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Market Reform on Unemployment Inflows  
and Outflows: a Regression Discontinuity  
Analysis using Duration Models***

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**JEL Classification:** J41, J64, C41



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## The Impact of the 2012 Spanish Labour Market Reform on Unemployment Inflows and Outflows: a Regression Discontinuity Analysis using Duration Models\*

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### ABSTRACT

This paper studies the impact of the 2012 Spanish labour market reform on the probability of exiting and entering unemployment using a regression discontinuity approach based on duration models. The 2012 reform modified important aspects of hiring and dismissal procedures in Spain and, by doing that, affected the probability of exiting both unemployment and employment. Comparing labour market performance before and after February 2012 and using a competing risk duration model for the exit from both unemployment and employment, we find that the reform has helped employment creation in two ways. First, it has increased the likelihood of exiting from unemployment to employment by making the monthly transition to permanent employment to increase from 1.7% to 2.6%, on average, for the first six months in unemployment. Secondly, it has reduced the probability of dismissal for workers on a temporary contract, especially among small firms, probably because they are using newly introduced internal flexibility measures in order to adjust the workforce, instead of using dismissals. The direct transition from temporary to permanent positions is also eased by the reform. Finally, we do not find any significant effect of the reform on the dismissal patterns for permanent workers. These findings point to a positive effect of the reform in dampening the widespread segmentation of the Spanish labour market, although the impact is so far small, which means that more effort will be needed in order to substantially reduce the strong duality of this labour market.

**Keywords:** labour reform, discontinuity design, unemployment hazard rate, employment hazard rate.

**JEL Codes:** J41, J64, C41.

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## 1. Introduction

The severe financial and economic crisis suffered in all developed countries since 2008 hit the Spanish labour market in a particularly hard way. The harmonised unemployment rate in Spain reached 26.3% in the first quarter of 2013, the second highest in the OECD area (only exceeded by Greece) and more than three times the OECD average (8.0%) at the time. Still on the first quarter of 2016, unemployment was above 20% and, what is even more worrying, long-term unemployment – defined as those unemployed for 12 months or more – was affecting to more than one out of any two unemployed in Spain. Despite this massive increase in unemployment, the wage component of unit labour costs in the business sector was slow to adjust. It did not decline in the first four years of the crisis, and its level at the end of 2011 was above that at the onset of the crisis.

The deterioration of the competitiveness of the Spanish economy dates back to the beginning of the 2000s (Bentolila et al., 2012), but the further decline during the early phases of the crisis and the upsurge of unemployment led to a reaction by the Spanish government with a series of structural reforms. A first labour reform in 2010 – among other provisions – facilitated the use of permanent contracts with reduced severance pay of 33 days of wages (instead of 45 days) per year of seniority, in the case of unjustified dismissal. It also expanded the conditions under which a dismissal for objective reasons could be justified. In this case, the employer pays 20, instead of 45 days of wages per year of seniority. Finally, it also introduced a subsidy equivalent to 8 days per year of service for dismissals in the case of firms with less than 25 employees.

A second major reform was undertaken in February 2012. This comprehensive reform had two main elements. First, it gave priority to collective bargaining agreements at the firm level over those established at the sector or regional level and made it easier for firms to opt-out from a collective agreement and to implement internal flexibility measures as an alternative to job destruction. Second, the provisions of Spain's Employment Protection Legislation were significantly modified, reshaping the definition of fair economic dismissal, reducing monetary compensations for unfair dismissal and eliminating the requirement of administrative authorisation for collective redundancies. In addition, a new permanent contract for full-time employees in small firms was introduced, entailing an extended trial period of one year.

In the four years that followed the reform, employment experienced a phase of net destruction followed by one of net creation. In the first twelve months after the approval of the reform, Social Security affiliation continued to decrease with a reduction of over 700 thousand affiliated workers. However, from February 2013 to the end of 2015 the number of workers affiliated to the Social Security increased by over 1.1 million. The net increase in employment in those four years was thus positive: there were over 400 thousand more affiliations by the end of 2015 than in February 2012. In addition, labour market flows experienced also important changes in those four years. The number of unemployed that found a job each quarter was around 922 thousand, a 10% higher than on the previous four years. In addition, flows from employment to unemployment decreased around 10% after the reform to around 809 thousand per quarter on average.

The objective of this paper is to study the impact of the 2012 Spanish labour market reform on the probability of exiting both unemployment and employment using duration models. The estimation of duration models to study the conditional probability of leaving employment and unemployment at each duration is a good way to establish if the reform has improved the probability of finding stable employment (if unemployed) or maintaining the existing one (if employed). These flow probabilities capture in a much better way the evolution of the labour market and thus give more insight than just analysing the stock of employment and/or unemployment.

This analysis updates and extends part of the analysis included in OECD (2014). While the OECD report analysed the impact of the reform only for the first 10 months after its approval, this analysis includes data up to 36 months after the reform, which allows not only to have more robust results but also to study a more medium-term impact of the reform in a period with net employment creation. In addition, our analysis studies the differential impact of the reform for different groups of individuals (men/women, young/old, long-term/short-term unemployed) who have different prospects in the labour market and to whom the reform might have affected differently. Finally, as different provisions of the reform affected only firms below a certain threshold, the impact of the reform is analysed for establishments of different sizes, to study the impact of those provisions. These include the *Contrato de Apoyo a Emprendedores*, a specific permanent employment contract available for firms with 50 or less employees with reduced social security contributions.

Our main results point to small but positive effects of the 2012 reform over both the exit from unemployment and employment. First, we find that the reform has increased the likelihood

of exiting from unemployment to employment by making the monthly transition to permanent employment to increase from 1.7% to 2.6%, on average, for the first six months in unemployment. Secondly, it has reduced the probability of dismissal for workers on a temporary contract, which we take as a sign that firms used newly introduced internal flexibility measures in order to adjust the workforce, instead of dismissals. We find also that the reform facilitated job-to-job transition from temporary to permanent positions: this transition increases on average, from 0.3 to 0.4% thanks to the reform, what is another positive outcome given this is an additional and even more efficient source for reducing duality: it entails no unemployment during the transition. Finally, we find no significant impact of the reform on the exit from permanent employment, which we interpret as evidence that the reduction in dismissal costs for permanent workers was compensated with the availability of alternative flexibility measures to a dismissal.

The rest of the paper is organized as follows: the following section summarizes the 2012 labour market reform, section 3 describes the empirical strategy, section 4 summarizes our main results and section 5 concludes.

## **2. The 2012 Spanish labour market reform**

The 2012 labour market reform was a comprehensive set of measures approved in February 2012 as *Real Decreto Ley 3/2012* that modified important aspects of the labour market regulation, in particular collective bargaining rules, dismissal regulations and hiring procedures (see OECD, 2014 for a complete description of the main changes introduced).

Collective bargaining procedures were modified to give priority to the collective bargaining agreements at the firm level above those at the sector or regional level, in order that those agreements could adjust more closely to the specific needs of a firm. Firms could also introduce more easily internal flexibility measures, including changes in working conditions (wages, working hours, etc.) whenever there were some specific objective reasons. In addition, those collective bargaining agreements that expire could only be prolonged for one year after their end date. All these changes in collective bargaining should allow employers make use more often of internal flexibility measures as an alternative to dismissals in the presence of adverse economic shocks.

Regarding dismissal legislation, the reform redefined the conditions for a fair dismissal and reduced, for all workers, the monetary compensation for unfair dismissal to 33 days' wages per year of seniority up to a maximum of 24 months, compared to the previous severance pay of 45 days up to a maximum of 42 months' wages.

As regards collective dismissals, the reform eliminated the requirement of administrative authorization for collective redundancies while maintaining the obligation of good-faith negotiations with unions before serving individual notice, in line with the current legislation in most OECD countries.

Finally, a new full-time permanent contract for small firms (under 50 employees) was created (*Contrato de Apoyo a Emprendedores*) which includes several hiring incentives and fiscal rebates for firms under 50 employees and allows an extended trial period of one year.<sup>1</sup> In addition, the reform extended the existing subsidy equivalent to 40% of ordinary severance pay (8 days per year of service, paid by a wage guarantee fund – FOGASA) to all cases of fair dismissal in the case of firms with less than 25 workers.<sup>2</sup>

### 3. Empirical strategy

Transitions between unemployment and employment are analysed using the *Muestra Continua de Vidas Laborales* (MCVL). This longitudinal dataset from social security registers covers employment histories of over one million individuals, making it a very good data source to study worker transitions out of unemployment. The MCVL covers around one in twenty persons registered in the social security and is representative of the whole population that had a relationship with social security in a given year.<sup>3</sup> These data are used to study the impact of the reform on both the hazard rate out of unemployment and the one for exiting from employment to unemployment by using a discrete-time competing-risk duration model. The empirical strategy followed is similar to the one followed in García-Pérez and Muñoz-Bullón (2011).

The probability of exiting unemployment after a spell of duration  $d$  to enter either temporary employment or permanent employment is simultaneously estimated for the two types of exits within a competing-risk framework. Both possible transitions are modelled using a logistic distribution as given by:

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1. Gamberoni et al. (2016) analyze the impact of these hiring incentives by means of a regression discontinuity design based on the firm size restriction for these new contracts. They conclude, by using firm-level data, that these subsidies show small but positive effects on the hiring decision of firms.
  2. The FOGASA subsidy however was dropped at the end of 2013. If this has not been the case, from that date small employers would have been liable for disbursing the same amount for open-ended and temporary contracts, in the case of fair dismissal, as the 2010 reform raised severance pay for fixed-term contracts to 12 days per year of service from 2014.
  3. See García-Pérez (2008) for further details on the MCVL data and its usefulness to study labour market transitions.

$$\begin{aligned} \Pr(U_{it} = d, L_{it} | U_{it} \geq d) = & \\ & F(\alpha_0 + \alpha_1 \ln(U_{it}) + \alpha_2 \ln(U_{it})^2 + \alpha_3 \ln(U_{it})^3 + \alpha_4 X_{1it} + \alpha_5 X_{2it} + \alpha_6 X_{1it} * \ln(U_{it}) + \alpha_6 \text{prevempl}_{it} \\ & + \gamma \text{FEDEA}_t + \beta_1 \Delta \log E_{jt} + \beta_2 \Delta \log E_{jt} * \ln(U_{it}) + \delta_0 I_{t>R} + \sum_{s=1}^N (\lambda_s + \delta_s I_{t>R})(t - R)^s + m_t) \end{aligned} \quad (1)$$

where  $\ln(U_{it})$  represents the logarithm of the unemployment duration for the individual  $i$  which terminates in month  $t$ .  $L_{it}$  represents the type of contract to which they are hired upon exiting unemployment, and  $X_1$  refers to the following individual characteristics: age and education categories and an indicator of whether the individual receives unemployment benefits or not. These are also included in interaction with the duration of the unemployment spell.  $X_2$  stands for controls for gender, migrant status and region, while *prevempl* comprises a set of dummies controlling for previous employment's sector of activity as well as the number of times the individual has been unemployed and the percentage of time he has been employed throughout his labour market career. The economic cycle is controlled by using the FEDEA index of economic activity<sup>4</sup> at the national level and the change in log employment at the provincial level ( $\Delta \log E$ ).  $R$  is the moment at which the reform is approved (February 2012) and therefore  $I_{t>R}$  is a binary variable which covers the reform's effect, being equal to 1 from February 2012 onwards and equal to 0 prior to that date. The trend of the series analyzed is specified as a polynomial of  $N$  terms and is allowed to have different coefficients before and after February 2012 by means of interaction terms with the variable  $I_{t>R}$ . Finally,  $m$  represents the monthly binary variables which are covered by seasonal dummies.

The exit from employment to unemployment is modelled in the same way. Equation (2) presents its specification, where  $J$  refers to the duration of the employment spell, which ends at time  $d$  for the worker  $i$ . The unique difference with respect to equation (1) is that the duration dependence of this hazard rates includes, apart from a polynomial in log duration, a set of dummies that control for labour contract duration at specific months (6, 12, 24 and 36).

$$\begin{aligned} \Pr(J_{it} = d | J_{it} \geq d) = & \\ & F(\alpha_0 + \alpha_1 \ln(J_{it}) + \alpha_2 \ln(J_{it})^2 + \alpha_3 \ln(J_{it})^3 + \alpha_4 X_{1it} + \alpha_5 X_{2it} + \alpha_6 X_{1it} * \ln(J_{it}) + \alpha_6 \text{ContractDur}_{it} \\ & + \gamma \text{FEDEA}_t + \beta_1 \Delta \log E_{jt} + \beta_2 \Delta \log E_{jt} * \ln(J_{it}) + \delta_0 I_{t>R} + \sum_{s=1}^N (\lambda_s + \delta_s I_{t>R})(t - R)^s + m_t) \end{aligned} \quad (2)$$

4. The FEDEA index of economic activity is an indicator that summarizes the evolution of economic activity in Spain using information available from many different sources (GDP, industrial production, indices of economic sentiment, etc.). For further information, see <http://www.fedea.net/indice/indice-f.html>.

