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Do wages increase when severance pay drops? Not in recessions

CGR Working Paper 77

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According to theory, wage rigidity may increase the scope for employment protection legislation (EPL) to have negative effects on employment. In this paper, we study this issue by analysing the extent to which entry wages respond to EPL. We exploit a recent reform in Portugal, in the midst of a recession, that reduced severance pay for new hires alone. Our main analysis is based on a regression-discontinuity approach using long monthly data on entry wages. We find no evidence of wage adjustments following the change in EPL, even when considering many different specifications and samples. This result highlights the potential of greater flexibility in EPL over the business cycle to reduce employment fluctuations.

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*The author thanks Giulio Fella for helpful discussions and the Ministry of Employment, Portugal, for data access. The author was Secretary of State of Employment in the Government of Portugal in 2011-2013 and was co-responsible for the reform evaluated in this paper.

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1 Introduction

The effect of labour regulations and, in particular, employment protection legislation (OECD 2014) on labour outcomes is an important question for academics, policy makers and the general public. This theme has also been subject to renewed interest following the 2008 financial crisis and the 2010 Eurozone crisis. Indeed, a number of findings are now emerging about the appropriate policies to address those crisis and the resulting large increases in unemployment in most countries. For instance, according to the International Monetary Fund (IMF 2016), 'reforms to employment protection arrangements [...] have positive effects in good times, but can become contractionary in periods of slack. These results suggest the need for carefully prioritizing and sequencing reforms'.

A particular dimension of labour regulations that has received considerable attention is severance pay, namely following the analysis of Lazear (1990) and a number of subsequent contributions (Hopenhayn & Rogerson 1993, Ljungqvist 2002, Garibaldi & Violante 2005, Holzmann et al. 2011, Fella 2012, Boeri et al. 2016). One important aspect here concerns the potential of bonding and the role of wage rigidity (Bewley 2002, Dickens et al. 2007, Babecky et al. 2010, Portugal & Martins 2014): under certain conditions, increasing (decreasing) severance pay can be neutralised by cuts (increases) in entry wages, with no effects on employment. This is indeed consistent with the findings in Leonardi & Pica (2013), which examines the effect of a 1990 reform in Italy which increased severance pay for small firms only, and those of Cervini-Pla et al. (2014), which studies the impact of a 1997 reform in Spain which lowered severance costs for some groups of workers, but in contrast to the results of Autor et al. (2006) and van der Wiel (2010).

This paper is the first to examine causally the effect of severance pay on wages during a recession. This is a critical external validity issue, since workers in slack labour markets may be unable to be paid for the lower protection given the lack of a better outside option. In such a context, adjustments to severance pay may at least partly address the effects of downward nominal wage rigidity in terms of longer periods of high unemployment. Specifically, we study the effects on entry wages of a recent labour law reform in Portugal that reduced significantly the severance pay of employees. Critically, from an econometric identification perspective, the change in severance rates was only applicable to new hires, not existing employment contracts at the time the new law was introduced. This creates a sharp discontinuity in severance levels,

which we use to identify its effect on entry wages.

Our results, based on detailed social security data and a regression discontinuity approach, indicate no evidence of wage adjustments following the change in EPL. The lack of impact of the law in terms of entry wages is also supported from the consideration of many different specifications and samples, including a second, complementary data set. These findings highlight the potential of greater flexibility in EPL, in particular severance pay, over the business cycle to reduce employment fluctuations. Our findings may also be interesting from the perspective of the literature on the 'unemployment volatily puzzle' (Pissarides 2009) and the role of wage rigidities.

The structure of the remaining of the paper is as follows: the next Section presents the reform underpinning our analysis, Section 3 presents the main data set used and its descriptive statistics, Section 4 presents the results. Finally, our conclusions appear in Section 5.

2 The severance pay reform and its context

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 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.

[1] See Hijzen & Martins (2016) and Martins (2016*a*) for evaluations of other labour market reforms implemented in Portugal between 2011 and 2013. This section is adapted from Martins (2016*c*), a companion paper which analyses the effect of this reform in terms of the trade-off between employees and contractors (independent workers).

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 2011, approximately 12% of all private-sector employees were paid the national minimum wage and a further 16.5% were paid the minimum wages established by collective agreements and extension mechanisms, according to our calculations based on the 'Quadros de Pessoal' matched employer-employee census data set. Martins (2016*b*) 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 (in the more standard sense of increases in its level) may have negative employment effects, given the inability of firms to engage in bonding.

This reform was delivered through Law 53/2011, which was submitted by the government to parliament in July 2011 and published in October. The law, which came into force in November 1st, 2011, established as agreed in the memorandum of understanding above that the severance applicable to all new hires from that date 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.

The reform received widespread attention in the media, given that it was one of the first of the new government and under the adjustment programme. Revisions to labour law typically attract considerable public attention, given their potential effects amongst a large share of the population. Moreover, the new law, while 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, in particular those who are affiliated in their associations. Indeed, the reform represented a significant reduction in total 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).

