employment contracts in Portugal are subject to considerable legal protection against dismissal, in terms of severance pay, advance notice, grounds for dismissal (required motives), and dismissal procedures (in particular in dismissals for subjective or performance reasons). Moreover, legal uncertainty following a dismissal is also significant, including possible reinstatements (in case the dismissal is successfully challenged in court) or expensive settlements for firms, as indicated in the Portuguese labour code. In the latter dimension, fixed-term contracts may be seen as less expensive, as the maximum cost of a dismissal is bounded by the salaries payable in the remaining duration of the contract. However, exceptions may apply if the contract is deemed permanent by an employment tribunal, for instance because the employer did not invoke valid reasons for a fixed-term appointment. Such differences in costs - together with the relatively large size of seasonal or volatile sectors (such as tourism, construction or agriculture) and the low economic growth rates and resulting economic uncertainty - may explain the very large percentage of employees currently employed under FTCs in Portugal (22%), the third largest in the European Union (see Damas de Matos & Parent (2016) and the references therein for previous studies about FTC in Portugal).

In a similar vein, the general restrictions that apply to employment contracts may also serve as a driver of the growth of the number of contractors. Given that the latter are regarded as service providers, and not employees, they are not subject to employment law (or collective bargaining) and their contracts can be terminated at will, with no severance or advance notice, in stark contrast to the case of employees. This far greater flexibility may represent a potentially profitable form of labour demand.

This motivation - reducing labour regulation costs - would complement the U.S. findings of Abraham & Taylor (1996) regarding firm's preferences towards contractors (in particular business support services) as driven by labour cost savings, output demand volatility, and skills availability (the former will also be applicable in the case of Portugal, as firms there generally do not pay social security on contractors while they are subject to a 23.75% rate on total salaries in the case of employees). The labour regulation dimension would also complement the results of Houseman (2001), which highlights the importance of workload fluctuations and staff absences (although in a more general context of flexible staffing arrangements and not

exclusively contractors). Moreover, Garen (2006) proposes the cost of measuring output and monitoring effort as an additional determinant of the choice of labour contract.

Given the increasing, even not necessarily representative, evidence of contractors delivering work very similar to that of employees, regulations have been introduced in Portugal to distinguish more clearly the two work formats. In particular, the labour code (article 12) establishes four criteria to this effect: the work being conducted in an establishment owned by the firm that is paying for the service, the equipment used by the contractor being owned by the firm, the contractor following a timetable indicated by the firm, and the firm paying the contractor a fixed salary on a standard schedule. If two or more criteria above are considered as met in a given case by an employment tribunal, then the service provision contract may be converted into a (permanent) employment contract.

On the other hand, Social Security has also established penalties to firms that employ dependent contractors (5% of the payments made if over 80% of all the contractor's earnings come from the firm). Contractors (or their relatives) are also entitled to benefits in case of paternity, old age, sickness, disability or death, in exchange of a social security rate of approximately 20% applicable on their earnings from the second year as a contractor.

2.2 The severance pay reform

Following important macroeconomic imbalances and a gradual loss of competitiveness during the 2000s, Portugal agreed in 2011 with the European Union and the International Monetary Fund to implement an economic and financial adjustment programme (IMF 2011). Amongst several measures to promote fiscal consolidation and financial stability, the programme also established a number of structural reforms, including in the labour market. One such labour reform - examined in this paper - concerned a greater alignment of severance pay by European standards, from the then very high levels applicable, as set by the Labour Code in Portugal.[1]

In this context, the law reform established that severance pay of new hires would be lowered from 36, 30 or 24 days per year (depending on whether the employment contract is fixed term or permanent and its total duration if fixed term) to a new, common level of 20 days per year (independent of the type of employment contract). Moreover, new contracts would become subject to a maximum severance of 12 months while permanent contracts of

[1]The Labour Code also establishes that severance pay can be increased but not decreased through collective or individual bargaining. See Hijzen & Martins (2016), Martins (2016*a*) and Martins (2016*c*) for evaluations of other labour market reforms implemented in Portugal between 2011 and 2013.