Equations (1) and (2) are estimated for a sample of Spanish workers aged 16-64 during the period 2003-2014 (2006-2014 for the subsample differentiating by establishment size). Transitions from unemployment to employment are conditional on being unemployed for at least fifteen days and durations are censored at 36 months of unemployment – that is, those spells lasting more than 36 months are considered to be censored at the 36<sup>th</sup> month.<sup>5</sup>

The basic identifying assumption implies that, conditional on the controls included in the model, entry or exit from unemployment of a group of individuals is smooth over time, and that any change or discontinuity in the series can be attributed to an exogenous change that happened at that point in time. Specifically, we will assume that any observed change around February 2012 is due to the labour market reform, which was implemented on that date. However, one month before the National Agreement for Employment and Collective Bargaining took place,<sup>6</sup> and it is possible that part of the effect is due as well to it (as both occurred almost at the same time, it is not possible to separate between them). Nevertheless, it seems unlikely that the agreement would have had a major *immediate* effect on the inflows and outflows from unemployment, as the agreement was only a guideline to employers and trade unions and it related mostly to wage conditions and firms' internal flexibility.

Obviously, misspecification of the empirical model might lead to identify a discontinuous shift in performance around the date of a reform even when this shift occurs before the reform (and cannot therefore be attributed to it). To validate the empirical model, therefore, placebo tests need to be run. Thus, we run placebo tests that “anticipate” the date of the reform to December 2011, September 2011, June 2011 and March 2011. Our results should show that no significant impact can be found in any of those dates.

A second issue concerns possible manipulations around the threshold. For example, if the introduction of the *Contrato de Apoyo a Emprendedores* were anticipated, employers eligible for the subsidy could delay hiring to after the reform in order to enjoy the subsidy. However, the details and the breadth of the reform were never mentioned during the national election campaign in 2011. It is therefore reasonable to assume that if threshold manipulation occurred, that is, if firms postponed certain choices until the approval of the reform, this phenomenon concerned, at worst, only the period January to March 2012. In order to test for this bias, any of the baseline

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5. The estimation sample is composed of 196,585 individuals for whom we observe 362,957 unemployment spells and 341,642 employment spells. More information about this sample can be found in García Pérez (2016).

6. The *Acuerdo sobre Empleo y Negociación Colectiva* was approved by employer's associations and labour unions on the 25th of January 2012.

models will be re-estimated excluding the period from January to March 2012 from the sample as an additional robustness check.

In any case, our identification strategy does not allow distinguishing the effect of each provision implemented by the reform, only the overall effect. There were however two provisions contained in the reform that have arguably a differential effect for firms above and below a specific firm size threshold: i) the *Contrato de Apoyo a Emprendedores*, available for firms with no more than 50 workers and ii) the suppression of back-pay in the case of unfair dismissal and the clarification of fair economic dismissal, which eliminated the incentive for employers to take the route of “*despido expreso*” (the most common route before). Although this applies in principle to all firms, the reform has increased the probability for firms with less than 25 employees to receive the severance-pay subsidy, for which they are eligible only in the case of fair dismissals.

## 4. Results

### 4.1. Exit from unemployment into employment

In this section we will present several sets of results. First, the results of estimating the exit rate from unemployment to any kind of job and afterwards a second model that distinguishes between exits to temporary employment and exits to permanent employment. Furthermore, supplementary results will be presented from models that allow differentiating between the exit to temporary or permanent work according to the size of the company which hires the unemployed person. For this purpose, we shall consider the values of companies which employ 25 and 50 employees to be critical, since these are the threshold values which decide access to subsidies from FOGASA (25 employees) and which allow the possibility of signing the new *contrato de Apoyo a Emprendedores* (50 employees).

Table 1 shows the value of the estimated coefficients for the first two models. The specification of the unemployment exit rate includes, as explained in Section 3, a polynomial specification for the duration dependence, as commonly done in these models. Specifically, the dependence of this exit rate with respect to unemployment duration has been modelled using a third degree polynomial in the logarithm of unemployment duration. Similarly, the time trend of the data in the sample has been modelled by means of a second degree polynomial with different coefficients for the pre- and post-reform period, i.e. for before and after February 2012. This specification provides more flexibility to the model as it allows for a possible discontinuity in the evolution of the dependent variable at the moment of the reform's approval. Finally, as well as

binary variables for each month in which the exit from unemployment occurs, the autonomous community of residence, and the economic sector from which the unemployed worker originates, the main regressors included in the estimated models are: gender, nationality, age (those under the age of 30 are in the constant term), qualification (low-skilled people are in the constant term), whether or not unemployment benefits were received, the number of prior periods of unemployment, the percentage of time which the individual has been employed during his/her working life, the year-on-year variation of the total number of affiliated contributors to Social Security (acting as an indicator of the cyclical condition of the job market at a provincial level), and the rate of change of the FEDEA index to capture the cycle's status at the national level.

[Table 1 – see at the END OF THE PAPER]

As usually in this type of models (see Meyer, 1990, for example), the duration of the unemployment period significantly reduces the probability of joining the workforce in a non-linear manner. Conversely, unemployment benefits strongly reduce the probability of re-employment, although their impact diminishes with respect to the duration of the period of unemployment (see García-Pérez and Rebollo, 2015).<sup>7</sup> Age has also a significant impact on the probability of exiting unemployment, particularly for young people: they have a smaller probability of exiting to a permanent job than their more senior counterparts. The degree of qualification has also an impact on the probability of exiting to work under a temporary or a permanent contract: those more qualified have the highest chance of exiting to permanent employment, whilst those lesser qualified exit more frequently to a temporary position. Being an immigrant is another detrimental factor to join the workforce, especially with respect to being hired on a permanent contract. Men exit unemployment to a temporary position sooner than women, the latter being more likely to join the workforce in a permanent position.

The business cycle has the expected effects on the probability of exiting from unemployment: the FEDEA index of economic activity has a positive and significant effect on the likelihood of exiting unemployment, and higher employment growth at a provincial level also has a highly positive impact on the exit rate. Finally, the second degree polynomial trends also appear to be very important and show a different evolution of the unemployment exit rate before and after the reform, something which could indicate that the trend of the analysed series is somewhat more positive as of February 2012 independently of how the market has evolved since that date. Finally, the impact of the 2012 labour reform on the transition from unemployment to any type of employment, without making a distinction between exits to temporary and permanent

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7. Nevertheless, our estimation does not take into account the time remaining until payments are exhausted, in contrast to García-Pérez and Rebollo (2015). The adjustment of the unemployment benefits replacement rates from 60 to 50% which was approved by the Government in July 2012 could be behind the pronounced negative effective shown by this variable in our estimations.

employment, is positive and significant, as shown in the final part of Table 1. The estimated coefficient of the *dummy* variable which covers the reform is +0.0882, which implies that the unemployment exit rate increased by 9.2% thanks to the reform, that is to say it rises from 0.095 to 0.104 on average.<sup>8</sup>

If we distinguish between exit from unemployment to a temporary contract and to a permanent contract, we can see in Table 1 that the estimated impact of the reform is greater and significant only in the case of exiting to permanent employment (the estimated coefficient is 0.414 compared with 0.041 for exiting to temporary employment). This means that, according to these results, the labour reform has lifted the possibility of exiting unemployment to a permanent job by 51.3% whilst it has had an insignificant impact on the exit rate to temporary employment. The average unemployment exit rate to temporary employment in our sample was 8.15% (11.8% for the first twelve months in unemployment) and has not significantly varied due to the reform. The average unemployment exit rate to permanent employment was 1.2% (1.7% for the first twelve months in unemployment) and has shifted to an average of 1.75% due to the reform (2.6% on average for the first twelve months of unemployment).

**Table 2:** Main Results for the exit from unemployment

	To Any Employment	To Temporary Employment	To Permanent Employment
t	-0.00747*** (0.00167)	-0.00526*** (0.00172)	-0.0238*** (0.00366)
t <sup>2</sup>	-1.82e-05 (2.33e-05)	1.25e-05 (2.42e-05)	-0.000243*** (5.06e-05)
t $I_{t>R}$	0.0174*** (0.00354)	0.0183*** (0.00353)	0.0123 (0.00906)
t <sup>2</sup> $I_{t>R}$	-0.000546*** (0.000102)	-0.000647*** (0.000104)	0.000155 (0.000260)
$I_{t>R}$	0.0882** (0.0345)	0.0411 (0.0365)	0.414*** (0.0736)

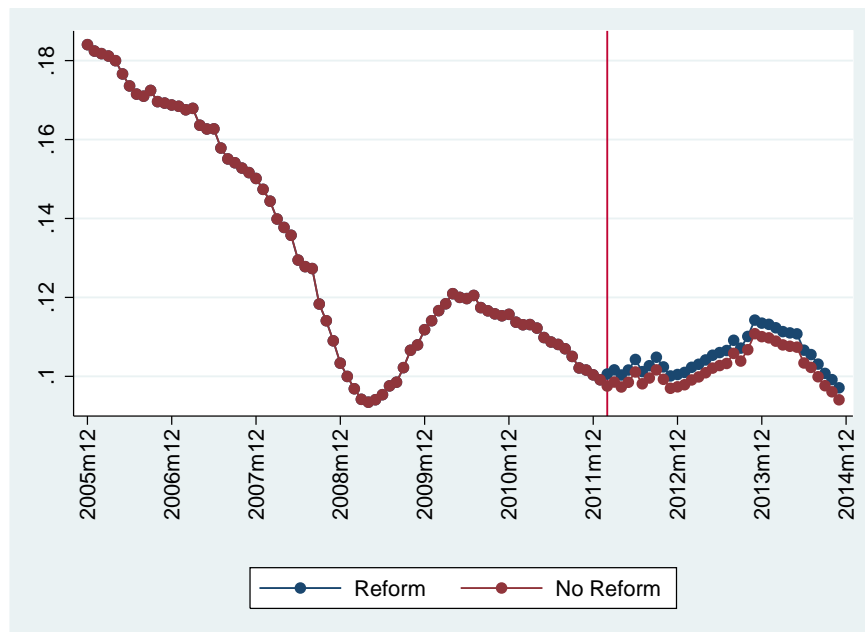
**Notes:** No. of observations: 3,099,026. Robust Standard Errors in parenthesis.

As Table 2 shows, the estimated behaviour of exiting unemployment to general employment is very different for the period before and after the introduction of the labour reform, i.e. February 2012. We observe that although the general trend of this series is decreasing before 2012 (independently of the individual and aggregate characteristics considered), following the introduction of the labour reform the series shows a positive and quadratic trend with a negative drift. Something similar occurs in the model distinguishing between the type of contract

8. This calculation is derived from the following formula, commonly known as *odds ratio*:  $[\text{Pr}(\text{after}) - \text{Pr}(\text{before})] / \text{Pr}(\text{before}) = \exp(0.0882) - 1$ .

in the new job, albeit in this case the trend shifting with the introduction of the reform is that of the exit from unemployment to temporary employment, which develops a more positive trend compared with the period before the reform. However, with respect to the unemployment exit rate to permanent employment, no change is estimated in the trend of the additional series for the knock-on effect discussed earlier and which raises this exit rate by 51.3%.

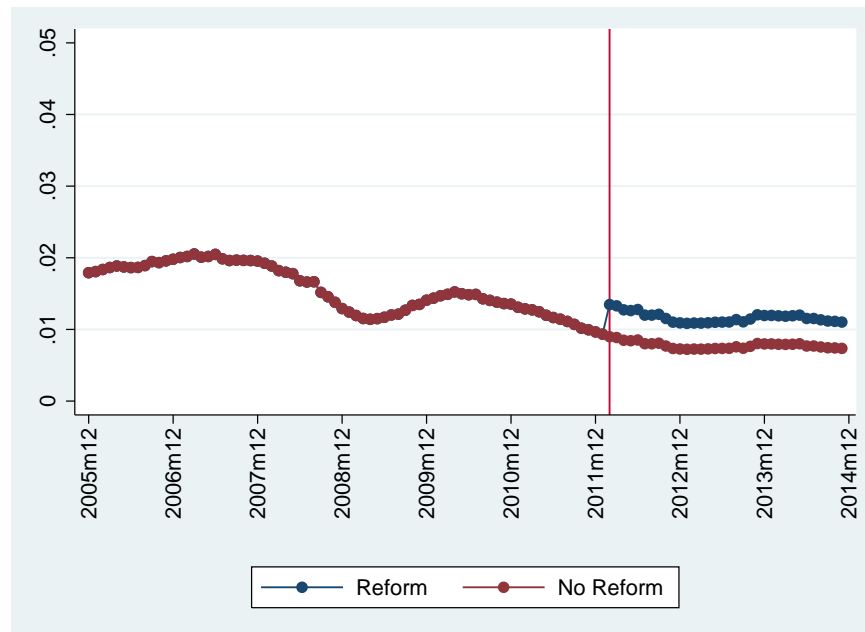
**Figure 1:** Predicted transition from unemployment to temporary employment



To fully assess the development of these series, the coefficients concerning the effect of the business cycle (the change in log employment at the provincial level and the FEDEA index of economic activity) must be considered jointly with the coefficients shown in Table 2. Therefore, Figures 1 and 2 respectively show the predicted effect of the reform on the average transition from unemployment to temporary employment and the transition to permanent employment for unemployment durations equal to or lower than six months. In these figures, we can clearly ascertain that the impact of the reform is greater on the exit rate to permanent employment than that observed on the exit rate to temporary employment. In fact, the coefficient which tracks the reform's impact on the exit rate to temporary employment is not significantly different to zero. Taking the values indicated above as reference values, our model predicts that, whilst prior to the reform exiting to temporary employment was 7 times more probable than exiting to a permanent position, following February 2012 the aforementioned ratio was reduced to a probability around 4.6 times higher thanks to the measures included in the labour reform. Nevertheless, it is

important to note that exiting to permanent employment continues to be highly unlikely in the Spanish job market even after the approval of the measures included in the 2012 reform.