3 Data and descriptive statistics

We draw on two micro data sets for our analysis. The first and main data set makes available monthly records of individual employment from January 2005 up to March 2012. The data set was made available by IISS,[2] and records a number of social-security related observations of a given 1% stratified random sample of all individuals with social-security records over the period considered. In total, the data set records over nine million individual-month observations or approximately 100,000 different individuals per month. Moreover, the data set also includes variables such as an individual's identifier, gender, date of birth, nationality, region of birth and residence, monthly earnings and contributions made by employers and employees, UBs, days of work, and the firm's identifier and location (if applicable).[3]

Using the information described above, we define an individual to be in employment in a given month if there is a registration of employment contributions in that month corresponding to at least one day of work. Moreover, we focus our analysis on the wages of workers that are observed as employed with a given employer for the first time during the sample period. In order not to rule out cases in which new matches are formed with a previous employer, we also consider such cases provided there is a period of at least two months in which salaries are not reported for that employer-employee pair. We examine the period 2008:m4 up to 2012:m3, corresponding to five complete years of monthly data.

These criteria lead to a data set with 140,330 observations, each one corresponding to the first month of a new match between a worker and her employer. Table 1 presents a number of descriptive statistics of the resulting data set, including percentage female (55%), average age (36.1) and percentage foreigner (10%). The average log daily wage is 2.97 (or approximately 20 euros), a figure around one third below the national average at the time, reflecting our focus here on entry jobs alone. The average log monthly wage is 5.77 (or approximately 320 euros) - its difference from the daily wage (after considering the number of days per month) reflects the fact that in many cases, the entry positions do not start at the beginning of the month and or do not end their first calendar month at the last day of that month (i.e. they would end before). Indeed, the average number of days per month is only 20.3, one third less than the reference period for a full month (30 days). Considering only the individuals and

[2] IISS stands for *Instituto de Informática da Segurança Social*, or Social Security Information Technology Institute. The data is originally collected and processed by the Social Security Institute, another public agency.

[3] See Martins (2016*d*) for another application of this data set.

time periods observed in the data set (including further months of the employment spell and previous employment spells), the average monthly salary is 664 euros.

The average month of hiring is February 2010 (corresponding to -21 in a centered variable) while the first month in sample is July 2008 (or 43.1 in the uncentered hiring month variable, 1 being January 2005). 7% of the sample are observed in months when the new severance law is in force (November 2011 or later). Finally, the most important sectors are Administrative services, Manufacturing, Wholesale and retail, Construction, and Hotels and restaurants; and the most important regions (location of employers) are Lisbon, Porto, Braga and Aveiro.

Our data is also presented in Figure 1, in terms of average entry daily (nominal) salaries per month (and the corresponding number of observations). From a first impression, we find two clear time trends: increasing salaries and decreasing hirings. Indeed, while entry wages increase by up to 0.2 log points (from 2.9 to 3.1) over the five-year period considered, the number of hirings per month fall by approximately a full log point (from 8.25 to 7.25). This contrast between salaries and employment is consistent with the increasing unemployment in the economy over the period covered and can be explained by composition: lower wage workers are not hired when hirings level fall, resulting in higher average wages. Institutional features may also be important, such as increasing minimum wages and virtually automatic extensions of collective agreements, which push entry wages up even at times of increasing unemployment, or long and generous unemployment benefits, which reduce donward wage pressure by those searching for jobs.[4]

A second important stylised fact that comes from Figure 1 and that speaks more directly to the analysis conducted in this paper concerns the within-year seasonality in both employment and wages. In the case of the number of hirings, there are very clear peaks in September and January and very clear troughs in December and August (for reference, the month of November of each year is indicated in the Figure by vertical dashed lines). The latter reflect typical months of holidays for most workers, when firms will not be interested in starting new appointments; the former reflect months in which economic activity resumes, leading to the start of new appointments. Moreover, the Figure does not suggest any evidence of delay effects, or manipulation of the running variable in our regression discontinuity approach,

[4]These views are in contrast to the findings of Martins et al. (2012), which finds evidence of real wage cyclicality in Portugal. However, the latter study covers a longer period, 1982-2008, and in particular one which was characterised by high levels of inflation (up to 30%), unlike the years of 2008-2012, with inflation rates of 1% or less.

whereby firms postpone hirings between July to October 2011 (the period during which the law proposal was discussed publicly) to November or subsequent months (when the law was in force and severance of new hires were lower).

In the case of wages, a stylised fact concerns the significant higher levels in November and December. Almost without exception, there is a jump in entry wages from October to November of at least 0.05 log points, in some cases nearly 0.1 log points. Entry wages in December tend to be similar to those in November, after which there is a significant drop in January, typically at a higher level than January of the previous year. This wage pattern may reflect a number of potential explanations, including composition (the fewer workers hired in typically low-activity months have stronger skills) and supply/demand imbalances (supply may be lower in those months given the standard start months of new jobs and duration of fixed-term contracts, for instance).

These stylised facts and, in particular, the last one (on seasonal effects) imply that it may be particularly important to take a long view on the relationship between the introduction of new policies - in our case the lower severance pay - and its effects, namely in terms of wages. A simple, single-year analysis would possibly conclude that there is a significant positive increase in wages in November and December in 2011, while this in fact happens in all years, even when no severance pay reform is introduced.