new hires would no longer be subject to a minimum severance of three months applicable until then. In contrast, severance pay of employees hired before the new law would remain unchanged at the higher levels.[2]

It is important to underline that Portugal, as other eurozone countries, was subject at the time to high levels of binding wage floors, which can make adjustments in severance pay important for employment. For instance, in October 2011, approximately 12% of all private-sector employees were paid the national minimum wage and a further 16.5% were paid the job-specific minimum wages established by collective agreements and government extensions, according to our calculations based on the 'Quadros de Pessoal' matched employer-employee census data set. Martins (2016*c*) and the references therein also highlight the very high level of (base) wage rigidity in Portugal, which reached unprecedented levels during the 2011-13 recession. In this context, severance pay may have negative employment effects, given the inability of firms to engage in bonding. Morever, the high and increasing unemployment rates at that time made it very unlikely that pay of new hires would symmetrically increase in proportion to the reduction in severance. Indeed, in a companion paper we examine this specific question using a regression-discontinuity approach and individual employee data and find no evidence of salary increases once the lower severance pay is in force (Martins 2016*b*).

The severance pay reform was delivered through Law 53/2011, which was submitted by the government to parliament in July 2011 and published in October. This law, which came into force in November 1st, 2011, established as agreed in the memorandum of understanding described above that the severance applicable to all new hires from November would be of 20 days per year of tenure for all employment contracts (permanent or fixed-term), subject to a maximum severance of 12 months (a criterion thus only binding after 18 years of employment) and no minimum severance.[3]

The effectiveness or take up of the reform is likely to have been very high. In fact, the

[2]Point 4.4 of the memorandum of understanding indicated that 'The Government will submit by end-July 2011 legislation to Parliament to implement a reform in the severance payments for new hires [...]. Severance payments of open-ended contracts will be aligned with those of fixed-term contracts. The reform will re-design the system for severance payment entitlements as follows: total severance payments for new open-ended contracts will be reduced from 30 to 20 days per year of tenure with a cap of 12 months and elimination of the 3 months of pay irrespective of tenure; total severance payments for fixed-term contracts will be reduced from 36 to 20 days per year of tenure for contracts shorter than 6 months and from 24 to 20 days for longer contracts [...]'.

[3]Point 4.4 of the memorandum also established an 'employers financed fund' which was not implemented at that time. Additional changes in severance pay were then introduced in 2012 and 2013, namely to 18 and 12 days per year of tenure, depending on when the contract was made. These subsequent changes are outside the scope of this paper.

reform received widespread attention in the media, given that it was one of the first laws of the new government that had come into office in June and of the adjustment programme. Revisions to labour law typically attract considerable public attention, given their potential effects amongst a large share of the population and the relatively polarised views in the public media. Moreover, the new law, while still in its draft version, was discussed with union and employer confederations, both by the government and the parliament. These confederations, in particular on the employer side, disseminated the provisions of the law widely across employers, especially those affiliated in their associations. Indeed, the reform represented a significant reduction of total (employee) labour costs, of approximately 2.4% (10 days out of 14 months of salary per year, excluding other items such as social security, insurance, paid holidays and training costs). In some cases, this percentage could be even higher, given the more significant cut in severance for longer fixed-term contracts (16 days, corresponding to 3.8%) and the elimination of the minimum severance of three months for permanent contracts (70 days - from 90 to 20 -, corresponding to a 16.6% reduction in labour costs).

To the extent that employees and contractors are substitutable by firms, we expect that the reduction in severance costs delivered by the law reform will lead to a relative increase in the employment and wage bills of the former compared to the latter. Considerable anecdotal evidence indeed points to such substitutability, given the many instances of individuals purportedly performing jobs that are also carried out by employees, sometimes even in the same firm or in the same establishment. The next sections present our empirical analysis of this question.