**Figure 2:** Predicted transition from unemployment to permanent employment



Compared with the results obtained in OECD (2014), our results show the reform is having a greater effect on the exit rate to permanent employment (0.391 compared with the previously estimated coefficient equal to 0.256) and a similarly insignificant impact on the exit rate to temporary work. Apart from the differing sample period used in this analysis in comparison with that report (here until the end of 2014, compared with the end of 2012 in OECD, 2014), the main difference between our model and the estimation in that report is the different specification for the trend of the series before and after the reform which allows the possible causal effect of the policy to be better identified in our case. In fact, the point estimate of our model with a common trend for both sub-periods (0.265) is nearly identical to the one obtained in OECD (2014).<sup>9</sup>

9. The estimated coefficients are not equal because in our estimation we have used only the FEDEA index as a proxy for the status of the business cycle at the national level. Another difference with that report is that we decided not to use certain indicators of work history previous to the status of unemployment (for example, the indicator as to whether the unemployed person was fired or not from their previous employment) that were used in OECD (2014) due to the possible endogeneity problem it may suffer. Moreover, we have decided to unify consecutive employment spells within the same company with unemployment interruptions of less than fifteen days. This means that the estimation sample is slightly different to that used in OECD (2014) and therefore the results are not exactly identical as those obtained in that report.

**Table 3:** The effect of the reform on the transition from Unemployment to Employment  
Monthly data, Coefficient for the reform dummy in each of the estimated models

Exit from Unemployment to Employment		Common pre and post reform trend				Different pre and post reform trend			
		1st. grade	2nd. grade	3rd. grade	4th. grade	1st. grade	2nd. grade	3rd. grade	4th. grade
U to E	All sample	0.155***	0.190***	0.187***	0.0535*	0.169***	0.0882**	0.0232	0.0384
U to Temp.	All sample	0.156***	0.171***	0.158***	0.0224	0.169***	0.0411	-0.0180	0.0113
U to Perm.		0.147***	0.314***	0.395***	0.268***	0.172***	0.414***	0.283***	0.219***
U to Temp.	Establish. <=50 workers	0.218***	0.232***	0.198***	0.0493	0.252***	0.0807*	0.0210	0.0283
	Establish. >50 workers	0.0852***	0.100**	0.112***	-0.0103	0.0683**	-0.00522	-0.0730*	-0.0177
U to Perm.	Establish. <=50 workers	0.278***	0.416***	0.515***	0.447***	0.284***	0.609***	0.490***	0.493***
	Establish. >50 workers	-0.00358	0.198***	0.266***	0.0690	0.0408	0.183*	-0.00269	-0.159
U to Temp.	Establish. <=25 workers	0.229***	0.250***	0.210***	0.0456	0.271***	0.0853**	0.0112	0.0222
	Establish. 25-50 workers	0.153***	0.134***	0.133***	0.0659	0.138***	0.0482	0.0687	0.0639
	Establish. >50 workers	0.0852***	0.100**	0.112***	-0.0103	0.0683**	-0.00524	-0.0729*	-0.0177
U to Perm.	Establish. <=25 workers	0.277***	0.419***	0.530***	0.464***	0.281***	0.650***	0.469***	0.439***
	Establish. 25-50 workers	0.283***	0.401***	0.441***	0.364**	0.300***	0.407***	0.593***	0.736***
	Establish. >50 workers	-0.00354	0.198***	0.266***	0.0691	0.0408	0.183*	-0.00248	-0.158

**Notes:** \*\*\*, \*\*, \*: significant coefficient at 1%, 5% y 10%, respectively.

In this type of models, which tries to capture the causal impact of a change in an economic policy by means of the discontinuity in the series affected by that change, the results may be very dependent to the particular specification of the trend before and after the moment in which the aforementioned discontinuity occurs. Therefore, we estimated the model under different specifications for the dummy capturing the effect of the reform and also for the time trend in each specification. The results for all these alternative specifications are shown in Table 3. Moreover, this table also covers the impact of the reform on other alternative specifications when the number of destinations to which a worker can proceed upon exiting unemployment is increased. The estimated coefficients in the models already shown in Table 1 are covered in the first two panels. The third panel covers an alternative model where exit is allowed to either temporary or permanent work, drawing a distinction between companies with more or fewer than 50 employees. The objective here is to see if the limit imposed in the reform for the new *Contrato de Apoyo a Emprendedores*, only available to companies with fewer than 50 employees, has a differential impact in terms of unemployment exit rate. Finally, the model in the fourth panel of Table 3 allows for a competing risk model with six possible exits, in this case allowing a distinction to be drawn between exits to companies with fewer than 25 employees, between 25 and 50 employees, and more than 50 employees. The objective now is to see if the

FOGASA benefits available until the end of 2013 acted as an additional incentive for companies with fewer than 25 employees.

In the first place, the results of Table 3 reflect the high level of stability of the estimated coefficients for the impact of the reform, independently of the specification for the trend, both when a common trend is imposed before and after the reform as well as when differences are allowed between the subperiods before and after February 2012. Although in some cases the model which does not distinguish between temporary and permanent workers estimates insignificant effects for the 2012 reform, the estimated effect on the exit from unemployment to a permanent position is always significant when a differential impact is allowed for the exit from unemployment to a temporary position and the exit to a permanent position.

Additionally, in the third panel of Table 3 we can verify that the impact of the 2012 reform is more relevant among companies with fewer than 50 employees. Focusing on our preferred specification, shown in Table 1, with a quadratic polynomial and a different impact for the two sub-periods pre- and post-reform, the estimated coefficient for exiting unemployment to temporary employment is not significant in either type of company. However, for the exit from unemployment to a permanent position, the estimated coefficient for companies with fewer than 50 employees is more than three times bigger than for larger companies (0.609 compared with 0.183). These results might be indicative that companies with fewer than 50 employees, which can access the subsidies and benefits associated with the new *Contrato de Apoyo a Emprendedores* are the ones that are more encouraged to offer a permanent contract following the reform's approval. An additional exercise which supports this conclusion (and which consists of comparing the unemployment exit rate to permanent employment around this 50-worker limit) indicates that for companies with between 40 and 50 employees, the estimated coefficient is +0.392, whilst for very similar companies with between 51 and 60 employees, the coefficient is not significant.<sup>10</sup>

Finally, the model shown in the final panel of Table 3 emphasizes that those companies with fewer than 25 employees are the ones which are hiring the most unemployed people to permanent contracts following the reform's introduction (+0.650 compared with 0.407 for companies with between 26 and 50 employees, and 0.183 for companies with more than 50 employees). This result is indicative that the existent incentives to sign permanent contracts for these companies which less than 25 employees (explained in Section 2) are working. In the event of dismissal, the compensation costs were practically the same as those of a temporary contract, because there the FOGASA benefit was available (until the end of 2013). In fact, if we

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10. These results are available upon request from the authors but are not shown in order to save on space for the remaining results in the paper.

once again adjust the size margin even more in order to compare exits to companies which are very similar in size but slightly above or below this 25-worker limit, we obtain very illuminating results which show that this margin is important for exiting to permanent employment. Comparing companies of between 20 and 25 employees with companies of between 26 and 30, the estimated coefficient for exiting to permanent employment is +0.677 compared with +0.393, with this difference only being significant for the period in which the FOGASA benefits were available, i.e. until the end of 2013.

**Table 4: The effect of the reform on Transitions out of Unemployment into temporary employment and into permanent employment, by type**

Monthly data, coefficients of the competing-risk hazard models  
Different 2nd order polynomial trend pre- and post-reform

		Women	Men	Young (<30y)	Old(>30y)
U to C	All sample	0.112***	0.0716*	0.0874**	0.0942**
U to TC	All sample	0.0601	0.0295	0.0346	0.0532
U to PC		0.410***	0.440***	0.634***	0.314***
U to TC	Establish. <=50 empl.	0.0925**	0.0714	0.0944**	0.0729
	Establish. >50 empl.	0.0224	-0.0315	-0.0332	0.0276
U to PC	Establish. <=50 empl.	0.613***	0.590***	0.769***	0.520***
	Establish. >50 empl.	0.223*	0.170*	0.421***	0.0799
U to TC	Establish. <=25 empl.	0.127***	0.0586	0.0962**	0.0814*
	Establish. 25<x<=50 empl.	-0.0721	0.139**	0.0873	0.0235
	Establish. >50 empl.	0.0237	-0.0311	-0.0320	0.0280
U to PC	Establish. <=25 empl.	0.671***	0.623***	0.847***	0.551***
	Establish. 25<x<=50 empl.	0.364*	0.458**	0.427*	0.398**
	Establish. >50 empl.	0.223*	0.171*	0.424***	0.0797

Notes: U: unemployment; C: any employment contract; PC: permanent employment; TC: temporary employment. \*\*\*, \*\*, \*: significant at the 1%, 5% and 10% level, respectively.

As additional exercise, we present in Table 4 the results of the same model in Table 1 but for different subgroups of the sample of estimation. We can observe in this table, for example, that the impact of the reform is somewhat greater for men than for women, and likewise considerably greater for under 30s than for people over that age. The estimated impact of the reform is especially high on the exit rate from unemployment to permanent employment among young people: the estimated coefficient for these workers is 0.634 compared with 0.314 among the remaining workers. Calculating the estimated odds ratio for these cases, this means that the exit to permanent employment among young people has grown by almost 88.5% compared with

an estimated growth of 36.9% for people over the age of 30. Since this exit to permanent employment among young people is around 1.1% monthly on average, our estimation implies that this rate may have risen to levels of around 2.07% thanks to the reform.

**Table 5:** The effect of the reform on the transition from short-term and long-term unemployment  
Monthly data, Coefficient for the reform dummy in each of the estimated models  
Different Polynomial for the pre and post-reform time trend (2nd order)

	UNEMPLOYMENT DURATION <= 12 MONTHS				
	All	Females	Males	Young (age<30y)	Older (Age>30y)
Exit to Employment					
- Any contract	0.0758**	0.0859**	0.0740*	0.0632	0.0922**
Exit to Employment					
- Temporary Contract	0.0299	0.0383	0.0302	0.0110	0.0538
- Permanent Contract	0.391***	0.353***	0.456***	0.612***	0.296***
Exit to Employment					
- Temp. <50 workers	0.0680*	0.0749*	0.0685	0.0788*	0.0655
- Temp. >50 workers	-0.0146	0.00290	-0.0261	-0.0614	0.0388
- Perm. < 50 workers	0.571***	0.555***	0.585***	0.762***	0.480***
- Perm. > 50 workers	0.184*	0.188	0.235**	0.391***	0.101
	UNEMPLOYMENT DURATION > 12 MONTHS				
	All	Females	Males	Young (age<30y)	Older (Age>30y)
Exit to Employment					
- Any contract	0.0863*	0.220***	-0.0468	0.143***	0.0301
Exit to Employment					
- Temporary Contract	0.0273	0.135*	-0.0760	0.0903*	-0.0353
- Permanent Contract	0.556***	0.825***	0.212	0.660***	0.471***
Exit to Employment					
- Temp. <50 workers	0.0532	0.147	-0.0211	0.0789	0.0311
- Temp. >50 workers	-0.0158	0.102	-0.155*	0.0817	-0.119
- Perm. < 50 workers	0.779***	0.968***	0.545**	0.749***	0.793***
- Perm. > 50 workers	0.135	0.588**	-0.499**	0.508*	-0.187

**Notes:** \*\*\*, \*\*, \*: significant coefficient at 1%, 5% y 10%, respectively.

A different exercise can be seen in Table 5 which shows the results when the model is estimated separately for short- and long-term unemployed workers (that is, twelve months or less and more than twelve months unemployed). Although for the whole population at an aggregate level few differences are observed between the reform's impact on short-term and long-term unemployed periods (the estimated coefficients for the reform's impact are similar in magnitude but some differences emerge in their significance levels), the impacts tend to be more significant for short-term periods of unemployment. When we also make distinctions according to the

gender or age of the unemployed person, some interesting differences emerge. Thus it appears that the reform has had a more positive impact for long-term unemployed women than for men in the same situation: the exit to permanent employment is greater for women (0.825) than men (0.212). Young people, however, continue to show a greater positive impact of the reform, both for those who are short-term unemployed (0.612) as well as for those who are unemployed for more than twelve months (0.660).