4 Results

Our main analysis of the effects of the lower severance pay is based on a regression discontinuity approach (Hahn et al. 2001, Lee & Lemieux 2010). This analysis is based on a comparison of the monthly entry wages of workers hired before the law reform was in force and the same wages of workers hired once the law reform was applicable. At the same time, we control for any direct effects from differences across workers driven or related to the month of hiring using different polynomials of our running variable, the month when the individual was hired (centered at November 2011). Given the discussion about seasonality in Section 3, we consider a long period of data before the introduction of the new severance pay levels.

Specifically, we estimate the following regression-discontinuity equation on a cross-section

of all workers hired between April 2008 and March 2012:

$$Y_i = \alpha + \beta D_i + \lambda_1 S(Z_i) + \lambda_2 X_{it} + \epsilon_i \quad (1)$$

The key dependent variable considered, Y_i, is the log of the daily entry wage in the month of hiring. D_i is a dummy variable equal to one for individuals hired from November 2011. $S(Z_i)$ are different polynomials of the running variable, the month of hiring, again centered at November 2011: linear, quadratic or cubic, depending on the specification. X_{it} are a group of control variables, included or not in the specification, including the worker's gender, age, foreigner, four region dummies, six sector dummies, and earliest month in the data. Standard errors are clustered at the month of hiring level.

Table 2 presents the first set of results. We find no significant differences in entry wages from the time in which severance pay has been reduced. The finding is the same in all six specifications, from three different polynomials in models without or with control variables. Although the point estimates are positive, standard errors are relatively high and no coefficient is statistically significant even at the 10% level, with p-values generally above 20%. The coefficient of the running variable in the linear polynomial specification is also interesting, as it indicates an average wage growth of entry wages of 0.4% per month, consistently with the positive trend presented in Figure 1.

An important test of these findings concerns differences in pre-determined or nearly pre-determined variables that may coincide with the threshold of interest. We conduct this balancing test using sixteen different variables - the fourteen indicated above in X_{it} plus the number of days of work and the worker's mean salary over the sample - and two polynomial specifications - quadratic and quartic. We find that across the resulting 32 models, the equivalent β coefficient in equation 1 is only significant at the 5% level in one case and at the 10% level in three aditional cases. We take these results to support the view that the samples across the threshold are comparable enough to validate our regression discontinuity approach.

We obtain the same main result when considering a large number of different subsets of the main data set - Table 3. These subsets were selected so to make it more likely to observe wage increases following the new severance pay . One first subset includes male workers only - who may typically be more willing to demand or at least ask for pay increases compared to women. A second subset is that of older workers (older than the mean age 36):

these workers will have greater labour market experience, including higher reference points in terms of previous salaries, and may therefore be in a better position to demand higher entry level wages. A third group addresses this theme more directly, by considering only high-wage workers, defined as those who, throughout their different employment spells over the 2008-2011 period, are paid above the average of our full sample (664 euros).

We consider three more subsets of our data that may be expected to have a greater ability to demand higher entry wages following the change in severance pay. The fourth group is that of workers who have a full first month of work (i.e. that corresponds to the maximum of 30 days): these cases are more likely to be associated to higher-paying positions, in which firms may respond more directly to worker demands regarding compensation for lower severance pay. The fifth group is based on workers from manufacturing only, a sector where greater scope for worker bargaining may apply, given its higher levels of unionisation and greater exposure to international trade and consequent greater protection from the contraction in the domestic economy at the time. Finally, we consider a specification using all observations but including worker fixed effects. The comparison of the entry wages of the same workers over different periods of time - in particular before and after the change in severance pay - may also be an interesting source of additional insight into the effects of the new law. However, in all six cases above, the coefficient on the post-October 2011 dummy variable is always insignificant, with p-values of 25% or more. All results are based on the quadratic polynomial but the same qualitative findings are obtained with the other two polynomials considered before.

Following from the last approach, based on individual fixed effects, we consider now models with firm fixed effects. This amounts to investigating the existence of systematic patterns whereby firms pay higher wages over the months in which severance is lower. Table 4 presents the results, the first which suggest that such wage premium may exist (first three columns). However, recalling the insights from Figure 1, we check the robustness of this finding to the inclusion of month fixed effects (one dummy variable for each month, from February to December, regardless of the year). When doing so, we find that the statistical significance of the lower severance dummy disappears altogether and their magnitude also drops considerably in two polynominals. The resulting coefficients of the month dummy variables are also large (at around 10%) and highly statistically significant for the months of November and December, as predicted by Figure 1. Overall, the findings from this Table emphasise the importance of

long before periods in similar analyses, to ensure that seasonal effects are not misinterpreted as impacts of a given programme or policy under evaluation.

4.1 Extension

Here we present the findings from an extension that complements the main findings of this Section. Specifically, we consider a different data set, 'Quadros de Pessoal', that covers a longer period (24 months) following the introduction of the lower severance pay. While this second data set does not indicate entry wages for all months in each year, it does provide information on wages at a given point in time following the admission of the worker plus the data when the current employment relationship started.

The data set used here is a compulsory survey filed annually by all firms in Portugal that employ at least one worker with the Ministry of Labour. The reference month is October of each year. Given that the survey is used for the purposes of monitoring compliance with employment law and is displayed publicly, it ensures a great deal with data quality.