3 Data and descriptive statistics

The data set used in this paper reports monthly social security information covering the entire population of firms in Portugal between January 2007 and June 2012. These data, made available by the Social Security Agency of the Ministry of Labour, are of high quality as they are used in the processing of social security payments, typically 34.75% of the salary of each employee (see Martins (2014) for more information on the data set). Critically for our purposes, the records available indicate the numbers of formal employees and service providers under contract by each firm in each month, as well as their wage bills (both of workers and

contractors). The data set also includes additional variables such as the number of new hires and leavers (only in the case of employees, not service providers). An additional variable is the industry affiliation of the firm, according to an ISIC rev. 4 five-digit code. It is also important to note that the wage bill information in the data set will also include severance payments (at the last month of the employment spell) and may be therefore lead to a small downward bias (in absolute terms) in our results.

Before focusing on the sample we use in our results below, we present some statistics from the original data set, focusing on the year of 2011. In fact, we know of very little statistics on population or other representative data regarding the employees/contractors duality. In total, we observe 426,711 firms in 2011, reporting a monthly average of 7.8 employees and 0.74 contractors each. Although potentially double-counting individuals, in particular contractors, these statistics suggest that approximately 9% of workers are contractors, a figure consistent with the U.S. statistics (Katz & Krueger 2016). We also find that over half of all firms (236,202) report at least one contractor in at least one month during that year.

Turning to wage information, the average individual pay of employees is 713 euros while the equivalent figure for contractors is 1,003 euros. These last figures suggest a significant contractor wage premium, in contrast to the analysis of Dube & Kaplan (2010) although the latter refers only to the specific cases of janitors and guards. Our contractor gross wage premium could be reconciled with compensating differentials, as contractors face greater uncertainty in terms of job stability and are not entitled to employment law mandated benefits (paid holidays, paid training, etc), or other explanations, including hours of work or employer taxes (much lower in the case of contractors).

Interestingly, we also find a relatively strong correlation (61.4%) between the inter-industry (gross) wage differentials of employees and contractors. Across firms (and months) which employ at least one employee, the average share of the wage bill of contractors in the total wage bill of the firm is 16.3%. We also find evidence of greater within-firm dispersion in employees count compared to contractors count. The coefficients of variation of the number of employees are always greater than those regarding the number of contractors, sometimes by a factor of two, even when excluding firms that do not report contractors in any month (both results not reported but available upon request). This finding may underline the point made earlier about significant similarities between the jobs performed by employees and contractors.

Our main analysis focus on the period 2011:m1 to 2012:m6, i.e. ten months before the new law was in force and eight months when the new law was in force. The second part of this more focused period also excludes the months since the introduction of a second new law (in August 2012) that reducing severance levels further. In our main analysis, we also consider only firms that report contractors in at least nine months (of the 18 months covered in our sample) and that hire employees also in at least nine months. The first restriction is intended to ensure that contractors may be a potential significant margin of labour choices. In fact, if a firm never or almost never employs a contractor, it is unlikely that a trade-off can be discerned, other than through an extensive margin unlikely to be observed over the short 'after' period observed. The second restriction (on worker turnover) is imposed to ensure that our analysis can focus on firms which may be affected by the lower severance levels. As indicated above, the reform was only applicable to new hires implying that firms with a very stable workforce will not be affected by the reform, again leaving aside extensive margin considerations.

Table 1 presents descriptive statistics on the sample used in the paper. This sample corresponds to a total of 145,892 firm-month-work type observations (and 4,081 different firms). This follows our reshaping of the data set into two observations per firm per month, one corresponding to employees, the other contractors, in a given firm and month. We find an average number of workers (across employees and contractors) of 71,5 and an average wagebill (again across employees and contractors) of 91.235 euros. As we indicate below, as data on hours of work is not available for employees and cannot be measured in most cases for contractors, our results focus on the wage bill of each type of labour. Given our data construction method, half of the observations correspond to employee data and 44% of the observations to November 2011 and subsequent months.