**Table 6: The effect of the reform on the transition from unemployment: different post-reform samples**

Monthly data, Coefficient for the reform dummy in each of the estimated models  
Different Polynomial for the pre and post-reform time trend (2nd order)

		Post-reform sample period:		
		2012	2012-2013	2012-2014
U to E	All sample	0.142***	0.0998***	0.0882**
U to Temp.	All sample	0.103***	0.0508	0.0411
U to Perm.		0.397***	0.439***	0.414***
U to Temp.	Establish. <=50 workers	0.145***	0.107***	0.0795*
	Establish. >50 workers	0.0428	-0.0194	-0.00590
U to Perm.	Establish. <=50 workers	0.604***	0.651***	0.603***
	Establish. >50 workers	0.0925	0.144	0.183*
U to Temp.	Establish. <=25 workers	0.137***	0.110***	0.0839*
	Establish. 25-50 workers	0.170***	0.0841	0.0477
	Establish. >50 workers	0.0430	-0.0194	-0.00594
U to Perm.	Establish. <=25 workers	0.619***	0.674***	0.644***
	Establish. 25-50 workers	0.527***	0.549***	0.404***
	Establish. >50 workers	0.0926	0.144	0.183*

**Notes:** \*\*\*, \*\*, \*: significant coefficient at 1%, 5% y 10%, respectively.

From results shown in Table 6, we can conclude that the impact of the reform was not immediately felt: the estimated coefficient on the exit from unemployment to permanent employment using only data from a year after the reform is somewhat smaller (0.397) than when

using data from up to two (0.439) or three (0.414) years following the reform. In any case, the differences are only slightly significant. The first column of this table also allows us to compare our results with those obtained in OECD (2014). Only data from 2012 was used in this report, and it was found that the reform's effect on the transition to permanent employment was positive and significant, with an estimated coefficient on this transition of +0.256. Comparing with the first column of Table 5, we can now see that with the same data our estimated coefficient is somewhat higher (+0.397). This difference must arise from the changes to the database which has been used in our estimation and which, as was noted above, consisted of the unification of consecutive employment spells within the same company with unemployment interruptions of less than fifteen days as well as the non-consideration of explanatory variables with possible endogeneity problems. In any case, our results are along similar lines to those obtained in OECD (2014) and they contain, in our view, a higher degree of reliability due to the larger estimation sample considered and due to the robustness tests performed. Finally, the result we obtain when using just the first 10 months after the approval of the reform can also be seen as a closer look to the discontinuity generated by the reform. By focusing only in that period we get almost the same result than when using the complete estimation period what helps us to conclude that the model is correctly identifying the causal effect of the reform by means of the discontinuity design approach we use.

For all this analysis to be consistent, it is important that the indicator variable designed to measure the change introduced by the reform in February 2012 actually captures the impact of the labour market reform and no other developments that might have happened some months before. Table 7 covers the results of different estimations with placebo effects which try to 'anticipate' the date of the change in the series when analysing November, August, May, and February in 2011 and November and August in 2010. As can be verified in this table, only when we anticipate the dates a few months before the real date is the effect on unemployment exit somewhat significant. However, it is smaller in absolute value to that found when we consider the true change that took place in February 2012. If we anticipate the reform's effect by at least twelve months, the effect is then never significant, and if it is, it appears with the opposite sign to that found in our assessment exercise. From this we can conclude with a high degree of certainty that the discontinuity effect of February 2012 is the only one which identifies the true effect of the reform.

[Table 7 and remaining tables at the END OF THE PAPER]

One important caveat that may arise when analysing transition probabilities is the presence of unobserved heterogeneity (see, for example, Van den Berg, 2001). It is well known that if this heterogeneity is not considered when estimating the exit from unemployment to employment, some of the effects estimated maybe biased, particularly the effect of unemployment duration, which may be negatively biased when unobserved heterogeneity is not controlled for. Table 8 presents the results for the estimation of the first model in Table 1 comparing the main

coefficients in this model when unobserved heterogeneity is (and it is not) controlled for. The way this heterogeneity is introduced in our model is by assuming it follows a discrete distribution with two mass points (See Heckman and Singer, 1984). Hence, apart from the rest of coefficients in the hazard rate, we have to estimate the two mass points and the probability of being in one of this points (the complementary one gives the value for this heterogeneity component taken the value in the second mass point).<sup>11</sup> As this table shows, the impact of the reform when unobserved heterogeneity is taken into account is basically similar under both specifications. Furthermore, the impact of unemployment duration and that of the pre and post-reform trend are all quite similar under both specifications. Hence, we conclude that the effect of unobserved heterogeneity, if present in the data, is not changing much of the analysis regarding the exit from unemployment.

As a final robustness check, we have replicated the regressions on transitions out of unemployment using as controls for the economic cycle both the economic activity at a national level, measured by the FEDEA index of economic activity, and by the change in log employment at the provincial level, or only the FEDEA index. The results in table 9 show that the impact of the reform is very similar under any of the two sets of controls for the economic cycle.

#### 4.2. Exit from employment into unemployment

The labour market reform could have modified as well the dismissal behaviour of firms. As mentioned in Section 2, the reform changed not only dismissal rules but also the alternative options available to firms to adjust their staff. Therefore, in addition to the transitions out of unemployment already shown, we will analyse the transitions out of employment into unemployment as defined in equation (2), including the transitions from a temporary contract into unemployment and from a permanent contract into unemployment. In addition, we will analyse if the reform had as well an impact on job-to-job transitions.

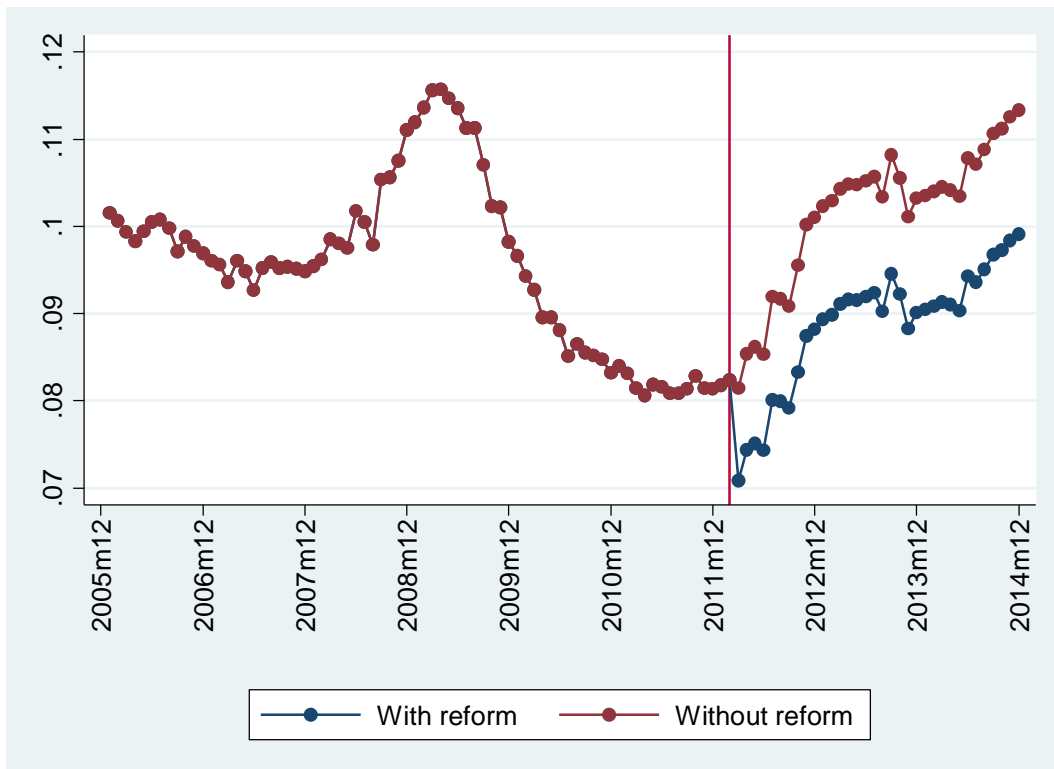
The main coefficients of the model as specified in equation (2) for the transitions from employment into unemployment are shown in Table 10, where the variable that measures the impact of the labour market reform is binary with value 1 from February 2012 onwards and value zero beforehand. This table shows the results for exits from any employment, from temporary employment and from permanent employment and includes two specifications, one with the

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11. In fact, the specification shown in Table 8 only estimates one mass point,  $\eta_1$ , because the model also has a constant term. Thus, the first mass point is fixed to zero and  $\eta_2$  represents the additional impact of being in the second mass point. The probability in this table is capturing the share of the sample being in the second mass point.

impact of the reform captured only by the variable  $I_{t>R}$  and an alternative where this variable is interacted with firm size in order to test whether there exists a differential impact of the reform among different firm's size.

**Figure 3:** Predicted transition from temporary employment to unemployment for small firms – i.e. 1 to 9 employees – for durations of 6 months or less



As shown in Table 10, the reform does not seem to have a significant impact on the probability of exiting employment overall, neither for any employment nor for temporary or permanent employment. However, it does seem to have a significant and differential impact for small firms, both when an identical polynomial trend is used before and after the reform and when we allow for a different polynomial trend. The interaction between the reform coefficient and firm size shows that the reform reduced the probability of exiting employment more for smaller firms (with less than 50 employees), and in particular for the smallest ones (those with 1 to 9 employees). If we differentiate between exits from temporary and from permanent employment, we find that the reform seems to have modified exits from temporary employment only. Figure 3 shows the predicted impact of the reform over the transitions from temporary employment (in the first 6 months) to unemployment, for the average values of all variables (except for the polynomial trend and the economic cycle variables). On the contrary, the probability of exiting permanent employment does not seem to be affected in a significant way

by the reform. However, the reform on the one hand changed dismissal rules reducing dismissal costs, which could facilitate dismissals, and on the other hand also made available alternative options for firms to adjust their staff (like modifying the number of hours, working conditions or wage conditions). The results could be indicative thus that both effects compensated each other for the case of permanent employment.

The rest of the regression coefficients show impacts similar to the ones found previously in the literature for the probability of dismissal in Spain (See Garcia-Perez and Muñoz-Bullón, 2011, for example). The probability of dismissal is much lower for those individuals with permanent contracts and less dependent on contract duration than for those in temporary employment. The duration of employment affects the probability of dismissal in a non-linear way and the probability increases at specific lengths of the contract, especially for temporary contracts (at one, 6, 12, 24 and 36 months), as seen in Guell and Petrongolo (2007). Age has also an impact on the probability of leaving employment: younger individuals are less likely to exit to unemployment than their older counterparts. Qualification has a protective effect on the probability of leaving employment: those on more skilled positions are less likely to move into unemployment. Being an immigrant increases the probability of leaving employment, in particular from a permanent job. Male individuals are less likely to leave employment than women. The previous individual employment and unemployment history have an impact on the probability of exiting employment: the larger the percentage of time in his labour market career the individual has been employed, the less likely he is to leave employment; the more unemployment spells the individual has had, the more likely he is to exit to unemployment again. The controls for the economic cycle try to isolate the impact of the reform from that of the economic cycle: the polynomial trends of second order are significant and are allowed to differ before and after the reform. The economic cycle is measured by the economic activity at a national level, measured by the FEDEA index of economic activity, and by the change in log employment at the provincial level. When estimated jointly, the FEDEA index does not have a significant impact and the impact of the change in log employment is quite significant and negative, which means that firing is far more likely when employment is decreasing.

Table 11 shows the results of the impact of the reform on transitions from employment into unemployment by firm size using the same or different polynomial trends before and after the reform. The impact of the reform for specific firm sizes is robust to changes in the polynomial trend specification: the coefficients are very similar in both specifications (and alternative ones not shown here as well).

In order to account for the potential endogeneity of the log employment at the provincial level, we have also estimated the transitions from employment into unemployment

with and without this variable as a robustness check. Table 12 shows the results using as controls for the economic cycle both the economic activity at a national level, measured by the FEDEA index of economic activity, and by the change in log employment at the provincial level, or only the FEDEA index. The impact of the reform is similar using any of the two sets of regressors as controls for the cycle (for the regressions shown here as well as the rest of estimations not shown here). However, the FEDEA index has a significant impact when it is the only control for the economic cycle.

We have also estimated the impact of the reform for particular groups (women, men, young and older workers) as well as the results of competing risk models where in addition to the risk of dismissal there is possibility of moving from job to job without going into unemployment. Table 13 shows that the reform reduced the probability of a transition from temporary employment into unemployment for small firms (with less than 50 employees). The impact is more sizeable the smaller the firm. However, the reform does not seem to have modified (as we discussed previously) the probability of a transition from permanent employment into unemployment. Between individuals, women and younger individuals are the ones more affected by the reform, while men and older individuals seem to be less affected.