In our analysis, we used the data regarding October 2013 and focused on all workers employed at that time that were hired in the previous four years. Following a similar approach to Figure 1, Figure 2 presents the average wages of workers by month of entry into the firm as well as the total number of workers, again by month of entry. Given the backward-looking approach of the current sample (in contrast to the the main sample, which considers a sample of all new hires), we find a large increase (of about two log points) in the number of new hires over the period 2010-2013. This reflects the simple fact that older matches are less likely to survive than more recent matches and this dominates the reduction in hirings over the recession. Moreover, average wages also fall significantly over the period, in a decline of about .25 log points. This decline will reflect composition effects (higher wages will last longer) and also returns to tenure and experience (older appointments have greater potential for wage increases). Downward wage adjustments could, in general, also be an explanation but are less likely to apply in this case, given the institutional features discussed above (despite the freezing of minimum wages and, to a large extent, of collective agreement extensions, in 2012 and 2013).

One additional important result from Figure 2 is the significant overlap between its employment seasonal pattern and that of Figure 1, in particular between late 2010 and early

2013. As before, the 'Quadros' data set indicates pronounced peaks in new hires in January and September and significant troughts in December and August. However, the wage differences that could be observed before, namely the peaks in November and December, cannot be discerned in this data set, which depicts wages measured as of October 2013. The imbalance in the seasonal parallels between the two data sets and the two variales (employment and wages) can be regarded as additional evidence of no effects from the severance law upon wages.

We test this preliminary evidence by reestimating equation 1, using this new, complementary data set, and considering again the same three polynomials. We also consider a fourth specification including a cubic of the running variable and a spline at the time threshold, a more flexible specification warranted here by the longer available period after the new law is introduced in this second data set. Table 5 presents the results, which again support our main finding of no significant evidence of wage increases following the change in severance pay. Specification one, based on a linear polynomial, indicates a marginally significant positive effect, but this reflects the lack of flexibility of a linear specification to accommodate the clearly non-linear pattern observed in Figure 2. Once that is accounted for, the coefficients even become negative (although once again not statistically significant).

Further robustness is presented in Table 6, which considers the quadratic polynomial and different sets of control variables: month effects, a range of worker control variables, and firm fixed effects. Again, this time in all specifications, the key coefficients are statistically insignificant, while somewhat smaller in absolute magnitude.

5 Conclusions

According to theory, wage rigidity may increase the scope for employment protection legislation (EPL) to have negative effects on employment or, at least, on hirings and long-term unemployment. If wages - and entry wages in particular - do not adjust to the increased costs that follow from EPL, then labour demand may contract, leading to fewer additional employment opportunities. Similarly, if EPL is reduced but wages do not increase to neutralise the lower regulation-related costs, then labour demand may expand, which would be particularly welcome during times of high unemployment.

In this paper, we study this key issue by examining on the extent to which entry wages

respond to EPL. We exploit a recent reform in Portugal, in the midst of a recession, that reduced severance pay for new hires alone, leaving unchanged the severance levels for workers hired before the new law was in force. Moreover, the decline in severance was substantial (a drop of one third), amounting to a reduction of annual labour costs of over 3% in most cases.

Our study is based on a regression-discontinuity analysis, comparing the entry wages of workers that joined their firms before and after the new law is in place. We thus provide causal evidence on the effect of the reduction in severance upon entry wages, a key parameter in the literature on the effects of EPL upon employment and other outcomes. In our results, we find no evidence of wage adjustments following the change in EPL. The lack of impact of the law in terms of entry wages is also supported from the consideration of many different specifications and samples, including a second, complementary data set.

This novel finding in the context of a downturn highlights the potential of greater flexibility in EPL, in particular severance pay, over the business cycle to reduce employment fluctuations. Cuts to severance pay of new hires, as in the policy evaluated here, may be particularly effective in simultaneously reducing labour costs of additional, marginal jobs in a context of high wage rigidity, while at the same time not facilitating dismissals of existing jobs and increasing unemployment further. Conversely, severance pay of new hires may be increased during times of booms and inflationary pressures, at least to the extent that the symmetric version of our findings also hold (i.e. increases in severance do not translate into reductions in entry wages). This may depend critically on the tightness of the labour market. In general, greater responsiveness of labour market institutions and their parameters over the business cycle may facilitate considerably the reduction of employment volatility, possibly also reducing the volatility of the business cycle itself.

References

Autor, D. H., Donohue, J. J. & Schwab, S. J. (2006), 'The Costs of Wrongful-Discharge Laws', *The Review of Economics and Statistics* **88**(2), 211–231.

Babecky, J., Caju, P. D., Kosma, T., Lawless, M., Messina, J. & Room, T. (2010), 'Downward Nominal and Real Wage Rigidity: Survey Evidence from European Firms', *Scandinavian Journal of Economics* **112**(4), 884–910.

Bewley, T. F. (2002), *Why Wages Don't Fall during a Recession*, Harvard University Press.

Boeri, T., Garibaldi, P. & Moen, E. R. (2016), Inside Severance Pay, Sciences Po Publications 47.

Cervini-Pla, M., Ramos, X. & Ignacio Silva, J. (2014), 'Wage effects of non-wage labour costs', *European Economic Review* **72**(C), 113–137.

