Collective Bargaining and Unemployment during the Great Recession: Evidence for Spain [*]

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Abstract

We study the consequences of (widespread) downward wage rigidity in Spain on job losses during 2009 and 2010, a period with a severe drop in activity. We measure wage rigidity using the fact that sector-level collective agreements in Spain are automatically extended to all firms in the province industry unit, setting wage floors that are downwardly rigid during the period of the agreement. Using the exact dates of bargaining periods, we find that agreements bargained after the fall of Lehman Brothers in September 15th 2008 adjusted to the large aggregate employment losses by agreeing on wage growth below 2%, while agreements signed earlier settled increases of about 3.5%. We match information on collective agreements with longitudinal Social Security records of employees and document that, relative to comparable workers covered by contracts signed later in 2009, workers whose wages were close to the collective agreement floor *and* who were covered by collective contracts signed prior to September 15th 2008 (a) experienced about 2 pp higher wage growth (b) were between 2 and 4pp more likely to lose their job. The estimates suggest an elasticity of labor demand of about -1 and are consistent with the notion that downward nominal wage rigidity has real effects during a recession.

JEL Codes: J23 - Labor Demand J50 -Collective Bargaining.

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1   Introduction

A large macroeconomic literature has long emphasized that downward nominal wage rigidity amplifies the impact of negative aggregate shocks by preventing the wage adjustments that could prevent employment losses. In particular, there are two main forms of downward wage rigidity stressed in the literature. The first is based on the low incidence of nominal wage cuts using individual level data –see Altonji and Devereux (2000), Dickens et al (2006) or Bewley (1999). The second form of wage rigidity is due to the fact that collective contracts signed under different macroeconomic conditions coexist in the labor market, generating wage dispersion that amplifies aggregate shocks -see Card (1990) and Olivei and Tenreyro (2007, 2010). We use matched data on collective agreements and Social Security records to test whether contract staggering around the large macroeconomic shock that followed the fall of Lehman Brothers generated employment losses in Spain during the 2009-2010 period.[1]

The impact of a nominal macroeconomic shock on employment and activity depends on how quickly wages adjust. Flexible wages will immediately incorporate the shock thus the level of employment unchanged. However, if nominal wages are rigid, a shock will change the real wage (through the level of prices) altering the level of employment in the economy. In this context, Card (1990) shows that inflation does affect employment levels through imperfect wage adjustment. In particular, he exploits differences in the timing of wage settlements in the presence of inflation to identify the impact of wage rigidity in the data. Olivei and Tenreyro (2007, 2010) illustrates the relevance of wage rigidity on employment fluctuations using macro data. They show that nominal shocks in the US have a lower real effects in January, when wages in collective agreements are typically bargained, than in other periods.

Our study is built on insights from that macro literature and on the nature of collective bargaining in Spain. Collective agreements at the industry-province level in Spain are automatically extended to all firms in the province-industry cell, regardless of the degree of unionization. Automatic extension of province-industry agreement

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[1] The 2009q4 the employment level in Spain was 11% lower than the 2007 peak, according to the Spanish Employment Survey. During the same period, the US economy lost 6% of the existing jobs in 2007.

effectively means that working conditions and, in particular, wage floors are compulsory for all employers typically for periods longer than one year. Furthermore, the high degree of decentralization implies that at every moment in time, different bargaining units vary widely in their ability to adjust wages to an negative aggregate shock -in particular, the one we use is the drop in activity that followed the fall of Lehman Brothers in September 15th. In sum, the structure of collective bargaining in Spain means that at a time of heavy employment drops, wages in already settled contracts were unable to adjust downward, possibly leading firms to lay-off workers. At the same time, contracts that were bargained at the time of the beginning of the crisis have the possibility of mitigating nominal wage growth, possibly softening unit labor costs and employment drops. In sum, automatic extension and the inability of firms to opt out implies substantial cross-sectional variation in the degree of (contract-induced) wage rigidity at the time of the shock. Such variation provides an unique opportunity to estimate the role of downward wage rigidity on employment destruction during a period of aggregate demand drops.

We use a very rich dataset with detailed information about all the collective agreements signed in Spain. That dataset contains information about the agreed wage increase and on the date of signature, giving us the opportunity to know at each point in time what information the bargaining parties could possibly incorporate into the agreements. We then match that Census of Collective Contracts with Social Security records to analyze the effects on employment of downward wage rigidity caused by automatic extension of collective contracts.

We first document that wages settled for 2009 in agreements signed after the fall of Lehman Brothers displayed substantially lower wage growth than wage settlements for the same period signed between 5 and 1 quarters before September 15th 2008. That is, there is substantial cross-sectional variation in wage growth in 2009 that depended only on the date of signature of the contract. We then estimate models of the probability of job loss between 2009 and 2010 as a function of how close wages were to the collective agreement floors in 2008, the date of signature of the contract and province x 3-digit industry fixed effects. We find that, relative to comparable workers covered by contracts signed later in 2009, workers whose wage were close to the collective agreement floor *and* covered by collective contracts signed prior to September 15th 2008 (a) experienced about 2 pp higher wage growth (b) were

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between 2 and 4pp more likely to lose their job. Importantly, we find no differential wage or employment responses by signature date among workers who are not bound by the agreement –i.e. workers whose wages are distant from the collective agreement floor. Those results suggest that wage rigidity created by the automatic extension of provincial agreements and multi-period bargaining had a substantial effect on the employment destruction during the 2008-2009 recession in Spain. The results are robust to the inclusion of workers covariates and still hold when we control for firm - skill specific fixed effects.