When taking into account the possibility of moving as well from job to job, we can observe that the reform had a positive and significant impact on the probability of moving between jobs, but only for those on temporary contracts (see results in table 14). This feature of the reform is positive as more mobility between contracts adds dynamism into the labour market. In this case, the impact on the probability of moving between jobs is not dependent on the size of the firm in which the individual was working (as it was the case for exits into unemployment). The impact of the reform is stronger for women on temporary employment than for men, and for older individuals than for young (table 15): they have at the same time reduced the probability of exiting temporary employment into unemployment and increased the probability of moving into another job. The effect on job-to-job transitions complements the previous impacts of a comprehensive labour market reform that added dynamism, albeit only partially, to the Spanish labour market. To explore this issue a bit further, we have also estimated a model where the job-to-job option is split into two additional options: exit to a new job under a temporary contract and exit to a new job under a permanent contract. The results for this model are shown in Table 16 where we find that the job-to-job transitions that have grown the most after the 2012 reform are the ones to a new permanent contract. This is very interesting because, through this channel, the reform is also helping to reduce duality as basically those employed in a temporary contract are the ones with larger probabilities of direct transition to a permanent contract. Again, this effect is the largest for small firms, especially for those with between 10 and 49 workers. The monthly

job-to-job transition to a permanent position for temporary workers in these firms increases, on average, from 0.3 to 0.4% thanks to the reform.<sup>12</sup>

**Table 16: The impact of the reform on Transitions from Employment into unemployment, a new Temporary Contract or a new Permanent Contract, by firm size**

Monthly data, coefficients of the competing-risk hazard models

	Out of Employment			Permanent Contract			Temporary Contract		
	Job-to-Unem	Job-to-job to a TC	Job-to-job to a PC	Job-to-Unem	Job-to-job to a TC	Job-to-job to a PC	Job-to-Unem	Job-to-job to a TC	Job-to-job to a PC
t	0.00253*** (0.000544)	-0.00843*** (0.000653)	-0.00431*** (0.000824)	0.00124 (0.000987)	-0.0107*** (0.00137)	-0.00170* (0.00100)	0.00296*** (0.000511)	-0.00809*** (0.000665)	-0.00856*** (0.00139)
t $I_{t>R}$	0.00689** (0.00336)	0.00529 (0.00457)	0.00187 (0.00592)	0.00701** (0.00312)	0.00392 (0.00582)	-4.59e-05 (0.00672)	0.00655* (0.00354)	0.00503 (0.00456)	0.00513 (0.00583)
$I_{t>R}$ (=1 after feb/2012)	<b>-0.120**</b> (0.0517)	<b>0.223***</b> (0.0635)	<b>0.128</b> (0.100)	<b>-0.0542</b> (0.132)	<b>-0.0587</b> (0.134)	<b>0.111</b> (0.123)	<b>-0.133***</b> (0.0479)	<b>0.250***</b> (0.0632)	<b>0.0559</b> (0.104)
<b>Interaction with firm size:</b>									
$I_{t>R}$ * Firm Size 1 to 9	<b>-0.203***</b> (0.0627)	<b>-0.0553</b> (0.0365)	<b>-0.000636</b> (0.0828)	<b>-0.268</b> (0.176)	<b>0.285**</b> (0.130)	<b>-0.00700</b> (0.105)	<b>-0.183***</b> (0.0536)	<b>-0.0771**</b> (0.0363)	<b>0.0997</b> (0.110)
$I_{t>R}$ * Firm Size 10 to 24	<b>-0.109*</b> (0.0558)	<b>-0.0360</b> (0.0372)	<b>0.171**</b> (0.0854)	<b>-0.0726</b> (0.159)	<b>0.369**</b> (0.156)	<b>0.116</b> (0.113)	<b>-0.104*</b> (0.0544)	<b>-0.0757*</b> (0.0457)	<b>0.347***</b> (0.105)
$I_{t>R}$ * Firm Size 25 to 49	<b>-0.0999**</b> (0.0487)	<b>-0.0572</b> (0.0462)	<b>0.181**</b> (0.0885)	<b>-0.0696</b> (0.140)	<b>0.309*</b> (0.172)	<b>0.129</b> (0.116)	<b>-0.107**</b> (0.0488)	<b>-0.0912*</b> (0.0539)	<b>0.315***</b> (0.116)
$I_{t>R}$ * Firm Size 50 to 99	<b>-0.0517</b> (0.0435)	<b>-0.0889*</b> (0.0536)	<b>0.109</b> (0.0769)	<b>-0.0998</b> (0.137)	<b>0.245</b> (0.155)	<b>0.0736</b> (0.104)	<b>-0.0432</b> (0.0434)	<b>-0.118**</b> (0.0565)	<b>0.206*</b> (0.109)
$I_{t>R}$ * Firm Size 100 to 249	<b>-0.0449</b> (0.0379)	<b>-0.0136</b> (0.0521)	<b>0.0963</b> (0.0971)	<b>-0.0696</b> (0.101)	<b>0.239*</b> (0.128)	<b>-0.0149</b> (0.116)	<b>-0.0412</b> (0.0472)	<b>-0.0342</b> (0.0571)	<b>0.346**</b> (0.146)

Robust standard errors in parentheses. Linear polynomial pre and post reform.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Finally, as in the case of the exit from unemployment, we have also estimated the models for the exit from employment by controlling for the potential presence of unobserved heterogeneity in the data. As Table 17 shows, our main results regarding the impact of the reform over the exit from employment both when we consider all types of jobs and also when we distinguish between the temporary and permanent workers. Again, and as it is usual, the duration dependence of these hazard rates are a bit less negative but the impact of the reform on the exit from small firms is negative, especially among temporary workers.

12 The marginal positive impact of the reform in the direct transition to a new temporary contract for those already in a permanent contract is somehow surprising. Maybe they are the results of voluntary transitions. In any case, this transition is very low in monthly terms (0.25% on average) so the positive impact shown in Table 16 for small firms is only changing this transition rate marginally (from 0.25 to 0.33% on average).

## 5. Conclusions

The 2012 labour market reform in Spain appears to have been a significant step in the direction of tackling and solving some of its main structural problems. As a result, the Spanish labour market has already shown some signs of increased dynamism and lower dualism. The reform focused primarily on collective bargaining and on dismissal regulations. This paper provides an analysis of the short- to medium-run effects of the reform on labour market performance. The results confirm that, as suggested before (e.g. OECD, 2014, Izquierdo et al. 2013, Ministerio de Empleo y Seguridad Social, 2013, BBVA, 2013), the reform has had an effect on hiring, particularly on permanent contracts, which is most likely the outcome of the relaxation of dismissal regulations. Consistently, the reform appears to have also reduced the duration of unemployment spells, essentially due to faster transitions towards a permanent contract. In addition, there are signs of a fall in the segmentation of the labour market insofar as transitions to permanent jobs have increased in particular for workers entering unemployment after a temporary contract. Finally, there is also some evidence of a reduction in separations, particularly for temporary workers, possibly resulting from the application of internal flexibility measures as an alternative to contract termination.

Using information on a sample of more than 200,000 workers employed and unemployed in Spain between 2003 and 2014 and applying an identification strategy based on a discontinuity design similar to that described in Hahn et al. (2001), we try to identify the time change in the probability of exiting both unemployment and employment that can be attributed to the effect of the Labour Market reform adopted in Spain on February 2012. We implement this policy evaluation exercise by estimating a discrete time duration model for the exit rate from unemployment to employment and from employment to unemployment.

Our results indicate that the 2012 Labour Reform seems to have increased the probability of exiting from unemployment to permanent employment, both in absolute and relative terms against the alternative of exiting to a temporary contract. As a result, we can say that the reform has succeeded in reducing the degree of duality of the Spanish labour market. Indeed, our analysis confirms that, as obtained in OECD (2014), the reform has increased the probability of leaving unemployment to permanent employment. In particular, it increased from 1.7% to 2.6%, on average during the first twelve months of unemployment. However, as the exit to temporary employment remains by far being the most likely option, the overall impact of this increase on the stock of permanent workers is still not very relevant in the short term.

Finally, the effect of the reform on transitions from employment to unemployment seems to be quite different for temporary and permanent employment. On the one hand, the

reform reduced job destruction rates of temporary workers, probably because firms are making use of the new measures of internal flexibility available since 2012. We find also that the reform made easier to observe a job-to-job transition from temporary to permanent positions, what is another positive outcome of this reform given this is an additional and even more efficient source for reducing duality: it entails no unemployment during the transition. On the other hand, however, the reform did not lead to any significant effect on dismissal patterns for permanent workers (either positive or negative). We interpret this result as evidence that the reduction in dismissal costs for permanent workers, which could have increased their exit to unemployment, could have been compensated by the availability of alternative flexibility measures also introduced by the 2012 reform (flexibility in hours, wages and other working conditions). Our results for permanent workers seem to indicate that these two types of measures could have counteracted each other resulting in no effect on the exit from employment to unemployment for permanent workers.

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**Table 1: Exit from Unemployment to Employment**

Exit to:	To any Employment	To a Temp. Employment	To a Perm. Employment
ln(unempl. duration)	-1.318*** (0.0706)	-1.517*** (0.0547)	-0.0538 (0.182)
ln(unempl. duration) <sup>2</sup>	0.551*** (0.0537)	0.699*** (0.0405)	-0.380** (0.148)
ln(unempl. duration) <sup>3</sup>	-0.127*** (0.0108)	-0.154*** (0.00836)	0.0405 (0.0298)
With unempl. Benefits	-1.099*** (0.0354)	-1.107*** (0.0318)	-1.057*** (0.0792)
* ln (unempl. duration)	0.151*** (0.0181)	0.167*** (0.0173)	0.0320 (0.0329)
Age 31-44	0.0507*** (0.0147)	0.0176 (0.0137)	0.284*** (0.0303)
Age 45-64	-0.100*** (0.0261)	-0.231*** (0.0177)	0.561*** (0.0554)
ln (unempl. duration) * Age 31-44	-0.138*** (0.0110)	-0.138*** (0.0108)	-0.122*** (0.0188)
ln (unempl. duration) * Age 45-64	-0.196*** (0.0137)	-0.180*** (0.0119)	-0.254*** (0.0281)
High qualification	-0.0522** (0.0208)	-0.0879*** (0.0230)	0.106** (0.0503)
Low qualification	0.0483*** (0.0141)	0.0718*** (0.0116)	-0.0954** (0.0445)
ln (unempl. duration) * High qualif.	0.0124 (0.00920)	0.00131 (0.00982)	0.110*** (0.0217)
ln (unempl. duration) * Low qualif.	-0.00461 (0.00643)	-0.0142** (0.00594)	0.0766*** (0.0192)
t	-0.00747*** (0.00167)	-0.00526*** (0.00172)	-0.0238*** (0.00366)
t <sup>2</sup>	-1.82e-05 (2.33e-05)	1.25e-05 (2.42e-05)	-0.000243*** (5.06e-05)
t $I_{t>R}$	0.0174*** (0.00354)	0.0183*** (0.00353)	0.0123 (0.00906)
t <sup>2</sup> $I_{t>R}$	-0.000546*** (0.000102)	-0.000647*** (0.000104)	0.000155 (0.000260)
Immigrant	-0.216*** (0.0394)	-0.185*** (0.0399)	-0.388*** (0.0469)
Male	0.0202 (0.0154)	0.0640*** (0.0118)	-0.284*** (0.0456)
No. Of Unempl. Spells	0.0597*** (0.00140)	0.0594*** (0.00136)	0.0667*** (0.00244)
% of time employed	1.165*** (0.0685)	0.982*** (0.0633)	2.766*** (0.114)
$\Delta \log E$	1.605*** (0.442)	1.571*** (0.434)	1.501 (0.950)
ln (unempl. duration) * $\Delta \log E$	0.310 (0.250)	0.261 (0.241)	0.912** (0.463)
FEDEA Index	0.0882*** (0.0169)	0.0867*** (0.0169)	0.101*** (0.0293)
$I_{t>R}$ (=1 after feb/2012)	0.0882** (0.0345)	0.0411 (0.0365)	0.414*** (0.0736)
Constant term.	-2.105*** (0.0613)	-2.085*** (0.0574)	-5.735*** (0.114)

**Notes:** Number of observations: 3,099,026. Robust Standard Errors in parenthesis.

**Table 7: Placebo tests for the exit from unemployment to employment**

Monthly data, Coefficient for the reform dummy in each of the estimated models  
 Different Polynomial for the pre and post-reform time trend (2nd order)

		Reform	Placebo tests					
		feb-12	nov-11	ago-11	may-11	feb-11	nov-10	ago-10
U to E	All sample	0.0882**	0.0435	0.0194	0.0449	0.00983	0.00382	-0.0134
U to Temp.	All sample	0.0411	0.00972	-0.0127	0.0301	0.0123	0.0113	-0.00682
U to Perm.		0.414***	0.284***	0.251***	0.156**	0.00138	-0.0456	-0.0469
U to Temp.	Establish. <=50 workers	0.0795*	0.0449	0.0324	0.0713*	0.0501	0.0324	-0.00599
	Establish. >50 workers	-0.00590	-0.0289	-0.0613*	-0.0140	-0.0278	-0.00815	-0.00438
U to Perm.	Establish. <=50 workers	0.603***	0.447***	0.291***	0.150*	0.0161	-0.0295	-0.132*
	Establish. >50 workers	0.183*	0.106	0.198**	0.157*	-0.000761	-0.0383	0.0495
U to Temp.	Establish. <=25 workers	0.0839*	0.0500	0.0320	0.0786*	0.0665*	0.0479	0.0104
	Establish. 25-50 workers	0.0477	0.0130	0.0324	0.0322	-0.0340	-0.0444	-0.0862**
	Establish. >50 workers	-0.00594	-0.0290	-0.0613*	-0.0140	-0.0279	-0.00828	-0.00448
U to Perm.	Establish. <=25 workers	0.644***	0.541***	0.318***	0.150*	0.0532	0.00635	-0.118*
	Establish. 25-50 workers	0.404***	-0.000965	0.161	0.147	-0.156	-0.193	-0.182
	Establish. >50 workers	0.183*	0.105	0.198**	0.157*	-0.00108	-0.0386	0.0493