Dickens, W. T., Goette, L., Groshen, E., Holden, S., Messina, J., Schweitzer, M., Turunen, J. & Ward, M. E. (2007), 'How wages change: Micro evidence from the international wage flexibility project', *Journal of Economic Perspectives* **21**(2), 195–214.

Fella, G. (2012), 'Matching, Wage Rigidities and Efficient Severance Pay', *The B.E. Journal of Economic Analysis & Policy* **12**(1), 1–35.

Garibaldi, P. & Violante, G. L. (2005), 'The Employment Effects of Severance Payments with Wage Rigidities', *Economic Journal* **115**(506), 799–832.

Hahn, J., Todd, P. & Van der Klaauw, W. (2001), 'Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design', *Econometrica* **69**(1), 201–09.

Hijzen, A. & Martins, P. S. (2016), No Extension without Representation? Evidence from a Natural Experiment in Collective Bargaining, Working paper 16/143, International Monetary Fund.

Holzmann, R., Pouget, Y., Vodopivec, M. & Weber, M. (2011), Severance pay programs around the world : history, rationale, status, and reforms, Social Protection and Labor Policy and Technical Notes 62726, World Bank.

Hopenhayn, H. & Rogerson, R. (1993), 'Job Turnover and Policy Evaluation: A General Equilibrium Analysis', *Journal of Political Economy* **101**(5), 915–38.

IMF (2011), Memorandum of economic and financial policies: Portugal, Report, International Monetary Fund.

IMF (2016), Time for a supply-side boost? Macroeconomic effects of labour and product market reforms in advanced economies, World Economic Outlook, International Monetary Fund, Chapter 3.

Lazear, E. P. (1990), 'Job Security Provisions and Employment', *Quarterly Journal of Economics* **105**(3), 699–726.

Lee, D. S. & Lemieux, T. (2010), 'Regression Discontinuity Designs in Economics', *Journal of Economic Literature* **48**(2), 281–355.

Leonardi, M. & Pica, G. (2013), 'Who Pays for it? The Heterogeneous Wage Effects of Employment Protection Legislation', *Economic Journal* **123**(12), 1236–1278.

Ljungqvist, L. (2002), 'How do lay-off costs affect employment?', *Economic Journal* **112**(482), 829–853.

Martins, P. S. (2016*a*), Can overtime premium flexibility promote employment? Firm- and worker-level evidence from a labour law reform, IZA Discussion Paper 10205.

Martins, P. S. (2016*b*), Should the maximum duration of fixed-term contracts increase in recessions? Evidence from a law reform, IZA Discussion Paper 10206.

Martins, P. S. (2016*c*), The third worker: Assessing the trade-off between employees and contractors, CGR Working Paper 75.

Martins, P. S. (2016*d*), Working to get fired? Regression discontinuity effects of unemployment benefit eligibility on prior employment duration, IZA Discussion Paper 10262.

Martins, P. S., Solon, G. & Thomas, J. (2012), 'Measuring what employers do about entry wages over the business cycle: A new approach', *American Economic Journal: Macroeconomics* **4**(4), 36–55.

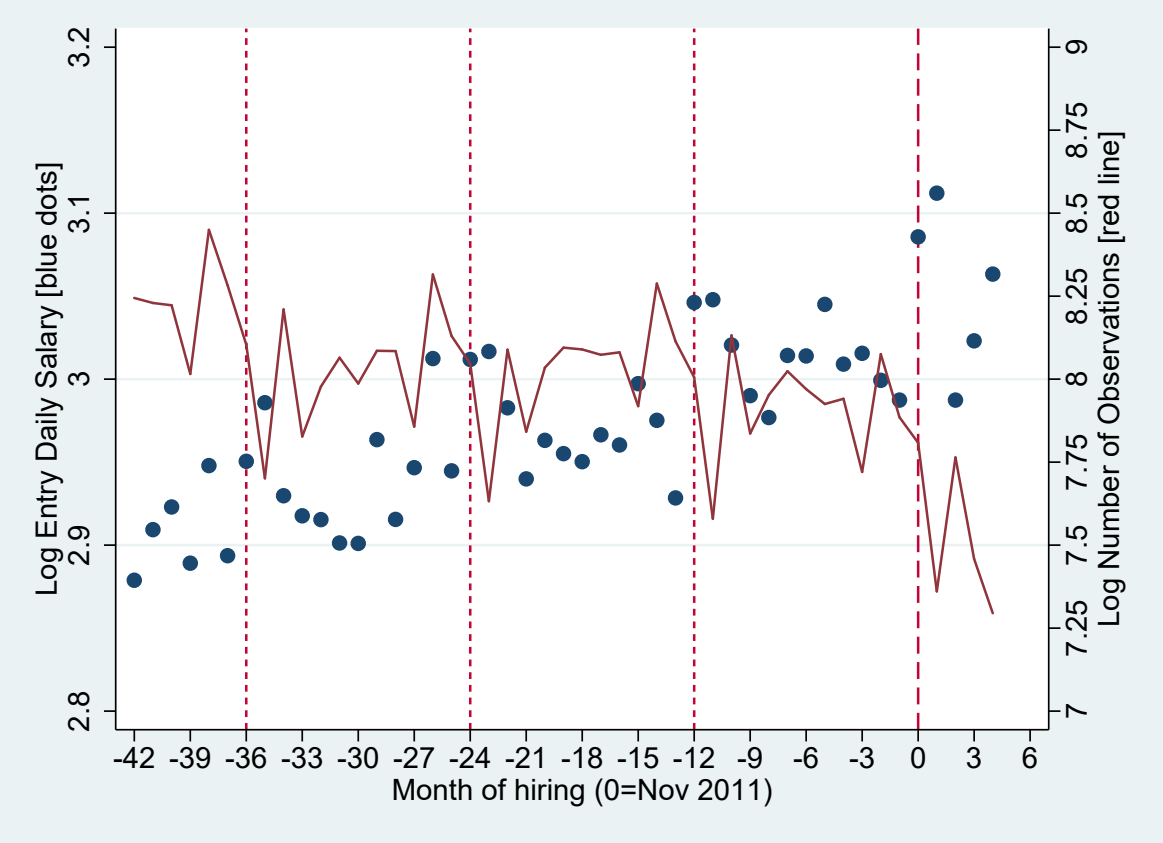
OECD (2014), OECD Employment Protection Legislation database, Report, OECD, Paris.