The average number of employees per firm is 141 and the average monthly salary of each employee is 887 euros. Average (monthly) worker flows ratio (hirings plus separations, divided by total employees) is 11%. We also report the logs of the key outcomes (workers and wage bill), including following an adjustment to address missing observations (namely zeros in the stock of contractors). The adjustment here was based on adding one to both the original numbers of workers (both types) and wage bills (also both types), zeros or positive numbers. Finally, Table 1 presents the percentages of firms in the five most important one-letter sectors:

manufacturing (20%), construction (18%), wholesale and retail (16%), hotels and restaurants (11%), and administrative services (9%).

4 Results

Our analysis is based on a difference-in-differences approach, taking employees as our treatment group (and their wage bill and worker counts as dependent variables) and November 2011 to June 2012 as the 'after' period. Moreover, we draw on the firm-level panel structure of our data set to contrast the two series, before and after the new law is introduced, within each given firm.

In particular, we consider the following main difference-in-differences equation:

$$Y_{it} = \beta_1 Employees_i + \beta_2 PostOct2011_t + \beta_3 Employees_i * PostOct2011_t + \alpha_i + \epsilon_{it} \quad (1)$$

The dependent variable considered, Y_i, is the log of the wage bill or number of workers in firm i and month t (either employees or contractors). $Employees_i$ is a dummy variable equal to one is the dependent variable refers to employees (zero, if it refers to contractors) and $PostOct2011_t$ is a dummy variable equal to one if the month t is from November 2011 onwards (when the lower severance pay was in force). Finally, the key regressor is $Employees_i * PostOct2011_t$, the interaction of the previous two dummies, highlighting the observations corresponding to employees in months when the new severance law was in force. The equation also controls for firm fixed effects (α_i). The coefficient of interest, β_3, will indicate any systematic percentage differences in the outcome of interest (wage bills or numbers of workers) in the period post-October 2011 relatively to the period pre-October 2011, when comparing employees and contractors in the same firms.

Table 2 presents our main results, on the wage bill effects, including or not firm fixed effects and using non-adjusted or adjusted variables.[4] First, we find, as expected from the descriptive statistics, that the wage bills are much higher (approximately fourteen times) when considering employees compared to contractors. Second, we find somewhat mixed evidence across the four columns when comparing the November 2011-June 2012 period with the period immediately before. However, our preferred estimates, based on adjusted wage bill, indicate a

[4]Given the lack of hours of work information, we consider the wage bill to be a more comparable metric of labour quantities.

decline in the after period, which is consistent with the recession and increasing unemployment that the country was facing at that time.

Finally, we find across the four specifications that the coefficient of the interaction effect is always significantly positive. This result indicates that the employees' wage bill in a given firm increases on average compared to the contractors' wage bill in the same given firm once the new severance law is in force. The magnitude of the effect varies significantly (by a factor of three) depending on the sample used (although not with the inclusion of firm fixed effects) - .039 vs .143, respectively. We interpret this as a consequence of the consideration of the zeros in the data (instances in which the wage bill drops to zero in this case). In particular, dropping these observations, as it is the case under the non-adjusted results, removes an extensive margin that proves to be an important source of variability in the data and in a difference-in-differences specification.

Table 3 presents the equivalent results but now on the number of workers. As before, we find significantly larger numbers of workers as employees (compared to contractors) - and larger equivalent coefficients compared to Table 2, consistent with the positive wage differentials in favour of contractors. Similarly to that table, we find significant negative coefficients on the after dummy, although in this case of a smaller magnitude. Finally, we again find evidence of significantly positive relative effects on employees (compared to contractors) once the reform is in force. In this case, the coefficients are more similar across the adjusted and non-adjusted variables, at .028 and .016, respectively.