Our results contribute to two literatures. Firstly, while the effect of collective bargaining on wages, and other important variables such as productivity, profits or the number of hours worked is well documented studies on the impact on employment are less numerous (see the summary in Cahuc and Zylberberg, 2004). For example, Boal and Pencavel (1994) in a framework different from that in our study, document that while unionized workers receive a wage premium, there is not an impact of unions on employment level. Another literature has used legal reforms to union power, arguably exogenous, to study the impact of unionization on transitions to and from unemployment. Blanchflower and Freeman (1994) document that the fall in the bargaining power of unions after the reforms introduced by Thatcher in the UK did not lead to a drop in unemployment or the probability of exiting from unemployment. Rather than studying long-run impacts of collective bargaining, our study focuses on the role of wage setting in collective in generating employment losses following a shock

Yet another literature has estimated the degree of wage rigidity in different sectors of the economy, and then related the estimated degree of rigidity to unemployment levels –see Barwell and Schweitzer (2007) for the UK or de Vicienti et al (2007) for Italy. Our method has the advantage of not requiring an inference about downward rigidity from longitudinal wage data -a daunting task in the presence of measurement error- as wage rigidity is built in the collective bargaining framework. Hence, we can focus on studying propagation mechanisms. Furthermore, we can study wage rigidity *within*-industry and *within*-province, rather than *across* industries or regions -always subject to the criticism that sectors or regions vary along other relevant dimensions that also affect employment levels

The rest of the paper is organized as follows. Section 2 describes the institutional

background. Section 3 presents some background for modelling. Section 4 discusses the data and Section 5 presents the results.

2 Institutional Background

The Spanish labor market is believed to be very rigid in comparison to international standards and one possible source of rigidity is the extent and characteristics of collective bargaining (Bentolila and Dolado, 1994, Bentolila, Izquierdo and Jimeno, 2012). Collective agreements are negotiated between the representatives of employers and workers that can show "sufficient representativeness" in the sector. The agreements reached in the process are public and legally binding for all workers within the scope of the agreement -independently of whether workers are union members or not. Thus, despite a relatively low rate of union membership (15% or less), the coverage of collective bargaining in Spain is very high (80%, according to the Ministry of Labor).

Collective contracts in Spain take place at multiple levels. There are basically two main types: firm level and sectorial agreements. The former include the ones which only affect the workers in a particular firm. The others are bargained at a given geographical or industry level (either national, regional or provincial) and affect all the workers in the given unit which are not covered by a firm agreement (Card and De la Rica, 2006). That is, these are automatically extended to firms in the scope of the agreement regardless of the degree of unionization of the particular firm. The majority of workers are covered by sectorial agreements, particularly, under provincial ones. That level of bargaining represents an intermediate degree of centralization between national - and firm - level agreements (Izquierdo, Moral and Urtasun, 2003). The analysis below focuses on provincial agreements for several reasons. Firstly, more than 50% of the workers covered by collective bargaining are covered by a provincial agreement. Secondly, it is typically argued in theoretical models that the intermediate level of bargaining is suboptimal: national level agreements internalize the impact of wage growth, while firm level agreements are most responsive to particular conditions of the worker and firm (see Calmforms and Driffill, 1988 or Jimeno and Thomas, 2012). In addition, the last two labor reforms in Spain have tried to weaken the automatic extension of provincial agreements.

Therefore, unless a worker is covered by a (more generous) firm-specific agreement,

provincial collective agreements establish a (de facto) minimum wage level for 10 skill levels within a particular province and industry. The minimum is compulsory for a whole year -basically all agreements run from December to December and, in the case of multi-year agreements, they specify the wage growth level for subsequent years. See Appendix A.1. for an example of the construction industry in Navarre. That agreement sets 11 minimum wages for each skill level in the industry. Note that this is a legally binding lower floor that does not depend on the particular situation of the firm. Moreover, it is very difficult for firms to opt out of the collective agreement [2].

The degree of wage rigidity caused by the automatic extension is exacerbated by the fact that collective agreements are typically set for more than one year. Such practice may influence the degree of nominal inertia of the economy, in the sense that if the longer the duration of the agreements the less likely wages are to respond to changes in demand and, therefore, the variable most significantly affected will be unemployment (Layard, 1991).

We illustrate how binding collective agreements are in Figures A.2. and A.3. We provide details about the samples below, but note now that those Figures show histograms of monthly wages in December 2008 in Social Security records for specific industries, provinces and skill groups, together with the corresponding statutory minimum. Figure A.2. documents the extent to which those wages vary with skill in the construction industry. Clearly, there is concentration of wages around the collective agreement minima for the lowest skill levels -laborers and foremen- while such concentration is basically absent for college graduates. Figure A.3. shows histograms of monthly wages in December 2008 for waiters in Food and Accommodation across provinces. As a result of province-level bargaining, the statutory minima vary markedly across provinces -as an example, note the concentration of monthly wages close the collective minimum of 1400 euros in Barcelona while most wages in Madrid -with a much lower minimum of 800- are below 1400 euros. A similar comparison can be made between Granada with extremely high concentration around a very high

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[2]The 2010 labor reform attempted to facilitate the process, causing an upheaval among unions. The alleged reason was that attempts to limit automatic extension would erode worker's bargaining power. Another reform in 2012 -outside our sample period- has facilitated the conditions under which a firm could temporarily deviate from a province level agreement.

minimum wage in the collective agreement, and the more dispersed distribution of monthly wages in Valencia -with lower statutory minima.

2.1 Modelling background

Consider a simple Cobb-Douglas production function $F(K, L) = Y = AL^\alpha K^{1-\alpha}$.where Y is output, A is technology, K is capital (assumed to be fixed) and L is labor. For simplicity we consider the problem of a firm that takes the wage in the settlement as given but that can choose the desired demand for labor as follows

$$dY/dL = \alpha A(K/L)^{1-\alpha} = \omega/P$$

ω is the nominal wage set in the agreement and P represents the level of prices, assumed to be fixed. Imagine that there is a negative shock that decreases A. Given our set up, there can be two possible scenarios:

I) The nominal wage, ω, is fixed and cannot respond to the aggregate shock. The firm can only react to the shock by a drop in its labor demand, L

II) The nominal wage set in the collective agreement reacts to the aggregate shock [3]. In such case the drop in labor demand would be smaller than in case I.