Pissarides, C. A. (2009), 'The Unemployment Volatility Puzzle: Is Wage Stickiness the Answer?', *Econometrica* **77**(5), 1339–1369.

Portugal, P. & Martins, F. (2014), 'Wage adjustments during a severe economic downturn', *Economic Bulletin and Financial Stability Report Articles (Bank of Portugal)* .

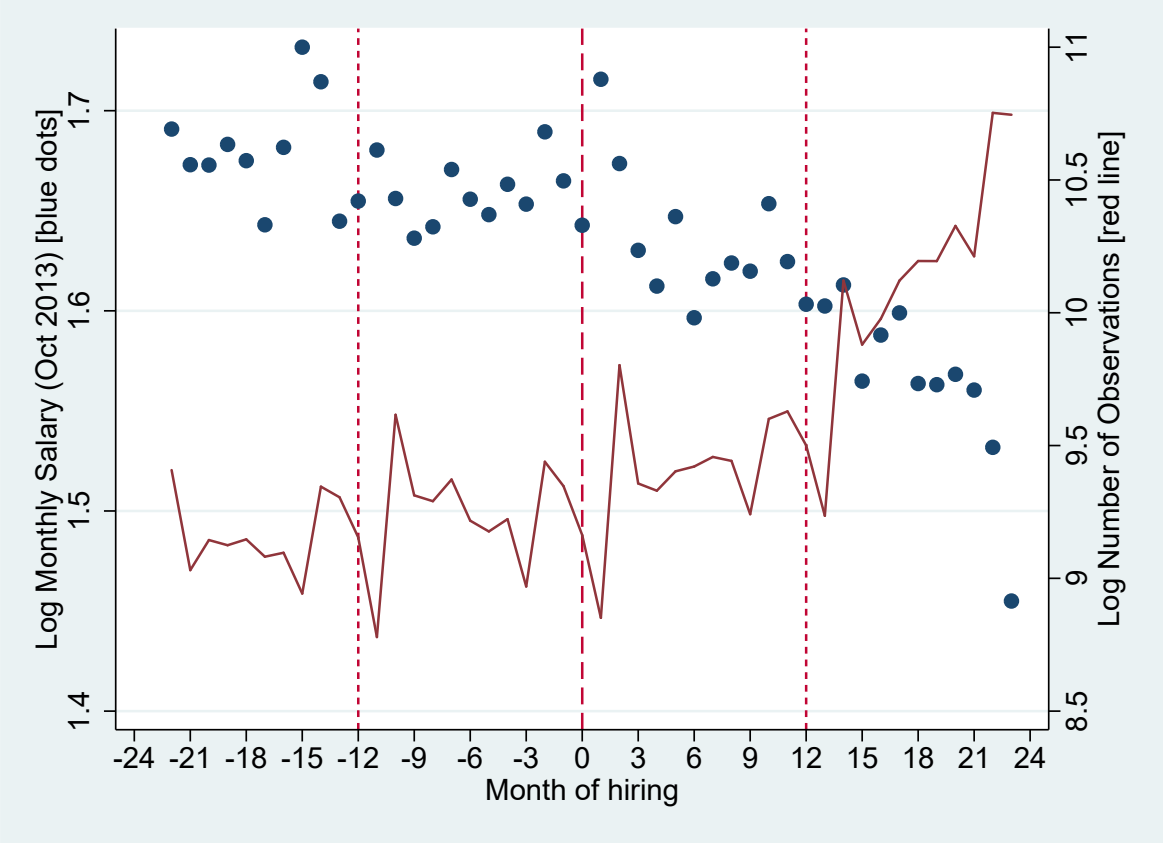
van der Wiel, K. (2010), 'Better protected, better paid: Evidence on how employment protection affects wages', *Labour Economics* **17**(1), 16–26.

Figure 1: Number of workers and average wages per hiring month



Notes: The red line indicates the number of hirings per month (measuring along the right-hand-side vertical axis); the blue dots indicate the mean entry daily salary per month (measured along the left-hand-side vertical axis). Month 0 (vertical thicker dashed line) refers to November 2011 (other vertical dashed lines refer to November 2010, November 2009 and November 2008). Source: own calculations based on Social Security sample of new hires.