It is difficult to quantify the implied elasticities from our results. In fact, different firms will have different patterns of employment spell durations and employment contract types (permanent or fixed term), which will lead to different reductions in their relevant labour costs from the severance law reform. As indicated in Section 2, the reductions in labour costs could be as high as 16.6% in the extreme case of firms that appoint workers as permanent and then dismiss them by end of their first year. In the more common cases, these reductions will range between 2.4% and 3.8%. These figures are of the same order of magnitude as the coefficients of the interaction dummies across different specifications, suggesting a labour demand elasticity of around -1. However, when considering the (adjusted) wage bill specifications, this elasticity will increase to around -3. This high figure that may reflect the downturn in the economy when the reform is introduced (GDP contracted by 1.3% in 2011 and 4% in 2012) and the

resulting greater sensitivity of labour demand to labour costs, coupled with the very high flexibility in the (downward) adjustment of contractors' wages and employment. Overall, these results are also consistent with Martins (2014), which finds evidence of a similar trade-off between employees and contractors but in the very different context of the extension of collective agreements.

5 Robustness checks

In this section, we present the findings from a number of robustness checks. First, we decompose the time effects discussed above in the specific months of both the before and after periods. Instead of an 'after' dummy variable and its interaction with the treatment dummy variable (employees), we include in our specification one dummy variable for each month and one interaction for each month and the treatment dummy. This allows us to trace the monthly effect of the new law and also check for potential cumulative effects. In fact, the gap between employees and contractors following the lowering of severance pay of new hires uncovered in Section 4 is likely to increase gradually amongst the medium- and high-worker turnover firms in our sample. This approach also serves to test the common trend assumption in difference-in-differences, namely that no significant differences across the two groups of workers should be observed in the run up to the intervention.

The extended difference-in-difference equation we estimate is therefore the following:

$$Y_{it} = \beta Employees_i + \sum_{m=2}^{18} \delta_m I(t=m) + \sum_{n=2}^{18} \theta_n I(t=n) * Employees_i + \alpha_i + \epsilon_{it}, \qquad (2)$$

where the variables are the same as in equation 1, $I(t=m)$ being an indicator function denoting the dummy variables for the different months over the period 2011:m1 up to 2012:m6.

The results are presented in Table 4 and highlight the strong overlap between the introduction of the new law and the gap between the number of employees and contractors within the same firms. In fact, across the ten months before the new law only two are significant at 5%; on the other hand, acoss the eight months once the new law is in place, only one (December) is not significant at 5%. Moreover, there is evidence of an increasing trend in the magnitude of the coefficients, consistent with the cumulative effect discussed before, from .078 in November, to .117 in January, .249 in April and .321 in June. Almost all the latter

coefficients are also significant at the 1% level.

We now turn to potential differences across sectors, focusing on the five most important in our sample. Table 5 presents the results from our preferred specification, a wage bill analysis, using adjusted labour and including firm fixed effects. We find significant effects in all sectors except administrative services. The effects are larger in hotels and restaurants, followed by retail and manufacturing. The non-significant results in administrative services may be related to the greater relative importance of employees, indicated by the large coefficient on their dummy variable (3.4, compared to coefficients between 2.5 and 2.9 in the other four sectors).

A third robustness check involves the analysis of different subsets of our main sample. In Table 6 we consider low-wage firms, defined as those that have a mean salary of employees over all months below the median of the full sample (759 euros), and high-flow firms, defined as those that have a mean ratio of employee hirings plus separations by total employees above the median of the full sample (7.7%). For instance, firms that tend to have higher levels of turnover may benefit more from the reform, as the lower severance pay levels were only applicable to new hires. They will have a greater reliance on fixed-term contracts, for which changes in severance costs will be more directly relevant and may have a greater effect on behaviour, namely hirings of employees and contractors. Overall, we find estimates supporting the robustness of the main results presented in Tables 2 and 3, indicating positive effects of the new law on both wage bills and labour. More specifically, we find evidence of somewhat lower effects amongst low-wage firms (a wage bill coefficient of .135 compared to .143 in the main findings) and higher effects amongst high-flow firms (a wage bill coefficient of .164). The latter result is consistent with our discussion above.