If data on nominal wages were available, the evolution of labor could be written as

$$\Delta L = \gamma_0 + \gamma_1 \Delta\omega + a + y + \Delta\varepsilon \tag{1}$$

The linearized equation shows that cross-sectional variation in nominal wage growth -as resulting from collective agreements that do or do not adjust to the aggregate shock- will affect firm-level demand of labor through the slope of the demand equation γ_1. a and y are proxies for the growth of real values of A and Y. However, there are problems in recovering the parameter γ_1 from the data. Firstly, changes in minimum statutory wages in collective agreements affect only the wages of workers whose wage is close to the agreement floor. Those workers can only be identified using joint information on statutory minimum wages and actual wage levels. Secondly, $\Delta\omega$ and ΔL are likely to be driven by unobservable demand changes, so even if we

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[3]We assume that there are some nominal rigidities and the wage is not fully flexible, otherwise the whole adjustment would happen through prices

identified the set of workers whose wage is is close to the collective agreement floor, the variation in $\Delta\omega$ and ΔL may be associated to outward or inward movements of labor demand curves, rather than to movements along the demand curve.

Hence, we isolate the variation on the agreed wage increase $\Delta\omega$ that is exclusively due to the timing of the signature of the collective contract around a large aggregate shock. The fall of Lehman Brothers on September 15th 2008 came to most economies as a substantial unexpected shock that generated uncertainty throughout the world. Under the assumption that the date of signature of a collective agreement reflects the information set about macroeconomic conditions by bargaining parties, that large aggregate shock could only be reflected in nominal wages bargained after September 15th 2008. However, collective agreements already signed for the years 2009 and 2010 could not adjust downward their settled wage growth -as mentioned above, the process of opting out of a collective agreement is very costly in Spain. The difficulty in renegotiating contracts ex-post, coupled with the typically long durations of collective contracts, generates a large fraction of workers whose wage growth for 2009 and 2010 reflects macroeconomic conditions very different from those in a large recession. Under the assumption of a downward sloping labor demand, job losses in firms covered by agreements already fixed at the time of the shock must be higher than in firms whose contract was signed after the shock. In sum, contract staggering due to different signature dates generates cross-sectional variation in $\Delta\omega$ in 2009 and 2010. We use that variation to identify the link between the existence of rigid nominal wages and employment losses.

The key identifying assumption is that, conditional on having a suitable proxy for A and Y, the date of signature does not reveal systematic information about the employers' performance. We control for such possible differences by fully controlling for unrestricted province x industry dummies. As we discuss below, γ_1 is then identified by comparing the chances of job loss of workers with wages close to the statutory minimum across those collective contracts signed before and after the aggregate demand shock that followed the fall of Lehman Brothers on September 15th 2008. If those differential chances in job loss are larger among workers with wages close to the statutory minimum than among workers further away from the collective agreement minimum, we infer that downward nominal wage rigidity due to contract staggering causes to job losses.

3 Data

We use two datasets: the *Registro de Convenios y Acuerdos Colectivos* (Census of Collective Agreements) and the *Muestra Continua de Vidas Laborales* 2010 - MCVL (Continuous Sample of Working Histories, CSWH 2010). All collective agreements signed in Spain are to be registered in the Ministry of Labor -hence forming the Registry- and the digitalized dataset contains detailed information about the agreed wage increase (the wage that the union and the employers agreed ex-ante, before any ex-post correction due to inflation), the 2-digit industry, an unions' estimation of the number of workers covered by the agreement, the type of agreement (sectorial or firm level) as well as requirements in terms of hours and vacation time. Particularly important for the purpose of the study, the dataset contains information on the day in which the agreement was signed and bargaining ended. Then, it is possible to use the exact day when the contract was arranged to establish what information could possibly be incorporated in the agreement. The Census contains limited information about the level of the wage set in the agreement for each skill level.

On the other hand, *The Continuous Sample of Working Histories* is a micro-level dataset built upon Spanish Social Security records. It contains electronically recorded information for approximately 1.1 million individuals who at any time during 2010 had an active record with the Spanish Social Security system. The CSWH also has a longitudinal design so between 2005 to 2010, an individual who is present in a wave and subsequently remains registered with the Social Security administration stays as a sample member. In addition, we refreshed the sample with workers present in the 2005-2009 waves so it remains representative of the population during the period of analysis -2008-2010 (see Bonhomme and Hospido, 2012). The registry contains information on the full labor market history of workers -wages, days worked per month, an identifier of the establishment it worked -actually, of a randomized indicator of the establishment Social Security Account- together with information on the industry at the three digit levels

The CSWH contains some information that permits constructing the skill level of a worker. Namely, each worker in Spain is assigned a skill level (from a table of 11 levels). The first two levels are reserved in principle to workers with college. The following levels 3-9 are defined by hierarchy at the job, while the latter two

groups correspond to laborers, unskilled workers. Importantly, the classification of skill groups in the Social Security records is the same as in the Census of Collective Agreements.

Sample 1: Matched Social Security records-Collective Agreements

To assess how the rigidity created by the automatic extension of the provincial collective agreements affects the probability of losing the job during the recession, we merged both datasets. The matching has been done using information on the 3-digit industry of economic activity and information on the province where the individual was working. We have assigned a collective agreement to each of the 3 digit industry-province cell in the Social Security records using information on the 2-digit industry in the Census of Collective Agreements and then assigned a 3-digit industry code based on the text of the agreement -that must specify the exact industries covered. As explained above, we use provincial collective agreements only, assuming that those agreements are the ones binding for each of the individuals in a given cell industry-province.[4]

We consider only province level agreements and use neither national or region-level agreements. Province level agreements cover around 50% of the labor force in Spain, while national and region-level agreements cover around 35% of workers -see Bentolila, Izquierdo and Jimeno, 2012..Nation-level agreements include FIRE (financial, Insurance and Real Estate), while other regional and national agreements are most common in manufacturing business services and other services. We do not consider firm level contracts either - which cover around 11% of the workers and most prevalent in the energy, extractive and transport industries, see Izquierdo, Moral and Urtasun, 2003. We note that those omissions are not likely to bias the analysis or introduce error. Firstly, due to the particular way agreements are bargained, provincial agreements typically improve the working conditions of nation- or region-level settlements. In that sense, province-level agreements would be the most relevant ones. Secondly, firm- or establishment level agreements cannot undercut the labor conditions set on a concurrent province-industry agreement. Hence, province-industry agreements still set the effective binding minima in those cases.