Figure 2: Number of workers and average wages per hiring month, alternative data set



Notes: The red line indicates the number of hirings per month (measuring along the right-hand-side vertical axis); the blue dots indicate the mean wages per month (measured along the left-hand-side vertical axis). Month 0 refers to November 2011. Source: own calculations based on 'Quadros de Pessoal' data, covering all private-sector employees working in October 2013 and hired by their current employer since January 2010.

Table 1: Descriptive statistics

	Mean	StDev
Female	0.55	0.50
Age	36.10	10.79
Foreigner	0.10	0.30
Log daily wage	2.97	0.65
Log monthly wage	5.77	0.97
Lower severance pay	0.07	0.25
Month of hiring (centered)	-20.74	13.27
Days worked (in entry month)	20.29	9.61
First month in sample	43.12	10.41
Mean individual monthly pay (over entire period)	664.09	505.72
Manufacturing	0.13	0.34
Construction	0.10	0.30
Wholesale, Retail	0.13	0.33
Hotels, Restaurants	0.10	0.30
Administrative Services	0.14	0.35
Other Services	0.09	0.29
Aveiro	0.06	0.23
Braga	0.08	0.27
Lisbon	0.27	0.44
Porto	0.16	0.36
Observations	140,330	

Notes: 'Female' is a dv equal to one for women. 'Age' indicates the worker's age in 2011. 'Foreigner' is a dv equal to one for foreign citizens. 'Log daily (monthly) wage' indicates the worker's entry daily log (monthly) salary (from nominal euros).'Lower severance pay' is a dummy variable equal to one for individuals hired from November 2011 onwards. 'Month of hiring (centered)' is a variable centered at November 2011 (ie -1 for individuals hired in October 2011, 1 for individuals hired in December 2011, etc). 'Days worked' is the number of days in the first month of employment (up to a maximum of 30, corresponding to a full month). 'First month in sample' indicates the first month in which the worker is in the sample, in which 1 corresponds to January 2008. 'Mean individual monthly pay' is the average of the workers monthly pay over all months in which the worker is employed between January 2008 and March 2012. The remaining variables refer to firm dummy variables (of the firm where the worker is employed): sectors (manufacturing, construction, wholesale and retail, hotels and restaurants, administrative services, and other services) and region (Aveiro, Braga, Lisbon, and Porto). Own calculations based on the Social Security data set.

Table 2: Wage effects, main results

	(1)	(2)	(3)	(4)	(5)	(6)
Lower severance pay	.022	.036	.046	.005	.021	.042
	(.024)	(.026)	(.030)	(.027)	(.030)	(.034)
Month of hiring (centered)	.003	.001	-.0004	.004	.002	-.001
	(.0003)***	(.001)	(.003)	(.0004)***	(.001)*	(.003)
Month of hiring (centered)^2		-.00003	-.0001		-.00004	-.0002
		(.00003)	(.0002)		(.00003)	(.0002)
Month of hiring (centered)^3			-1.56e-06			-3.13e-06
			(2.91e-06)			(2.97e-06)
Const.	3.024	3.013	3.006	3.338	3.326	3.313
	(.008)***	(.011)***	(.012)***	(.039)***	(.038)***	(.040)***
Control variables				X	X	X
Obs.	140330	140330	140330	140330	140330	140330
R^2	.004	.004	.004	.058	.058	.058

Notes: The columns present different specifications of a (sharp) regression discontinuity model. The dependent variable is the log daily wage of the worker paid at her first month with the firm. The running variable (month of hiring) is centered at November 2011, when it takes value zero. The key regressor (Lower severance pay) is a dummy variable taking value one for individuals hired from November 2011 onwards and value zero otherwise. Control variables are worker's gender, age, foreigner, four region dummies, six sector dummies, and earliest month in the data. The sample is all individuals hired between April 2009 and March 2012. Own calculations based on Social Security data of new hires in their months of entry in the firm. Standard errors clustered at the month of hiring level. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 3: Wage effects, subsamples

	Men	Older workers	High wages	Full month	Manu-facturing	Worker FEs
	(1)	(2)	(3)	(4)	(5)	(6)
Lower severance pay	.016	.032	.032	.043	.018	.007
	(.017)	(.034)	(.052)	(.041)	(.048)	(.012)
Month of hiring (centered)	.003	.00004	-.002	-.001	-.0005	.002
	(.001)**	(.002)	(.002)	(.003)	(.003)	(.0007)***
Month of hiring (centered)^2	-5.46e-06	-.00005	-.0001	-.00009	-.00008	-.00003
	(.00003)	(.00004)	(.00005)**	(.00007)	(.00007)	(.00002)**
Const.	3.104	3.043	3.428	2.972	3.068	3.039
	(.011)***	(.017)***	(.021)***	(.028)***	(.023)***	(.007)***
Obs.	62543	64321	43039	46551	18190	140330
R^2	.005	.002	.005	.003	.004	.729