Finally, we examine the possibility that our main results are picking up seasonal patterns or other similar effects in the labour choices of firms and workers regarding employee and contractor formats. For instance, the period when the new law is in force may coincide with a greater propensity for the use of employees compared to contractors. We do not know of specific reasons why this may be the case but examine this possibility in any case. In fact, if anything, we would expect the period of the new law to be subject to a greater propensity for contractors, given the economic downturn then and its likely implications in terms of firms preferring more flexible labour formats.

Our analysis is based on a triple-difference approach, in which we add a third period to our analysis: January 2008 up to June 2009. To the extent that the seasonal effects described above are similar in this time period and in the main period of January 2011 to June 2012, the inclusion of this additional difference will reveal if the main results still hold or not after controlling for these more general seasonal effects.

Given the above, the triple-difference equation we consider is the following:

$$\begin{aligned} Y_{it} = \beta_1 Employees_i + \beta_2 PostOct2008/11_t + \beta_3 Employees_i * PostOct2008/11_t \\ +\beta_4 2011/12_t + \beta_5 Employees_i * 2011/12_t + \beta_6 PostOct2008/11_t * 2011/12_t \\ +\beta_7 Employees_i * PostOct2008/11_t * 2011/12_t + \alpha_i + \epsilon_{it} \end{aligned} \tag{3}$$

The interpretation of the variables above is the same as in equation 1, $PostOct2008/11_t$ being a dummy variable equal to one both for the period November 2011 to June 2012 and for the period November 2008 to June 2009. Moreover, $2011/12_t$ is a dummy variable equal to one for the period 2011-12 (both the months range subject to the treatment - November 2011 to June 2012 - and the months range just before - January 2011 to October 2011). The equation also includes all pairs of interactions and the critical triple interaction whose coefficient (β_7) is the result of interest - it indicates the difference in the outcome of interest between the post- and pre-October 2011 (2008) months, across employees and contractors, between 2011-12 and 2008-09.

Table 7 presents the results, including all coefficients. Once again, we consider our main specification, based on (adjusted) wage bill and firm fixed effects. We find that the key coefficient (β_7), of the interaction of the three dummy variables is significantly positive, at .034. This result indicates that, compared to an equivalent period in 2008/9, there is a positive, additional wage bill effect for employees from November 2011 compared to contractors in the same firms. This finding lends additional support to a causal interpretation of our main results, stemming from the change in severance pay.

6 Conclusions

A number of forces such as international trade, technology, or outsourcing are shaping the future of work, including a greater role for other labour relationships than (permanent) em-

ployment contracts. In fact, the breadth of non-standard work is considerably large these days, including different margins than the much-discussed segmentation between permanent and fixed-term contracts.

This paper analysed the increasingly important but still little discussed potential trade-off between employees and contractors. Moreover, we focus on the role of labour market regulation and, in particular, severance pay, as a driver of contractors to the expense of employees. Critically from an identification perspective, our analysis draws on the exogenous variation in the severance levels of employment contracts at a time when no changes were introduced to service contracts. The results indicate significant evidence of a large relative increase in the wage bills and numbers of employees within firms over time, with elasticities of -1 or more.

Our results are the first to present causal evidence on the effects of employment protection law, in particular severance pay, on the employee/contractor trade-off. From a policy perspective, these findings indicate that reductions (not increases) in labour regulations may help to promote more standard forms of employment, which offer far greater protection to workers. This may be particularly the case in contexts in which the economy is under a recession and or regulations are relatively restrictive.

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Table 1: Descriptive statistics, pooled data

	Mean	SD
Workers	71.50	388.94
Wage bill	91,234.71	724,932
Employees (dummy variable)	0.50	0.50
Post-Oct 2011	0.44	0.50
Post-Oct 2011 * Employees (dv)	0.22	0.42
Mean employees per firm (over time)	141.40	539.72
Mean employees' wage bill per firm (over time)	887.15	520.32
Mean worker flows ratio per firm (over time)	0.11	0.10
Log workers	2.15	2.02
Log wage bill	9.21	1.90
Log workers (adjusted)	2.41	1.77
Log wage bill (adjusted)	9.06	2.21
Manufacturing	0.20	0.40
Construction	0.18	0.38
Wholesale and retail	0.16	0.37
Hotels and restaurants	0.11	0.31
Administrative services	0.09	0.29
Observations	145,892	