**Notes:** \*\*\*, \*\*, \*: significant coefficient at 1%, 5% y 10%, respectively.

**Table 8: The effect of the reform on the transition from unemployment to employment controlling for unobserved heterogeneity**

Monthly data

	No Unobserv. Heterog. Control	With Unobsev. Heterog. Control
Indurparo	-1,3180 ***	-1,2832 ***
Indurparo2	0,5514 ***	0,5968 ***
Indurparo3	-0,1271 ***	-0,1351 ***
T	-0,0075 ***	-0,0136 ***
t2	0,0000 **	-0,0001 ***
t $I_{I>R}$	0,0174 ***	0,0229 ***
t <sup>2</sup> $I_{I>R}$	-0,0005 ***	-0,0005 ***
$\bar{I}_{I>R}$ (=1 after feb/2012)	0,0882 ***	0,1204 ***
Constant Term	-2,1055 ***	-2,7308 ***
Heterog. Inobserv component		
$\eta_2$		1,1517 ***
Pr( $\eta = \eta_2$ )		0,6634 ***

**Table 9: The effect of the reform on Transitions out of Unemployment, controlling for the potential endogeneity of the provincial employment control variable**  
Monthly data, coefficients of the competing-risk hazard models

	To any Employment		To Temporary Empl.		To Permanent Empl.	
$\log E$	1.605***		1.571***		1.501	
	(0.442)		(0.434)		(0.950)	
$\ln(\text{empl. duration}) * D\log E$	0.310		0.261		0.912**	
	(0.250)		(0.241)		(0.463)	
FEDEA Index	0.0882***	0.145***	0.0867***	0.141***	0.101***	0.173***
	(0.0169)	(0.0139)	(0.0169)	(0.0143)	(0.0293)	(0.0171)
$I_{t>2}$ (=1 after feb/2012)	0.0882**	0.0765**	0.0411	0.0289	0.414***	0.408***
	(0.0345)	(0.0379)	(0.0365)	(0.0393)	(0.0736)	(0.0772)

**Table 9 (Cont.): Coefficient for the reform dummy in each of the estimated models:**  
Monthly data, coefficients of the competing-risk hazard models

		Controls for the economic cycle included:	
		$\Delta \log E$ and Fedea Index	Fedea Index only
U to E	All sample	0.0882**	0.0765**
U to Temp.		0.0411	0.0289
U to Perm.	All sample	0.414***	0.408***
	Establish. <=50 workers	0.0807*	0.0686
U to Temp.	Establish. >50 workers	-0.00522	-0.0175
	Establish. <=50 workers	0.609***	0.599***
U to Perm.	Establish. >50 workers	0.183*	0.181*
	Establish. <=25 workers	0.0853**	0.0740
	Establish. 25-50 workers	0.0482	0.0324
U to Temp.	Establish. >50 workers	-0.00524	-0.0175
	Establish. <=25 workers	0.650***	0.640***
	Establish. 25-50 workers	0.407***	0.406***
U to Perm.	Establish. >50 workers	0.183*	0.181*

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 10: Estimation results of Transitions from Employment into unemployment**

Monthly data, coefficients of the competing-risk hazard models

	Out of Employment		Permanent Contract		Temporary Contract	
ln(empl. duration)	0.508*** (0.183)	0.504*** (0.183)	2.650*** (0.537)	2.648*** (0.537)	0.654*** (0.185)	0.648*** (0.185)
ln(empl. duration) <sup>2</sup>	-0.323*** (0.0930)	-0.320*** (0.0932)	-0.929*** (0.220)	-0.928*** (0.220)	-0.449*** (0.104)	-0.445*** (0.105)
ln(empl. duration) <sup>3</sup>	0.0245 (0.0156)	0.0239 (0.0157)	0.0797*** (0.0282)	0.0795*** (0.0282)	0.0425** (0.0184)	0.0418** (0.0184)
Empl. Duration 1 Month	0.854*** (0.0972)	0.853*** (0.0973)	2.293*** (0.337)	2.293*** (0.337)	0.868*** (0.0902)	0.866*** (0.0902)
Empl. Duration 6 Months	0.614*** (0.0339)	0.614*** (0.0339)	0.197** (0.0932)	0.197** (0.0930)	0.699*** (0.0276)	0.699*** (0.0276)
Empl. Duration 12 Months	1.032*** (0.0516)	1.032*** (0.0516)	-0.274*** (0.0668)	-0.274*** (0.0667)	1.394*** (0.0517)	1.394*** (0.0517)
Empl. Duration 24 Months	0.372*** (0.0376)	0.372*** (0.0376)	-0.0847 (0.0595)	-0.0850 (0.0595)	0.666*** (0.0516)	0.666*** (0.0517)
Empl. Duration 36 Months	0.492*** (0.0545)	0.491*** (0.0545)	0.224*** (0.0698)	0.223*** (0.0695)	0.735*** (0.0806)	0.735*** (0.0807)
Age 31-44	0.108*** (0.0106)	0.108*** (0.0106)	0.180*** (0.0426)	0.180*** (0.0427)	0.125*** (0.0110)	0.125*** (0.0110)
Age 45-64	0.250*** (0.0144)	0.250*** (0.0144)	0.356*** (0.0503)	0.352*** (0.0505)	0.277*** (0.0170)	0.278*** (0.0170)
ln(empl. duration) * Age 31-44	0.00501 (0.00642)	0.00480 (0.00642)	0.0143 (0.0182)	0.0143 (0.0182)	-0.0141** (0.00644)	-0.0143** (0.00644)
ln(empl. duration) * Age 45-64	0.00625 (0.00954)	0.00593 (0.00953)	0.0496*** (0.0189)	0.0507*** (0.0190)	-0.0392*** (0.00907)	-0.0395*** (0.00908)
High Qualification	-0.397*** (0.0189)	-0.397*** (0.0189)	-0.592*** (0.0593)	-0.587*** (0.0592)	-0.328*** (0.0228)	-0.329*** (0.0228)
Medium Qualification	-0.154*** (0.0115)	-0.155*** (0.0115)	-0.373*** (0.0481)	-0.373*** (0.0482)	-0.122*** (0.0118)	-0.123*** (0.0118)
ln(empl. duration) * High Qualif.	-0.00903 (0.0105)	-0.00986 (0.0105)	0.0520*** (0.0199)	0.0494** (0.0202)	-0.0307** (0.0138)	-0.0315** (0.0138)
ln(empl. duration) * Medium Qualif.	0.0150* (0.00787)	0.0149* (0.00788)	0.0785*** (0.0185)	0.0782*** (0.0185)	0.00510 (0.00695)	0.00493 (0.00696)
Permanent Contract	-1.341*** (0.0314)	-1.344*** (0.0312)				
Immigrant	0.0993*** (0.0141)	0.0968*** (0.0138)	0.229*** (0.0311)	0.228*** (0.0312)	0.0648*** (0.0142)	0.0623*** (0.0140)
Male	-0.0341** (0.0140)	-0.0351** (0.0140)	-0.123*** (0.0318)	-0.123*** (0.0317)	-0.00658 (0.0115)	-0.00776 (0.0116)
No. Unempl. Spells	0.0545*** (0.00122)	0.0544*** (0.00122)	0.104*** (0.00188)	0.104*** (0.00187)	0.0441*** (0.00127)	0.0440*** (0.00126)
% time employed	-1.067*** (0.0599)	-1.065*** (0.0600)	-0.877*** (0.125)	-0.880*** (0.124)	-1.077*** (0.0563)	-1.075*** (0.0567)
t	-0.00809** (0.00328)	-0.00829** (0.00326)	-0.00605 (0.00602)	-0.00607 (0.00602)	-0.00660** (0.00323)	-0.00684** (0.00321)
t <sup>2</sup>	-0.000246** (0.000125)	-0.000252** (0.000124)	1.72e-05 (0.000242)	1.53e-05 (0.000242)	-0.000240** (0.000120)	-0.000246** (0.000119)
t <sup>3</sup>	-1.35e-06 (1.31e-06)	-1.39e-06 (1.30e-06)	2.36e-06 (2.76e-06)	2.34e-06 (2.76e-06)	-1.51e-06 (1.22e-06)	-1.55e-06 (1.22e-06)
t $I_{t>R}$	0.0212 (0.0133)	0.0209 (0.0133)	0.000361 (0.0172)	0.000553 (0.0171)	0.0239* (0.0128)	0.0236* (0.0128)
t <sup>2</sup> $I_{t>R}$	-0.00258** (0.00104)	-0.00256** (0.00104)	-0.000628 (0.00127)	-0.000653 (0.00126)	-0.00286*** (0.00103)	-0.00285*** (0.00102)
t <sup>3</sup> $I_{t>R}$	7.19e-05*** (2.20e-05)	7.16e-05*** (2.20e-05)	2.60e-05 (2.52e-05)	2.66e-05 (2.50e-05)	7.89e-05*** (2.21e-05)	7.85e-05*** (2.20e-05)

$\Delta \log E$	-2.205*** (0.567)	-2.183*** (0.569)	-0.547 (1.318)	-0.501 (1.307)	-2.692*** (0.541)	-2.674*** (0.542)
$\ln(\text{empl. duration}) * \Delta \log E$	0.437 (0.328)	0.436 (0.330)	-0.709** (0.312)	-0.709** (0.311)	0.882*** (0.337)	0.880*** (0.338)
FEDEA Index	-0.0214 (0.0159)	-0.0221 (0.0159)	-0.0235 (0.0300)	-0.0253 (0.0299)	-0.0148 (0.0153)	-0.0153 (0.0153)
Firm Size 1 to 9	0.248*** (0.0260)	0.319*** (0.0233)	0.360*** (0.0749)	0.456*** (0.0875)	0.221*** (0.0246)	0.285*** (0.0212)
Firm Size 10 to 24	0.178*** (0.0227)	0.216*** (0.0231)	0.315*** (0.0633)	0.348*** (0.0805)	0.144*** (0.0244)	0.180*** (0.0233)
Firm Size 25 to 49	0.134*** (0.0204)	0.169*** (0.0218)	0.315*** (0.0562)	0.345*** (0.0730)	0.0915*** (0.0223)	0.127*** (0.0227)
Firm Size 50 to 99	0.117*** (0.0180)	0.136*** (0.0206)	0.277*** (0.0524)	0.318*** (0.0638)	0.0837*** (0.0203)	0.0990*** (0.0229)
Firm Size 100 to 249	0.113*** (0.0158)	0.130*** (0.0169)	0.196*** (0.0418)	0.226*** (0.0557)	0.0941*** (0.0199)	0.110*** (0.0200)
$I_{t>R}$ (=1 after feb/2012)	<b>-0.0358</b> (0.0462)	<b>0.0615</b> (0.0559)	<b>0.0448</b> (0.0761)	<b>0.171</b> (0.145)	<b>-0.0583</b> (0.0410)	<b>0.0299</b> (0.0471)
<b>Interaction Reform with firm size:</b>						
$I_{t>R}$ * Firm Size 1 to 9		<b>-0.203***</b> (0.0620)		<b>-0.272</b> (0.176)		<b>-0.181***</b> (0.0527)
$I_{t>R}$ * Firm Size 10 to 24		<b>-0.110**</b> (0.0553)		<b>-0.0791</b> (0.158)		<b>-0.104*</b> (0.0537)
$I_{t>R}$ * Firm Size 25 to 49		<b>-0.0994**</b> (0.0483)		<b>-0.0724</b> (0.139)		<b>-0.106**</b> (0.0482)
$I_{t>R}$ • Firm Size 50 to 99		<b>-0.0484</b> (0.0431)		<b>-0.103</b> (0.137)		<b>-0.0389</b> (0.0429)
$I_{t>R}$ • Firm Size 100 to 249		<b>-0.0457</b> (0.0374)		<b>-0.0741</b> (0.100)		<b>-0.0414</b> (0.0462)
Constant Term	-2.552*** (0.139)	-2.584*** (0.143)	-6.719*** (0.397)	-6.763*** (0.410)	-2.373*** (0.121)	-2.402*** (0.125)

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 11: The impact of the reform on Transitions from Employment into unemployment, by firm size**