Notes: The columns present different specifications of a (sharp) regression discontinuity model. The dependent variable is the log daily wage of the worker paid at her first month with the firm. The running variable (month of hiring) is centered at November 2011, when it takes value zero. The key regressor (Lower severance pay) is a dummy variable taking value one for individuals hired from November 2011 onwards and value zero otherwise. The original sample is all individuals hired between April 2009 and March 2012. The subsamples considered are, in the same order as in the Table: male workers only, older workers (older than the mean age 36), high-wage workers only (workers that, throughout their different employment spells in the 2008-2011 period, are paid above the average of our sample of 664 euros), workers who have a full first month of work (which corresponds to 30 days), workers from manufacturing only, and all observations but including worker fixed effects. Own calculations based on Social Security data. Standard errors clustered at the month of hiring level. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 4: Wage effects, firm fixed effects and extra controls

	(1)	(2)	(3)	(4)	(5)	(6)
Lower severance pay	.027	.054	.079	.028	.028	.024
	(.015)*	(.018)***	(.024)***	(.021)	(.021)	(.027)
Month of hiring (centered)	.003	.00004	-.004	.0009	.0009	.002
	(.0003)***	(.001)	(.003)	(.001)	(.001)	(.003)
Month of hiring (centered)^2		-.00006	-.0003	-.00005	-.00005	-6.40e-06
		(.00002)***	(.0001)**	(.00002)**	(.00002)**	(.0001)
Month of hiring (centered)^3			-3.84e-06			6.79e-07
			(2.14e-06)*			(2.23e-06)
Const.	3.026	3.004	2.988	2.977	2.977	2.980
	(.006)***	(.011)***	(.014)***	(.015)***	(.015)***	(.019)***
Firm FE	X	X	X	X	X	X
Months FE				X	X	X
Obs.	140330	140330	140330	140330	140330	140330
R^2	.566	.566	.566	.568	.568	.568

Notes: The columns present different specifications of a (sharp) regression discontinuity model. The dependent variable is the log daily wage of the worker paid at her first month with the firm. The running variable (month of hiring) is centered at November 2011, when it takes value zero. The key regressor (Lower severance pay) is a dummy variable taking value one for individuals hired from November 2011 onwards and value zero otherwise. The sample is all individuals hired between April 2009 and March 2012. Months FE denotes dummies for each month from February to December, regardless of the year. Own calculations based on Social Security data. Standard errors clustered at the month of hiring level. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 5: Wage effects, alternative data set

	(1)	(2)	(3)	(4)
Lower severance pay	.0485	.0228	-.0210	-.0213
	(.0262)*	(.0156)	(.0223)	(.0201)
Month of hiring (centered)	-.0053	-.0038	.0002	.0004
	(.0012)***	(.0006)***	(.0017)	(.0025)
Month of hiring (centered)^2		-.0001	-.0001	-.0001
		(.00003)***	(.00002)***	(.00009)
Month of hiring (centered)^3			-8.00e-06	-8.00e-06
			(4.00e-06)**	(3.00e-06)**
Month of hiring (cent.)*Lower severance pay				-.0003
				(.0046)
Const.	1.6095	1.6475	1.6661	1.6668
	(.0156)***	(.0083)***	(.0110)***	(.0118)***
Obs.	689176	689176	689176	689176
R^2	.0113	.0128	.0133	.0133

Notes: The columns present different specifications of a (sharp) regression discontinuity model. The dependent variable is the log of the monthly wage. The running variable (month of hiring) is centered at November 2011, when it takes value zero. The key regressor ('Lower severance pay') is a dummy variable taking value one for individuals hired from November 2011 onwards and value zero otherwise. The sample is all individuals employed in October 2013 and hired in their current employment spell between October 2008 and September 2013. Own calculations based on the 'Quadros de Pessoal' data set. Standard errors clustered at the month of hiring level. Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 6: Wage effects, alternative data set, robustness

	(1)	(2)	(3)	(4)
Lower severance pay	.0220	.0123	.0047	-.0041
	(.0151)	(.0118)	(.0043)	(.0041)
Month of hiring (centered)	-.0038	-.0026	-.0027	-.0022
	(.0005)***	(.0005)***	(.0002)***	(.0002)***
Month of hiring (centered)^2	-.0001	-.00008	-.0001	-.0001
	(.00002)***	(.00003)**	(7.00e-06)***	(7.00e-06)***
Const.	1.6582	1.2083	1.6496	1.3245
	(.0142)***	(.0185)***	(.0028)***	(.0074)***
Month effects	X			X
Worker control variables		X		X
Firm fixed effects			X	X
Obs.	689176	682834	689176	682834
R^2	.0141	.2566	.5851	.6345

Notes: The columns present different specifications of a (sharp) regression discontinuity model. The dependent variable is the log of the monthly wage. The running variable (month of hiring) is centered at November 2011, when it takes value zero. The key regressor ('Lower severance pay') is a dummy variable taking value one for individuals hired from November 2011 onwards and value zero otherwise. The sample is all individuals employed in October 2013 and hired in their current employment spell between October 2008 and September 2013. Worker control variables are gender, age, and schooling dummy variables. Own calculations based on the 'Quadros de Pessoal' data set. Standard errors clustered at the month of hiring level. Significance levels: * 0.10, ** 0.05, *** 0.01.