Notes: Monthly data, covering the period from January 2011 until July 2012. Two observations per firm per month, one regarding employees, the other contractors. Workers denotes the number of individuals registered in the firm-month (either employees or contractors). Wage bill denotes the amount paid to all individuals in the relevant firm-month-worker type cell, in nominal euros. 'Employees (dv)' is a dummy variable indicating cells that refer to employees. 'Post-Oct 2011' is a dummy variable indicating cells that refer to the months of October 2011 and after. 'Mean employees (employees' wage bill) per firm' is a variable indicating the mean number of employees (employees' wage bill) in the firm (across all time periods). 'Mean worker ows ratio per firm' is constructed from the ratio of total employees hirings and separations in a month by that month's employees stock, averaged over all months. 'Log workers (wage bill)' is the log of the variables indicated above; the adjustment versions are again the same logs but first adding one to the numbers of workers or the value of the wage bill (to address the zero reported workers and wage bill in a small number of cases). The last five dummy variables refer to one-letter sectors. 143,555 observations for log workers and log wage bill.

Table 2: Wage bill effects - difference-in-differences

	Non-adjusted wage bill		Adjusted wage bill	
	(1)	(2)	(3)	(4)
Employees (dv)	2.717	2.725	2.869	2.869
	(.009)***	(.004)***	(.011)***	(.007)***
Post-Oct 2011	.007	.017	-.071	-.064
	(.008)	(.005)***	(.013)***	(.010)***
Post-Oct 2011 * Employees (dv)	.039	.038	.143	.143
	(.014)***	(.007)***	(.018)***	(.012)***
Const.	7.818	7.810	7.625	7.622
	(.005)***	(.003)***	(.008)***	(.006)***
Firm FE		X		X
Obs.	143555	143555	145892	145892
R^2	.516	.893	.439	.76

Notes: The dependent variables are the log of the firm's monthly wage bill (employees or contractors), adjusted or not for zeros. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 3: Labour effects - difference-in-differences

	Non-adjusted labour		Adjusted labour	
	(1)	(2)	(3)	(4)
Employees (dv)	3.541	3.545	3.033	3.033
	(.007)***	(.005)***	(.006)***	(.004)***
Post-Oct 2011	-.012	-.006	-.016	-.012
	(.004)***	(.005)	(.003)***	(.004)***
Post-Oct 2011 * Employees (dv)	.016	.016	.028	.028
	(.010)	(.007)**	(.010)***	(.007)***
Const.	.361	.356	.894	.892
	(.002)***	(.003)***	(.002)***	(.003)***
Firm FE		X		X
Obs.	143555	143555	145892	145892
R^2	.772	.903	.736	.878

Notes: The dependent variables are the log of the firm's monthly labour count (employees or contractors), adjusted or not for zeros. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 4: Wage bill effects, by month - difference-in-differences

Regressors (subset)	Coefficients	St. Errors
(Feb 2011 dv)*Employees (dv)	-.002	(.039)
(Mar 2011 dv)*Employees (dv)	.021	(.039)
(Apr 2011 dv)*Employees (dv)	.058	(.038)
(May 2011 dv)*Employees (dv)	.068	(.037)*
(Jun 2011 dv)*Employees (dv)	.077	(.037)**
(Jul 2011 dv)*Employees (dv)	.052	(.036)
(Aug 2011 dv)*Employees (dv)	.031	(.036)
(Sep 2011 dv)*Employees (dv)	.056	(.035)
(Oct 2011 dv)*Employees (dv)	.074	(.035)**
(Nov 2011 dv)*Employees (dv)	.078	(.036)**
(Dec 2011 dv)*Employees (dv)	.057	(.036)
(Jan 2012 dv)*Employees (dv)	.117	(.037)***
(Feb 2012 dv)*Employees (dv)	.155	(.037)***
(Mar 2012 dv)*Employees (dv)	.225	(.039)***
(Apr 2012 dv)*Employees (dv)	.249	(.040)***
(May 2012 dv)*Employees (dv)	.298	(.041)***
(Jun 2012 dv)*Employees (dv)	.321	(.042)***
Employees (dv)	2.825	(.029)***
Const.	7.469	(.023)***
Obs.	145892	
R^2	.763	