On the other hand, the focus on provincial agreements presents the advantage of

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[4]In some cases when there are several provincial agreements in a given industry, we have assigned to all the individuals in that particular cell the agreement that covered a highest number of workers.

providing substantial variation in minimum wages -see Figure A.3 and in signature dates within industries and provinces.[5] The focus on province-industry agreements also implies that much of the results we exploit is driven by smaller firms, that cannot afford to have their own agreement.

Sample 2: Sample with information on wage levels.

Wage levels are not available in the collective contracts dataset for the period considered (2008-2010). However, for the period spanning 1994-2001, the basic wage level by skill level was available for some contracts. Using the revised agreed wage growth (the ex-post agreed wage increase corrected by inflation) from 2002 to 2008 we have computed the collective wage levels in 551 out of the 1771 agreements that were binding as of 2008. In all cases, the wage level is available for groups of the Spanish Social Security System: 1, 2, 3 (High Skilled), 4, 5, 6 (Medium Skilled) and 10 (Low Skilled) (see Lacuesta, Puente and Villanueva, 2012). We use that dataset for most of the analysis that follows. The reason is that, as discussed above, to analyze the role of wage rigidities in amplifying aggregate shocks one needs to take into account how binding collective agreements are and for what groups. The characteristics of the resulting sample are presented in Table 2. Figures A.2 and A.3 are based on this subsample, and illustrate how statutory minima affect the distribution of monthly wages.

3.0.1 Sample selection criteria, common to both samples

We use the following selection criteria:

Signature dates We use collective agreements with economic effect in 2009 and that were signed between October 1st, 2007 and December 31st 2010, so that we encompass a 5 quarters of dates of signature before the fall of Lehman Brothers and have at least 5 quarters of dates signature afterwards. We want to have enough quarters before September 15th 2009 to be able to detect possible trends in wage setting in advance of that date. We also exclude agreements that had not been signed by the end of 2010 -albeit those were a very limited number of agreements.

Seniority at the firm: We also require that all workers in the sample are present at the firm at the time the first collective agreement for 2009 in our sample was signed,

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[5]While there are 52 provinces in Spain, there are only 17 regions. Not all the regions have their own agreement

so all of them have accumulated some tenure on the job at the time when heavy employment losses occurred. In addition the outcome "being hired by an employer in an industry i at time t" may be affected by the agreed wage increase signed before moment t.

These two restrictions prevent us from analyzing agreements signed early on. For example, studying the impact of a wage increase in the first quarter of 2007 would require to analyze workers who were already working in late 2006. With a third of the working force being hired with fixed-term contracts, such selection would bias the sample toward stable workers.

Age We examine cohorts of males and females born between 1950 and 1991 who have been employed during 2008 (at least 1 year). We make no selections regarding gender, to maximize sample size, but control for that variable in our specifications.

3.0.2   Summary statistics

The resulting matched sample of collective agreements and Social Security records contains 93,960 observations, and each individual contributes one observation. 12.5% of workers in the sample are high-skilled (meaning that belong to the groups 1, 2 or 3 of the Spanish Social Security System), 19% are medium skilled (meaning that belong to the groups 3, 4, 5 or 6) and 68 % is low skilled (meaning that belong to the groups 7, 8, 9, or 10). On the other hand, the vast majority of workers in the sample (87%) is covered by an open-ended individual contract. The mean of the agreed wage increase for the collective contracts signed in 2008 with economic effect in 2009 is 350 basis points. However, the agreements signed after September 15th 2008 have a mean of 150 bp. The difference suggests a substantial downward adjustment of wages after September 15th

Table 1 provides summary statistics of the matched sample with collective agreements and Social Security records. We mainly use this sample to detect changes in wage setting behavior on a quarter by quarter basis. The sample overrepresents the Food and Accommodation and Construction sectors.[6] Examining the distribution

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[6]We show below that the overrepresentation of construction is irrelevant for our results. The reason is that employers and unions in the Construction sector is an unique one in that it sets wage growth at the *national* level, but other labor conditions at the province level. Hence, there is no effective variation of wage growth across signature dates in provincial agreements.

of industries by quarter of signature of the collective contract, Table 1 documents that agreements in construction, services to industries, health and accommodation or single-year agreements were more likely to sign after September 15th 2008. We condition on those variables in the analysis. Probably due to the overrepresenting of construction in the collective contracts signed before September 15th 2008, workers covered by those contracts are more likely to be low skilled. We note however, that those differences disappear once we condition on province and industry dummies (see the results in Column 4 of Table 1). Wage growth was substantially lower in wages set after September 15th 2008.

The sample with matched wage levels in collective agreements is presented in Table 2. That subsample contains about 45% of the cases in the sample containing the Census of Collective Agreements.

4 Empirical strategy

We proceed in three steps. We firstly determine whether or not new aggregate information affects wage settlements in collective agreements. To that end we use the matched sample of the Census of Collective Agreements and Social Security Records. In a second step we investigate the behavior of actual wages.

4.1 Wage settlements in collective agreements around September 15th 2008

A central element of our empirical strategy is to determine the timing of the shock -i.e., the moment when unions and employers perceived a turning point in activity. As mentioned above, we use September 15th, 2008 as the date of such turning point. The fall of Lehman Brothers arguably caused a disruption in the working of financial markets, and was possibly unanticipated by most agents in the economy. We first examine of there was a disruption in collective bargaining in Spain as of September 15th, 2008 by analyzing wage settlements for 2009 in all the collective agreements by signature date. The date when a collective agreement is signed reflects the information set of all agents involved in the process, so sharp cross-province and industry changes in wage growth by signature date is likely to reflect changes in the information

set of agents. That first specification is

$$\log \Delta wage_{ind,p}^{2009} = \theta_{ind} + \pi_p + \sum_{j=1}^{J=11} \delta_j 1(sign_{ind,p} = q) + \varepsilon_{ind,p}$$

θ_{ind} is a (three-digit) industry fixed effect, π_p is a province-specific fixed effect and $1(sign_{ind,p} = q)$ is an indicator variable that takes value 1 if the contract was signed in that quarter. We include quarters between 2007q4 and 2010q2. We include all collective contracts signed prior to September 15th 2008 as signed in 2008q3. We do not include an indicator for contracts signed in 2007q4 -the reference period. The regression is run on the Social Security Sample, effectively weighting the regression by the industry and province shares in that source. Standard errors are clustered at the province x 3-digit industry level.