Monthly data, coefficients of the competing-risk hazard models

Polynomial trend (common/different) pre- and post-reform up to the 3rd degree

	Employment to Unemployment		Permanent Empl. to Unemployment		Temporary Empl. to Unemployment	
	Common trend	Different trend	Common trend	Different trend	Common trend	Different trend
$I_{I>R}$ (=1 after feb/2012)	-0.0447	0.0615	0.132	0.171	-0.0817	0.0299
<b>Interaction Reform with firm size:</b>						
$I_{I>R}$ * Firm Size 1 to 9	-0.203***	-0.203***	-0.271	-0.272	-0.181***	-0.181***
$I_{I>R}$ * Firm Size 10 to 24	-0.110**	-0.110**	-0.0788	-0.0791	-0.104*	-0.104*
$I_{I>R}$ * Firm Size 25 to 49	-0.0998**	-0.0994**	-0.0734	-0.0724	-0.106**	-0.106**
$I_{I>R}$ * Firm Size 50 to 99	-0.0494	-0.0484	-0.104	-0.103	-0.0395	-0.0389
$I_{I>R}$ * Firm Size 100 to 249	-0.0460	-0.0457	-0.0739	-0.0741	-0.0418	-0.0414
<b>Firm Size:</b>						
1 to 9	0.320***	0.319***	0.456***	0.456***	0.286***	0.285***
10 to 24	0.216***	0.216***	0.348***	0.348***	0.180***	0.180***
25 to 49	0.170***	0.169***	0.345***	0.345***	0.128***	0.127***
50 to 99	0.137***	0.136***	0.318***	0.318***	0.0993***	0.0990***
100 to 249	0.131***	0.130***	0.226***	0.226***	0.110***	0.110***
<b>Polynomial trends:</b>						
t	0.00264	-0.00829**	-0.00290	-0.00607	0.00376**	-0.00684**
t <sup>2</sup>	0.000130***	-0.000252**	0.000144***	1.53e-05	0.000124**	-0.000246**
t <sup>3</sup>	2.16e-06***	-1.39e-06	3.72e-06***	2.34e-06	1.88e-06***	-1.55e-06
t $I_{I>R}$		0.0209		0.000553		0.0236*
t <sup>2</sup> $I_{I>R}$		-0.00256**		-0.000653		-0.00285***
t <sup>3</sup> $I_{I>R}$		7.16e-05***		2.66e-05		7.85e-05***
<b>Observations</b>	3,716,388	3,716,388	1,996,781	1,996,781	1,719,607	1,719,607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 12: Estimation results of Transitions from Employment into unemployment - potential endogeneity of the provincial employment control variable**

Monthly data, coefficients of the competing-risk hazard models

	Out of Employment				Permanent Contract				Temporary Contract			
DlogE	-2.205***		-2.183***		-0.547		-0.501		-2.692***		-2.674***	
	(0.567)		(0.569)		(1.318)		(1.307)		(0.541)		(0.542)	
ln (empl. duration) * DlogE	0.437		0.436		-0.709**		-0.709**		0.882***		0.880***	
	(0.328)		(0.330)		(0.312)		(0.311)		(0.337)		(0.338)	
FEDEA Index	-0.0214	-0.0628***	-0.0221	-0.0629***	-0.0235	-0.0829***	-0.0253	-0.0836***	-0.0148	-0.0549***	-0.0153	-0.0549***
	(0.0159)	(0.0118)	(0.0159)	(0.0118)	(0.0300)	(0.0195)	(0.0299)	(0.0195)	(0.0153)	(0.0116)	(0.0153)	(0.0116)
$I_{t>R}$ (=1 after feb/2012)	-0.0358	-0.0227	0.0615	0.0761	0.0448	0.0692	0.171	0.198	-0.0583	-0.0474	0.0299	0.0424
	(0.0462)	(0.0478)	(0.0559)	(0.0571)	(0.0761)	(0.0758)	(0.145)	(0.145)	(0.0410)	(0.0431)	(0.0471)	(0.0490)
<b>Interaction Reform with firm size:</b>												
$I_{t>R}$ * Firm Size 1 to 9			-0.203***	-0.205***			-0.272	-0.276			-0.181***	-0.183***
			(0.0620)	(0.0623)			(0.176)	(0.176)			(0.0527)	(0.0531)
$I_{t>R}$ * Firm Size 10 to 24			-0.110**	-0.113**			-0.0791	-0.0818			-0.104*	-0.107**
			(0.0553)	(0.0555)			(0.158)	(0.159)			(0.0537)	(0.0541)
$I_{t>R}$ * Firm Size 25 to 49			-0.0994**	-0.103**			-0.0724	-0.0760			-0.106**	-0.110**
			(0.0483)	(0.0484)			(0.139)	(0.140)			(0.0482)	(0.0484)
$I_{t>R}$ * Firm Size 50 to 99			-0.0484	-0.0508			-0.103	-0.107			-0.0389	-0.0415
			(0.0431)	(0.0433)			(0.137)	(0.137)			(0.0429)	(0.0431)
$I_{t>R}$ * Firm Size 100 to 249			-0.0457	-0.0486			-0.0741	-0.0787			-0.0414	-0.0444
			(0.0374)	(0.0375)			(0.100)	(0.101)			(0.0462)	(0.0464)

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 13: The impact of the reform on Transitions from Employment into unemployment, by type and firm size**

Monthly data, coefficients of the competing-risk hazard models

	Exit from Permanent Employment to Unemployment (1)					Exit from Temporary Employment to Unemployment (1)				
	All	Women	Men	Young (<30y)	Old(>30y)	All	Women	Men	Young (<30y)	Old(>30y)
$\Delta \log E$	<b>-0.501</b> (1.307)	<b>-0.182</b> (1.438)	<b>-0.792</b> (1.467)	<b>0.450</b> (1.474)	<b>-1.002</b> (1.451)	<b>-2.674***</b> (0.542)	<b>-3.133***</b> (0.605)	<b>-1.951***</b> (0.633)	<b>-2.885***</b> (0.559)	<b>-2.593***</b> (0.576)
$\ln(\text{empl. duration}) * D \log E$	<b>-0.709**</b> (0.311)	<b>-0.804**</b> (0.350)	<b>-0.558</b> (0.396)	<b>-0.601</b> (0.428)	<b>-0.660**</b> (0.333)	<b>0.880***</b> (0.338)	<b>0.867***</b> (0.315)	<b>0.875**</b> (0.418)	<b>0.843**</b> (0.354)	<b>0.904***</b> (0.341)
FEDEA Index	<b>-0.0253</b> (0.0299)	<b>-0.0654**</b> (0.0311)	<b>0.00769</b> (0.0329)	<b>-0.0712**</b> (0.0344)	<b>-0.0104</b> (0.0323)	<b>-0.0153</b> (0.0153)	<b>-0.0143</b> (0.0209)	<b>-0.0206</b> (0.0131)	<b>-0.0196</b> (0.0163)	<b>-0.0129</b> (0.0162)
$I_{t \rightarrow R}$ (=1 after feb/2012)	<b>0.171</b> (0.145)	<b>0.111</b> (0.0911)	<b>0.239</b> (0.187)	<b>0.328**</b> (0.154)	<b>0.119</b> (0.145)	<b>0.0299</b> (0.0471)	<b>0.0843</b> (0.0573)	<b>-0.00972</b> (0.0507)	<b>0.0110</b> (0.0585)	<b>0.0419</b> (0.0501)
<b>Interaction Reform with firm size:</b>										
$I_{t \rightarrow R}^*$ Firm Size 1 to 9	<b>-0.272</b> (0.176)	<b>-0.261***</b> (0.0843)	<b>-0.276</b> (0.242)	<b>-0.244**</b> (0.115)	<b>-0.281</b> (0.196)	<b>-0.181***</b> (0.0527)	<b>-0.204***</b> (0.0483)	<b>-0.184***</b> (0.0620)	<b>-0.187***</b> (0.0585)	<b>-0.187***</b> (0.0545)
$I_{t \rightarrow R}^*$ Firm Size 10 to 24	<b>-0.0791</b> (0.158)	<b>-0.0918</b> (0.0823)	<b>-0.0804</b> (0.214)	<b>-0.187</b> (0.120)	<b>-0.0446</b> (0.173)	<b>-0.104*</b> (0.0537)	<b>-0.128**</b> (0.0517)	<b>-0.125*</b> (0.0645)	<b>-0.0935</b> (0.0708)	<b>-0.117**</b> (0.0537)
$I_{t \rightarrow R}^*$ Firm Size 25 to 49	<b>-0.0724</b> (0.139)	<b>-0.0363</b> (0.0771)	<b>-0.121</b> (0.189)	<b>-0.176*</b> (0.0980)	<b>-0.0550</b> (0.160)	<b>-0.106**</b> (0.0482)	<b>-0.162***</b> (0.0508)	<b>-0.0837</b> (0.0516)	<b>-0.122**</b> (0.0603)	<b>-0.106**</b> (0.0521)
$I_{t \rightarrow R}^*$ Firm Size 50 to 99	<b>-0.103</b> (0.137)	<b>-0.0847</b> (0.0970)	<b>-0.129</b> (0.180)	<b>-0.0851</b> (0.123)	<b>-0.115</b> (0.152)	<b>-0.0389</b> (0.0429)	<b>-0.0542</b> (0.0515)	<b>-0.0615</b> (0.0455)	<b>-0.00241</b> (0.0574)	<b>-0.0581</b> (0.0481)
$I_{t \rightarrow R}^*$ Firm Size 100 to 249	<b>-0.0741</b> (0.100)	<b>-0.0602</b> (0.0888)	<b>-0.123</b> (0.118)	<b>-0.0909</b> (0.127)	<b>-0.0652</b> (0.113)	<b>-0.0414</b> (0.0462)	<b>-0.0711</b> (0.0503)	<b>-0.0339</b> (0.0527)	<b>0.0156</b> (0.0647)	<b>-0.0732</b> (0.0467)

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

(1) In this specification transitions to a new job are considered as censored observations.

**Table 14: The impact of the reform on Transitions from Employment into unemployment or another job, by firm size**

Monthly data, coefficients of the competing-risk hazard models

	Out of Employment		Permanent Contract		Temporary Contract	
	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job
t	0.00257*** (0.000545)	-0.00709*** (0.000595)	0.00126 (0.000986)	-0.00459*** (0.000879)	0.00296*** (0.000511)	-0.00783*** (0.000661)
t $I_{t>R}$	0.00684** (0.00336)	0.00451 (0.00479)	0.00700** (0.00312)	0.000989 (0.00595)	0.00653* (0.00354)	0.00553 (0.00453)
$\Delta \log E$	-2.021*** (0.528)	0.150 (0.561)	-1.502 (1.129)	-1.320 (0.987)	-2.352*** (0.473)	0.199 (0.539)
ln (empl. duration) * $\Delta \log E$	0.438 (0.324)	-0.0112 (0.189)	-0.408 (0.301)	0.0680 (0.304)	0.852** (0.336)	0.172 (0.188)
FEDEA Index	-0.0480*** (0.0176)	0.103*** (0.0206)	-0.0543* (0.0313)	0.147*** (0.0312)	-0.0406** (0.0163)	0.0923*** (0.0208)
Firm Size 1 to 9	0.320*** (0.0235)	0.0203 (0.0177)	0.455*** (0.0876)	-0.0165 (0.0315)	0.285*** (0.0215)	0.0158 (0.0197)
Firm Size 10 to 24	0.217*** (0.0232)	0.0345* (0.0183)	0.345*** (0.0806)	-0.0597 (0.0408)	0.181*** (0.0236)	0.0456** (0.0220)
Firm Size 25 to 49	0.171*** (0.0218)	0.0619*** (0.0202)	0.343*** (0.0731)	-0.0452 (0.0379)	0.130*** (0.0228)	0.0747*** (0.0220)
Firm Size 50 to 99	0.137*** (0.0208)	0.0438* (0.0240)	0.316*** (0.0639)	-0.0116 (0.0406)	0.101*** (0.0231)	0.0447* (0.0265)
Firm Size 100 to 249	0.129*** (0.0170)	-0.00687 (0.0216)	0.224*** (0.0558)	-0.00857 (0.0414)	0.108*** (0.0202)	-0.0160 (0.0242)
$I_{t>R}$ (=1 after feb/2012)	<b>-0.121**</b> (0.0516)	<b>0.186***</b> (0.0666)	<b>-0.0538</b> (0.132)	<b>0.139</b> (0.109)	<b>-0.133***</b> (0.0478)	<b>0.202***</b> (0.0620)
<b>Interaction Reform with firm size:</b>						
$I_{t>R}$ * Firm Size 1 to 9	<b>-0.203***</b> (0.0627)	<b>-0.0277</b> (0.0331)	<b>-0.269</b> (0.176)	<b>-0.0128</b> (0.0802)	<b>-0.182***</b> (0.0535)	<b>-0.0368</b> (0.0339)
$I_{t>R}$ * Firm Size 10 to 24	<b>-0.108*</b> (0.0557)	<b>0.0102</b> (0.0324)	<b>-0.0736</b> (0.159)	<b>0.0957</b> (0.0858)	<b>-0.103*</b> (0.0544)	<b>-0.0222</b> (0.0415)
$I_{t>R}$ * Firm Size 25 to 49	<b>-0.0988**</b> (0.0487)	<b>-0.00789</b> (0.0412)	<b>-0.0697</b> (0.140)	<b>0.112</b> (0.102)	<b>-0.107**</b> (0.0487)	<b>-0.0475</b> (0.0500)
$I_{t>R}$ * Firm Size 50 to 99	<b>-0.0505</b> (0.0434)	<b>-0.0431</b> (0.0443)	<b>-0.100</b> (0.137)	<b>0.0749</b> (0.0873)	<b>-0.0424</b> (0.0434)	<b>-0.0761</b> (0.0538)
$I_{t>R}$ * Firm Size 100 to 249	<b>-0.0439</b> (0.0378)	<b>0.0148</b> (0.0453)	<b>-0.0703</b> (0.101)	<b>0.00976</b> (0.0954)	<b>-0.0402</b> (0.0472)	<b>0.0121</b> (0.0513)