Notes: The dependent variable is the log of the firm's monthly wage bill (employees or contractors), adjusted for zeros. Firm fixed effects included. The specification also controls for dummy variables for each one of the 17 months other than January 2011 (from February 2011 to July 2012) - not reported. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 5: Wagebill and employment effects - sectors

	Manuf.	Constr.	Retail	Hotels	Admin.
	(1)	(2)	(3)	(4)	(5)
Employees (dv)	2.853	2.749	2.642	2.509	3.482
	(.016)***	(.018)***	(.016)***	(.022)***	(.028)***
Post-Oct 2011	-.018	-.031	-.044	-.299	-.0009
	(.021)	(.022)	(.022)**	(.033)***	(.037)
Post-Oct 2011 * Employees (dv)	.142	.062	.147	.284	-.027
	(.024)***	(.027)**	(.025)***	(.039)***	(.043)
Const.	8.009	7.125	7.798	7.379	7.303
	(.013)***	(.014)***	(.013)***	(.018)***	(.023)***
Firm FE	X	X	X	X	X
Obs.	29166	25902	23220	16270	13276
R^2	.768	.747	.777	.684	.757

Notes: The dependent variable is the log of the firm's monthly wage bill and employment (employees or contractors), adjusted for zeros. Each column corresponds to the following one-letter sectors, manufacturing, construction, wholesale and retail, hotels and restaurants, and administrative services, respectively. All columns include firm fixed effects. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 6: Wage bill and employment effects - subsamples

	Adjusted wage bill		Adjusted labour	
Type of firms:	Low-wage	High-flows	Low-wage	High-flows
	(1)	(2)	(3)	(4)
Employees (dv)	2.654	2.566	2.682	2.522
	(.011)***	(.012)***	(.006)***	(.006)***
Post-Oct 2011	-.070	-.076	-.009	-.011
	(.014)***	(.015)***	(.006)	(.006)*
Post-Oct 2011 * Employees (dv)	.135	.164	.009	.021
	(.017)***	(.018)***	(.009)	(.009)**
Const.	7.028	7.058	.813	.807
	(.009)***	(.009)***	(.004)***	(.004)***
Firm FE	X	X	X	X
Obs.	73006	73006	73006	73006
R^2	.697	.668	.862	.842

Notes: The dependent variables are the log of the firm's monthly wage bill and employment (employees or contractors), adjusted for zeros. 'Low-wage firms' are those with average monthly employee wage bill per worker of less than the median, 759 euros. 'High-flows' firms are those with average monthly employee flows per employee stock greater than the median, 7.7%. All columns include firm fixed effects. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 7: Wage bill effects - triple differences

Employees	2.600
	(.006)***
Post-Oct 2011/2008	.033
	(.007)***
2011/12	.025
	(.008)***
Post-Oct 2011/2008 * Employees (dv)	.109
	(.009)***
Employees * 2011/12	.269
	(.009)***
Post-Oct 2011/2008 * 2011/12	-.097
	(.012)***
Post-Oct 2011/2008 * Employees (dv) * 2011/12	.034
	(.015)**
Const.	7.556
	(.005)***
Obs.	389700
R^2	.746

Notes: The dependent variable is the log of the firm's monthly wage bill (employees or contractors), adjusted for zeros. The sample includes the period 2011:m1-2012:m6 as before and the equivalent period 2008:m1-2009:m6. Firm fixed effects included. Robust standard errors. Significance levels: * 0.10, ** 0.05, *** 0.01.