4.2   Wage and employment effects by proximity to wage floors

We estimate the models of individual's wage growth (as opposed to statutory wage growth in collective agreements) as well as of the transition from employment to unemployment as a function of the exact date when the collective provincial agreements was signed. As shown in the descriptives of the full sample, wages vary as new information arrives and the date of signature matters. Therefore, workers in 2009 are subject to a different wage settlements depending on whether their collective contract was signed early in 2008 (when the full extent of employment destruction was hard to predict) than in 2009 -when unions and firms could observe and bargain taking into account national net employment losses of about 8%. The parameter of interest can therefore be interpreted as the slope of a province-industry level "demand curve": a higher bargained wage increase should increase the probability of becoming unemployed in 2009.

In our setting, demand shocks affecting employment losses and wages are to be expected. For example, the construction industry experienced a severe drop in 2008, and that drop was likely to have propagated to industries that provide inputs for the sector. In the presence of industry-specific demand shocks, an OLS specification linking transitions into unemployment to observed wage increases would be biased. Hence, we use variation in the date when the contract was signed, interacted with

the distance to the minimum wage floor. We fit the following model:

$$Y_{i,s,p} = \alpha_0 + \alpha_1 1(signed\_2008_{s,p}) * f(W_{i,2008} - \underline{W}_{s,p,2008}) + f(W_{i,2008} - \underline{W}_{s,p,2008}) + \theta_{s,p} + \varepsilon_{i,s,p}$$
(2)

Where $Y_{i,s,p}$ denotes the outcome of interest (either individual wage growth in 2009 or employment losses in that year, described below). $1(signed\_2008_{s,p})$ is an indicator function that takes value 1 if the collective contract was signed before September 15th, 2008 and 0 otherwise. The function $1(signed\_2008_{s,p})$ indicates whether the wage increase settled for 2009 depends on the change of information set of bargaining units after the Lehman Brothers. We document below that wage growth was higher among collective contracts signed before the fall of Lehman Brothers. $f(W_{i,2008} - \underline{W}_{s,p,2008})$ is an indicator of the distance between the wage of the worker in 2008m12 and the collective agreement floor. $\theta_{s,p}$ is a contract-specific fixed effect (an interaction of province and 3-digit industry dummies) that absorbs any trend in wages or employment destruction that affects all workers covered by the agreement. Finally, X_{sp} collects individual characteristics such as type of contract (whether is open-ended or fixed-term contract), age dummies, nine dummies denoting the skill level (proxied by the group of the Spanish Social Security system).

In the first stage, the dependent variable is yearly wage growth between 2008m12 and 2009m12 -or $\Delta \log(W_{i,2009m12})$. That specification allows us to verify if within the set of workers whose wages were closest to their statutory minimum, those covered by a contract signed in 2008 experienced systematically higher wage growth than the rest. Introducing a flexible specification of $f(W_{i,2008} - \underline{W}_{s,p,2008})$ we can also examine if the impact is present all over the distribution of $W_{i,2008} - \underline{W}_{s,p,2008}$ or if, alternatively, the impact only happens close to the collective agreement wage floor. As collective agreements only specify minimum wages at the industry-province level, the increase in the agreement statutory minimum wage should mostly increase wage growth of workers with wages close to that floor.

The second specification uses as the dependent variable an indicator of whether the employee transited from employment into unemployment at some point in time between 2009 and 2010. Namely, we use indicators of whether the workers experienced at least 3 months of unemployment between 2009 and 2010 as well as an indicator

of the fraction of days not worked during the 2009-2010 period. That specification is an Intention-To-Treat that checks whether workers whose wage was closest to the statutory minimum and were covered by contracts signed before 2008m9 had higher chances of transiting into non-employment than workers similarly close to their agreement floor but whose contract was signed in 2009.

The coefficient of interest is α_1. Given the discussion about the degree of anticipation of the magnitude of employment destruction in the last quarter of 2008 and the first of 2009, we expect that α_1 is positive in the first-stage -agreements signed before the September 2008 should have settled higher wage increases than those settled in the early months of 2009, and such wage increases are most relevant for workers whose wage was already close to the statutory minimum in their province-industry-skill group cell. Similarly, in the employment equation, workers covered by agreements settled in 2008 and close to the statutory minimum should have a higher chance of transiting into unemployment, as their employers would have experienced larger wage costs.

Illustration of the empirical strategy

We illustrate the source of identification in Figure 3, that displays the histograms of monthly wages of a specific skill group (waiters) in 2008m12 a particular industry - *Food and Accommodation*- in two provinces (Valencia and Granada). The vertical line at the left each graph denotes the statutory wage floor in the province-industry-skill group. Employees and employers in Valencia signed their collective contract in 2007, and agreed a 5% wage increase for 2009 -thus raising the wage floor for 2009 at the second vertical line. That is, restaurants in Valencia employing workers with earnings between both statutory wages must have a wage increase during 2009. Conversely, the collective contract for *Food and Accommodation* in Granada expired in December 2008 and no agreement was reached until 2010 -thus leaving the set of 2008 wage floors effectively unchanged for 2009. Unlike their counterparts in Valencia, employers in the *Food and Accommodation* industry in Granada who employed waiters whose earnings were close to the statutory minima had no obligation of increasing their wage bill.

Waiters in Valencia whose earnings in 2008m12 were below 1.05 times the statutory minimum wage for 2008 (1100 euros) should have their wage increased during the recession period. Under the assumption of a downward sloping labor demand, those workers would have a higher chance of losing their job than workers similarly

close to the statutory minimum in Granada -where no wage increase was compulsory for their employers.

Our identifying assumption is that changes in wages agreed in the second case are due to more information about the amount of employment destruction during the 2008-2009 crisis and do not reflect industry-province specific effects which are correlated with the date of signature and affect workers differentially by how close their statutory wage was from the . We also conduct robustness checks to support that identification assumption by controlling for firm-skill group fixed effects -dummies that control non-parametrically for any variable that varies at the firm level, like managerial skills, access to credit or firm level shocks during the period.