Robust standard errors in parentheses. Linear polynomial pre and post reform.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 15: The impact of the reform on Transitions from Employment into unemployment or another job, by firm size**

Monthly data, coefficients of the competing-risk hazard models

	Exit from Permanent Employment to Unemployment									
	All		Women		Men		Young (<30y)		Old(>30y)	
	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job
$\Delta \log E$	<b>-1.502</b> (1.129)	<b>-1.320</b> (0.987)	<b>-1.448</b> (1.249)	<b>-1.283</b> (1.179)	<b>-1.495</b> (1.280)	<b>-1.524</b> (1.158)	<b>-1.333</b> (1.292)	<b>-4.241***</b> (1.336)	<b>-1.735</b> (1.244)	<b>-0.0717</b> (1.163)
$\ln(\text{empl. duration}) * D \log E$	<b>-0.408</b> (0.301)	<b>0.0680</b> (0.304)	<b>-0.362</b> (0.330)	<b>0.0298</b> (0.358)	<b>-0.416</b> (0.396)	<b>0.181</b> (0.375)	<b>-0.146</b> (0.405)	<b>0.903**</b> (0.424)	<b>-0.419</b> (0.323)	<b>-0.287</b> (0.340)
FEDEA Index	<b>-0.0543*</b> (0.0313)	<b>0.147***</b> (0.0312)	<b>-0.110***</b> (0.0330)	<b>0.151***</b> (0.0342)	<b>-0.00699</b> (0.0322)	<b>0.142***</b> (0.0376)	<b>-0.100***</b> (0.0359)	<b>0.203***</b> (0.0415)	<b>-0.0382</b> (0.0330)	<b>0.122***</b> (0.0328)
$I_{D>R}$ (=1 after feb/2012)	<b>-0.0538</b> (0.132)	<b>0.139</b> (0.109)	<b>-0.0911</b> (0.0735)	<b>0.0577</b> (0.121)	<b>-0.0148</b> (0.167)	<b>0.240**</b> (0.109)	<b>-0.0115</b> (0.104)	<b>0.125</b> (0.105)	<b>-0.0592</b> (0.140)	<b>0.142</b> (0.119)
<b>Interaction Reform with firm size:</b>										
$I_{D>R}$ * Firm Size 1 to 9	-0.269 <b>(0.176)</b>	-0.0128 <b>(0.0802)</b>	-0.255*** <b>(0.0840)</b>	0.0523 <b>(0.0895)</b>	-0.275 <b>(0.243)</b>	-0.0943 <b>(0.0992)</b>	-0.239** <b>(0.115)</b>	0.0176 <b>(0.0905)</b>	-0.278 <b>(0.196)</b>	-0.0337 <b>(0.0948)</b>
$I_{D>R}$ * Firm Size 10 to 24	-0.0736 <b>(0.159)</b>	0.0957 <b>(0.0858)</b>	-0.0843 <b>(0.0823)</b>	0.173* <b>(0.103)</b>	-0.0765 <b>(0.215)</b>	-0.0137 <b>(0.113)</b>	-0.182 <b>(0.119)</b>	0.0408 <b>(0.121)</b>	-0.0393 <b>(0.173)</b>	0.107 <b>(0.0966)</b>
$I_{D>R}$ * Firm Size 25 to 49	-0.0697 <b>(0.140)</b>	0.112 <b>(0.102)</b>	-0.0347 <b>(0.0770)</b>	0.121 <b>(0.125)</b>	-0.117 <b>(0.189)</b>	0.122 <b>(0.125)</b>	-0.172* <b>(0.0981)</b>	0.189 <b>(0.132)</b>	-0.0529 <b>(0.161)</b>	0.0855 <b>(0.116)</b>
$I_{D>R}$ * Firm Size 50 to 99	-0.100 <b>(0.137)</b>	0.0749 <b>(0.0873)</b>	-0.0792 <b>(0.0972)</b>	0.116 <b>(0.105)</b>	-0.129 <b>(0.181)</b>	0.0328 <b>(0.117)</b>	-0.0825 <b>(0.123)</b>	0.00208 <b>(0.166)</b>	-0.113 <b>(0.153)</b>	0.0873 <b>(0.105)</b>
$I_{D>R}$ * Firm Size 100 to 249	-0.0703 <b>(0.101)</b>	0.00976 <b>(0.0954)</b>	-0.0561 <b>(0.0890)</b>	0.00351 <b>(0.110)</b>	-0.119 <b>(0.118)</b>	0.0298 <b>(0.122)</b>	-0.0854 <b>(0.127)</b>	-0.116 <b>(0.140)</b>	-0.0617 <b>(0.113)</b>	0.0423 <b>(0.120)</b>

	Exit from Temporary Employment to Unemployment									
	All		Women		Men		Young (<30y)		Old(>30y)	
	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job	Job-to-Unem	Job-to-job
$\Delta \log E$	<b>-2.352***</b> (0.473)	<b>0.199</b> (0.539)	<b>-3.170***</b> (0.536)	<b>0.288</b> (0.594)	<b>-1.145**</b> (0.559)	<b>-0.342</b> (0.655)	<b>-2.594***</b> (0.503)	<b>-0.756</b> (0.702)	<b>-2.271***</b> (0.498)	<b>0.691</b> (0.580)
$\ln(\text{empl. duration}) * D \log E$	<b>0.852**</b> (0.336)	<b>0.172</b> (0.188)	<b>0.883***</b> (0.307)	<b>0.184</b> (0.211)	<b>0.772*</b> (0.425)	<b>0.237</b> (0.273)	<b>0.802**</b> (0.352)	<b>0.626***</b> (0.228)	<b>0.882***</b> (0.340)	<b>-0.0693</b> (0.226)
FEDEA Index	<b>-0.0406**</b> (0.0163)	<b>0.0923***</b> (0.0208)	<b>-0.0449**</b> (0.0224)	<b>0.0955***</b> (0.0251)	<b>-0.0368***</b> (0.0132)	<b>0.0934***</b> (0.0205)	<b>-0.0372**</b> (0.0170)	<b>0.115***</b> (0.0256)	<b>-0.0422**</b> (0.0173)	<b>0.0805***</b> (0.0231)
$I_{D>R}$ (=1 after feb/2012)	<b>-0.133***</b> (0.0478)	<b>0.202***</b> (0.0620)	<b>-0.180***</b> (0.0558)	<b>0.213***</b> (0.0744)	<b>-0.0378</b> (0.0452)	<b>0.150**</b> (0.0666)	<b>-0.122***</b> (0.0431)	<b>0.193***</b> (0.0749)	<b>-0.134**</b> (0.0532)	<b>0.204***</b> (0.0643)
<b>Interaction Reform with firm size:</b>										
$I_{D>R}$ * Firm Size 1 to 9	-0.182*** <b>(0.0535)</b>	-0.0368 <b>(0.0339)</b>	-0.205*** <b>(0.0492)</b>	-0.0372 <b>(0.0384)</b>	-0.185*** <b>(0.0625)</b>	0.00630 <b>(0.0491)</b>	-0.188*** <b>(0.0590)</b>	-0.0223 <b>(0.0588)</b>	-0.187*** <b>(0.0555)</b>	-0.0426 <b>(0.0387)</b>
$I_{D>R}$ * Firm Size 10 to 24	-0.103* <b>(0.0544)</b>	-0.0222 <b>(0.0415)</b>	-0.124** <b>(0.0521)</b>	0.00141 <b>(0.0542)</b>	-0.129** <b>(0.0657)</b>	-0.0240 <b>(0.0668)</b>	-0.0889 <b>(0.0711)</b>	0.0287 <b>(0.0691)</b>	-0.117** <b>(0.0543)</b>	-0.0472 <b>(0.0466)</b>
$I_{D>R}$ * Firm Size 25 to 49	-0.107** <b>(0.0487)</b>	-0.0475 <b>(0.0500)</b>	-0.161*** <b>(0.0515)</b>	0.00252 <b>(0.0564)</b>	-0.0871* <b>(0.0519)</b>	-0.0931 <b>(0.0735)</b>	-0.123** <b>(0.0615)</b>	0.0312 <b>(0.0830)</b>	-0.107** <b>(0.0526)</b>	-0.0801 <b>(0.0545)</b>
$I_{D>R}$ * Firm Size 50 to 99	-0.0424 <b>(0.0434)</b>	-0.0761 <b>(0.0538)</b>	-0.0574 <b>(0.0514)</b>	-0.102 <b>(0.0656)</b>	-0.0651 <b>(0.0463)</b>	-0.00125 <b>(0.0725)</b>	-0.00750 <b>(0.0581)</b>	-0.0912 <b>(0.0855)</b>	-0.0610 <b>(0.0481)</b>	-0.0685 <b>(0.0601)</b>
$I_{D>R}$ * Firm Size 100 to 249	-0.0402 <b>(0.0472)</b>	0.0121 <b>(0.0513)</b>	-0.0673 <b>(0.0512)</b>	0.0223 <b>(0.0678)</b>	-0.0357 <b>(0.0537)</b>	0.0138 <b>(0.0621)</b>	0.0207 <b>(0.0653)</b>	0.0711 <b>(0.0928)</b>	-0.0735 <b>(0.0478)</b>	-0.0157 <b>(0.0574)</b>

Robust standard errors in parentheses. Linear polynomial pre and post reform.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 17: The effect of the reform on the transition from employment controlling for unobserved heterogeneity**

Monthly data

	All workers		Permanent Workers		Temporary Workers	
	No Unobserv. Heterog. Control	With Unobsev. Heterog. Control	No Unobserv. Heterog. Control	With Unobsev. Heterog. Control	No Unobserv. Heterog. Control	With Unobsev. Heterog. Control
ln(empl. duration)	0,5041 **	0,4217 ***	2,6483 ***	1,9645 ***	0,6484 ***	0,5930 ***
ln(empl. duration) <sup>2</sup>	-0,3200 ***	-0,2174 ***	-0,9281 ***	-0,4609 ***	-0,4448 ***	-0,3786 ***
ln(empl. duration) <sup>3</sup>	0,0239	0,0078	0,0795 ***	0,0140	0,0418 **	0,0325 ***
t	-0,0083 **	-0,0098 ***	-0,0061	-0,0098 **	-0,0068 **	-0,0079 ***
t <sup>2</sup>	-0,0003 **	-0,0003 ***	0,0000	-0,0001	-0,0002 **	-0,0003 ***
t <sup>3</sup>	0,0000	0,0000 ***	0,0000 *	0,0000	0,0000	0,0000 ***
t $I_{t>R}$	0,0209	0,0235 ***	0,0006	-0,0025	0,0236 *	0,0256 ***
t <sup>2</sup> $I_{t>R}$	-0,0026 **	-0,0028 ***	-0,0007	-0,0005	-0,0028 ***	-0,0031 ***
t <sup>3</sup> $I_{t>R}$	0,0001 ***	0,0001 ***	0,0000 *	0,0000	0,0001 ***	0,0001 ***
$I_{t>R}$ (=1 after feb/2012)	0,0615	0,0474 *	0,1714 ***	0,1257 **	0,0299	0,0199
$I_{t>R}$ * Firm Size 1 to 9	-0,2033 ***	-0,1848 ***	-0,2717 ***	-0,1815 ***	-0,1812 ***	-0,1666 ***
$I_{t>R}$ * Firm Size 10 to 24	-0,1101 **	-0,0802 ***	-0,0791 *	0,0010	-0,1044 **	-0,0814 ***
$I_{t>R}$ * Firm Size 25 to 49	-0,0994 **	-0,0787 ***	-0,0724	0,0027	-0,1058 **	-0,0886 ***
$I_{t>R}$ * Firm Size 50 to 99	-0,0484	-0,0302	-0,1030 **	-0,1086 *	-0,0389	-0,0285
$I_{t>R}$ * Firm Size 100 to 249	-0,0457	-0,0238	-0,0741	-0,0643	-0,0414	-0,0233
Constant Term	-2,5844 ***	-1,9734 ***	-6,7629 ***	-5,0433 ***	-2,4020 ***	-2,0848 ***
Heterog. Inobserv. component						
$\eta_1$		-1,0498 ***		-2,1738 ***		-0,9519 ***
Pr( $\eta = \eta_1$ )		0,5982 ***		0,2581 ***		0,6603 ***