5   Results

Figure 1 plots the estimated coefficients $\widehat{\delta}_j$, along with the standard errors -corrected for heteroscedasticity and autocorrelation at the industry-province level. Wage settlements effective in 2009 were very similar for all contracts signed in 2007q4 through 2008q3. However, contracts signed in 2008q4 settled a wage increase 50bp lower than those settled a quarter before. Figure 1 also shows that contracts signed later in the year included wage settlements that were progressively smaller. For example, wage settlements for 2009 signed retrospectively in 2010q2 included wage growth 150bp lower than those signed in 2008q3. In sum, the staggering of labor contracts caused substantial variation of wage growth across industries and provinces in 2009, leaving some workers covered by contracts that settled high wage increases reflecting the situation in 2007q4 while other workers covered by contracts that settled substantially lower wage increases for that same year. We exploit that source of exogenous variation to examine the response of job loss to higher labor costs.[7]

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[7]Note that the progressively lower wage growth in contracts signed later in 2009 and 2010 can reflect stickiness in the dissemination of information about the extent of the crisis, but can also be due to strategic delays in contract settlements. For example, it could be the case that employers and employees found it optimal already in 2009 not to renew immediately because of macroeconomic uncertainty, postponing signature and effectively freezing nominal wage growth in statutory minimum wage levels for 2009.

5.1 Individual wage growth responses

Table 3 shows estimates of Model 3 when the dependent variable is $\Delta \log(W_{i,2009m12})$ -wage growth computed at the individual level between 2008m12 and 2009m12. The sample is restricted to workers who stay in their job for the whole year and who worked full time both in December 2008 and in December 2009. The evidence from Figure 1 suggests that wage growth in 2009 must have been higher among workers who were covered by collective contracts signed before 2008m9 and, within that group, among the set of workers who were close to the minimum wage.

In what follows, we specify $f(W_{i,2008} - \underline{W}_{s,p,2008})$ as two dummies indicating if the wage of the worker in 2008m12 was below 1.2 times the statutory minimum in the province-industry-skill group cell or whether it is between 1.2 and 1.4 times that minimum wage, the omitted group being workers whose initial wage was above 1.4 times the statutory minimum. Note also that $1(signed\_2008_{s,p})$ is not identified, because all our models include agreement-level fixed effects. However, the interaction between $1(signed\_2008_{s,p})$ and $f(W_{i,2008} - \underline{W}_{s,p,2008})$ is identified.

The first column first row of Table 3 shows that the coefficient of $1(signed\_2008_{s,p})*$ $1(1.2\underline{W}_{s,p,2008} < W_{i,2008} < 1.4\underline{W}_{s,p,2008})$ is .018 (standard error: .0059). The estimate implies that workers whose contract was signed before 2008q4 *and* their initial wage was below 1.2 times the minimum wage experienced an increase in compensation that was 180bp higher than similar workers covered by agreements signed after 2008m9. Crucially, the wage growth of workers whose initial wage level was far away from the statutory minimum depended not on whether or not the contract was signed before or after 2008 (i.e., the interaction between $1(signed\_2008_{s,p})$ and $1(W_{i,2008} > 1.2\underline{W}_{s,p,2008})$ is .0050 (standard error .0051). The second column of Table 3 shows that the estimate is basically unaltered once we control for additional covariates, like female, five age dummies, an indicator for a fixed-term contract -in turn, an indicator of dismissal costs- as well as the nine skill group dummies determining the statutory wage minima.

5.2 Employment responses

Table 4 presents OLS regressions linking the probability of transiting from employment in 2008 to unemployment in 2009 to the date of signature. -interacted with

18

distance to the statutory minimum. For each specification, we present two measures of transitions from employment to unemployment. The first is an indicator of job loss during 2009, defined as the event "having three months or more of unemployment during 2009 and 2010". Note that a layoff due to a high wage increase in 2009 could have happened in any moment in 2009, so if layoffs happened late in 2009, we would only observe the unemployment spell in 2010. In addition, we also use as a dependent variable an indicator of the time elapsed in unemployment, measured as the fraction of total days not worked during 2009 and 2010. While those outcomes measure the joint effect of job destruction and of subsequent job finding rates, they are also unlikely to reflect churning in the labor market -such as job-to-job movements.

Columns (1-2) present estimates of Model (3) using as a dependent variable an indicator of having spent in unemployment at least three months during the period 2009-2010 -while initially employed. The standard errors are corrected for heteroskedasticity and arbitrary correlation at the collective contract level. The pattern of the point estimates in the first and third row, first column of Table 4 suggests that within the set of workers whose wage was less than 1.2 times the statutory minimum in their collective contract, collective contract was signed before 2008q4 had a 2.7 higher percentage chance of transiting into unemployment (row 2 column 1 of Table 4). The estimate increases to a 3.3 higher chance if the wage in 2008 was below 1.1 times the statutory minimum wage -however the latter coefficient is imprecisely estimated.

On the other hand, we find little evidence of a differential date of signature effect among workers with wages in 2008 far away from the compulsory minimum. For example, for workers whose wages were above 1.2 times the collective agreement minimum wage but below 1.4 times the estimate of $1(signed\_2008_{s,p})$ and $1(1.2\underline{W}_{s,p,2008} < W_{i,2008} < 1.4\underline{W}_{s,p,2008})$ is -.003 (standard error .014)

In the third column we use as the dependent variable the fraction of days spent in non-employment. The results are similar to those in Columns 1 and 2, but much more precise. Within the set of workers whose wage in 2008 were below 1.2 times the statutory minimum wage, those whose collective contract was signed before 2008m9 spent 2.5 percent more time in unemployment during the sample period (standard error: .9 percentage points) than workers whose contract was signed afterwards. We fail to detect a statistically significant response for workers whose wage was only 1.1

times the statutory minimum

5.2.1 Firm level fixed effects

Firm performance during a recession may depend on its size, financial health or its managerial skills, variables thus far omitted. The Continuous Sample of Working Histories contains an identifier that permits identifying workers in the same establishment. Under the assumption that financial health or other characteristics affect workers of the same skill group similarly, replacing the collective contract fixed effect in Model 3 by firm-skill group fixed effect would absorb the impact of such confounding factors. Namely, we run a model of the form:

$$Y_{i,s,p} = \beta_0 + \beta_1 1(signed\_2008_{s,p}) * f(W_{i,2008} - \underline{W}_{s,p,2008}) + f(W_{i,2008} - \underline{W}_{s,p,2008}) + \mu_{f,g} + \varepsilon_{i,s,p}$$
(3)

Where $\mu_{f,g}$ is a firm - skill group fixed effect. β_1 is again identified by comparing workers whose wage in 2008 was below 1.2 times the collective agreement industry-level minimum wage but whose labor contract was signed before the fall of Lehman Brothers. However, and unlike Model (3), in Model (4) β_1 is identified by comparing if those workers close to the minimum and whose collective contract was signed in "good times" had higher chances of transiting into unemployment than the average *at the firm-skill group level.* β_1 is identified from the set of firms that employ multiple workers in skill-group cells - a subsample of the one that identifies α_1 in Model (3). The estimates are shown in Table 5 and imply a higher 4.3 pp chance of transiting into unemployment among workers whose wage was below 1.2 times the collective agreement minimum and had whose wage increase was settled before the fall of Lehman Brothers -relative to workers similarly close to the collective agreement minimum but whose collective agreement was signed afterwards.

5.2.2 Impacts by industry

In Table 6 we examine differential effects by industry. The specification serves two purposes. Firstly, there are sectors where there is provincial collective bargaining, albeit in terms of wage growth it follows a national level agreement - for example, construction. Hence, even though there is within province dispersion in the date of

signature, such dispersion affected not wage growth at the industry level, which is basically set at the national agreement.[8] Our main hypothesis is that dispersion in wage growth across provinces and sub-industries causes job losses. Hence, in the presence of dispersion of signature dates but absence of dispersion of wage growth should result in no differences in employment losses. The second column of Table 6 shows that the interaction of $1(signed\_2008_{s,p})$ and $f(W_{i,2008} - \underline{W}_{s,p,2008})$ is basically zero. That is a reassuring result that confirms that in the absence of province-level variation in collective agreements our specification is unable to detect differential employment losses.

Columns 3 and 4 of Table 6 present estimates in the services industry. Column 3 shows the impact on employment losses in services like retail, wholesale, food and accommodation as well as transportation. Column 4 shows employment impacts in other type of services, like personal, services to business, health and education. The effects seem confined to the first set of services, where the estimate of the interaction of $1(signed\_2008_{s,p})$ and $f(W_{i,2008} - \underline{W}_{s,p,2008})$ is 2.95 percentage points (standard error: 1.3). The estimates in personal or business services, health and education are very similar in magnitude, but much more imprecisely estimated -the standard error is eight times larger than in the Food and Accommodation case. It should be noted that statutory minimum wages in those industries are less binding than in the Food and Accommodation or in the Transportation industry.

6 Conclusions

We present evidence for Spain during the Great Recession suggesting that both bargained wage growth and employment-to-unemployment transitions depend on the information available at the time when collective agreement were signed . The degree of widespread downward wage rigidity induced by automatic extension of provincial agreements and multi-period bargaining implies that only collective contracts signed after agents could observe large drops in aggregate activity and employment could partially adjust by reducing wage growth by 1.5%. However, firms covered by collective agreements already signed before 2009 faced a sharp drop in activity while

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[8]There are a few collective agreements in the construction sector that do specifiy differential wage growth. However, their coverage is very low.

experiencing increases in labor costs of about 3%. We combine information on the exact dates of collective agreements bargaining periods and longitudinal Social Security worker records to test if higher wage growth during a recession leads to higher flows from employment to unemployment.

Using a sample with matched information on Social Security records, and detailed collective agreement wage levels as of 2008 (prior to the recession), we find that, relative to comparable workers covered by contracts signed later in 2009, workers whose wage were close to the collective agreement floor *and* covered by collective contracts signed prior to September 15th 2008 (a) experienced about 2 pp higher wage growth (b) were between 2 and 4pp more likely to lose their job. The evidence suggests that the particular form of wage rigidity created for the automatic extension of provincial agreements and multiperiod bargaining had a role on the employment destruction during the 2008-2009 recession in Spain. However, further research must assess how important this source of wage rigidity was during other recessions. Furthermore, the role of downward wage rigidity on job creation is a key to assess how the labor market reacts to economic shocks. These topics are left for further research.

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Table 1: Summary statistics, by year of signature

| | Full sample | Contract signed | | Difference | Net of industry & province |
		prior to 2008m9	after 2008m9		
Agriculture, manufacturing, utilities	15.9	14.9	17.2	-2.3	
Construction	41.1	59.0	21.2	37.8	
Trade, food & accomodation, transp.	26.4	20.7	32.8	-12.1	
Services to businesses, health and educ.	16.4	5.3	28.8	-23.5	
Multi-year	88.2	100	75.1	24.9	
Escalation clause	64.3	82.2	44.2		
Wage growth 2009 -agreement. [mean]	2.60 (1.20)	3.10 (.96)	1.86 (1.15)	1.24	
Wage growth 2009 -agreement. [median]	2.9	3.5	1.5	2.00	
Worker characteristics					
Age	37.76 (10.5)	37.75 (10.6)	37.80 (10.4)	-.05	-.27 (.12)
High skill (college)	12.5	9.4	17.1	-7.7	.6 (.4)
Mid-skill	19.2	14.6	26.1	-11.5	-1.2 (.5)
Low skill	68.2	76.0	56.1	19.9	0.6 (0.6)
Fixed-term contract	29.7	34.3	22.8	11.5	.9 (.7)
Sample size	93990	55858	38132		

Characteristics of the matched sample of Social Security records with collective agreements.signed between 2007m10 and 2010m12.
 Each worker contributes one observation. Worker characteristics refer to 2007m12, and agreement characteristics are those set for 2009

Table 2 Summary statistics, by year of signature. Sample with wage levels

	Full sample	Contract signed	
		prior to 2008m9	after 2008m9
Agriculture, manufacturing, utilities	.11	.09	.12
Construction	.32	.62	.15
Trade, food & accomodation, transp.	.35	.25	.38
Services to businesses, health and educ.	.22	.02	.35
Multi-year	.89	1	.82
Escalation clause	.56	.89	.36
Wage growth 2009 -agreement.	2.41	3.55	1.73
mean (S.D.)	(1.29)	(.82)	(.102)
Worker characteristics			
Age	37.6	37.5	37.6
High skill (college)	.17	.105	.22
Mid-skill	.20	.18	.25
Low skill	.60	.69	.37
Fixed-term contract	.11	.11	.11
(Wage08m12-Minwage)/Minwage	.635	.45	.75
Female	.32	.20	.39
Sample size	38434	14282	24152

Source: Matched Social Security-Census of Collective Agreements sample with information on wage levels in the collective agreement.
The sample contains Social Security records with collective agreements signed between 2007m10 and 2010m12 and information on wage floors
Each worker contributes one observation. Worker characteristics refer to 2007m12, and agreement characteristics are those set for
2009. (Wage08m12-Minwage)/Minwage is the distance between the wage in 2008m12 and the collective agreement minimum for
the skill group as of 2008m12

Table 3: Actual wage growth 2008-2009 by date of signature and distance to contract-specific minimum wage

	No covariates (1)	Covariates (2)
Contract signed before 2008q4 * (min_wage<wage 2008 <1.20*min_wage)	**.0179** **(.0059)**	**.0185** **(.0058)**
Contract signed before 2008q4 * (1.2*min_wage<wage 2008 <1.40*min_wage)	.0050 (.0051)	.0051 (.0051)
Wage in 2008 between min_wage and 1.2 times minimum wage	.0508 (.0034)	.0526 (.0036)
Wage in 2008 between 1.2 times min_wage and 1.4 times minimum wage	.0392 (.0025)	.0403 (.0026)
Constant	-.0112 (.0013)	.00075 (.0044)
Indicator of skill level	no	yes
Collective contract fixed-effect	yes	yes
Number of observations:	34878	
R-squared	.0644	.0675

Covariates in 2nd column: 5 age dummies, type of labor contract and an indicator of female worker

Sample of stayers in their 2008m12 job. Standard errors clustered at province-industry cell

Table 4: The response of the probability of not working in 2009-2010 to date of contract signature x distance to wage minimum

Dependent variable:	1(90+ days in U 2009-2010)		Days in U 2009-2010/730	
	Basic set covariates	Full set	Basic set of covariates	Full set
	(1)	(2)	(3)	(4)
Signed before 2008m9 *	.0331	.034	.0181	.0185
(min_wage <wage< 1.10 min_wage)	(.022)	(.022)	(.0129)	(.0129)
Signed before 2008m9 *	.0272	**.0281**	**.0248**	**.0251**
(1.10 min_wage <wage< 1.20 min_wage)	(.0164)	**(.0165)**	**(.009)**	**(.0094)**
Signed before 2008m9 *	-.003	.0054	.003	.0036
(1.20 min_wage <wage< 1.40 min_wage)	(.0139)	(.0073)	(.007)	(.0075)
Min_wage<wage 2008 <1.10 min_wage	.112	.105	.058	.055
	(.017)	(.017)	(.009)	(.010)
1.1 Min_wage<wage 2008 <1.20 min_wage	.095	.089	.045	.0433
	(.0087)	(.0089)	(.005)	(.005)
1.20 Min_wage<wage 2008 <1.40 min_wage	.058	.053	.028	.023
	(.0091)	(.0091)	(.005)	(.0047)
Constant	.146	.153	.078	.076
	(.007)	(.0150)	(.003)	(.008)
Collective contract fixed effect	yes	yes	yes	yes
Number of observations (contracts):		38434 (551)		
R-squared	.104	.106	.0969	.0978

The Table shows coefficients of a regression of the dependent variable is either a dummy indicating if the worker did not work for than 3 months in 2009-2010 or the actual share of days not worked during that period. The regressors are dummies indicating the distance between the monthly wage of the worker in 2008m12 and the minimum statutory wage in the province - industry - skill group. The omitted group are workers whose wage in 2008m12 was at least 1.4 times the statutory minimum wage. The coefficient of interest is the interaction of the distance to the statutory wage and the date of signature of the contract. . All regressors include 551 separate intercepts for each contract
The basic list of covariates include 9 dummies with the skill group of the worker and a dummy for a fixed-term labor contract.
The extended set of covariates adds 5 age dummies, and an indicator of female worker. Standard errors clustered across contracts

Table 5: The response of days not worked in 2009-2010 within province - industry -group cells and within firms

Dependent variable:	(Days not worked in 2009-2010) / 730		
	(1)	(2)	(3)
Signed before 2008q4 *	**.022**	.012	**.043**
(20pp above agreement minimum)	**(.009)**	(.009)	**(.019)**
Signed before 2008q4 *	.0035	-.0035	.0073
(20pp <wage< 40pp)	(.0075)	(.0076)	(.016)
Wage in 2008	.048	.0499	.044
20 pp above agreement minimum	(.0073)	(.0056)	(.016)
Wage in 2008	.0264	.0276	.0275
20-40pp above agreement minimum	(.0077)	(.0051)	(.010)
Constant	.076	.085	.0739
	(.008)	(.0072)	(.018)
Collective contract fixed effect:	yes	yes	yes
Indicator of skill level	yes	--	--
Collective contract x group fixed effect	--	yes	--
Firm x group fixed effect			yes
Number of observations:		38384	
R-squared	.17	.172	.782

The Table shows coefficients of a regression of the dependent variable is either a dummy indicating the share of days not worked during that period.
 The regressors are dummies indicating the distance between the monthly wage of the worker in 2008m12 and the minimum statutory wage in
the province - industry - skill group. The omitted group are workers whose wage in 2008m12 was at least 1.4 times the statutory minimum wage.
The coefficient of interest is the interaction of the distance to the statutory wage and the date of signature of the contract.
 Column 1 includes 551 separate intercepts for each contract Column 2 includes province x industry x skill group fixed effects
and Column 3 includes firm x skill group fixed effects.All models include 9 dummies with the skill group of the worker, a dummy for a fixed-term
 labor contract. 5 age dummies, and an indicator of female worker. Standard errors clustered across contracts

**Table 6: The response of days not worked, by industry 2009-2010**

Dependent variable: 1 if more than 90 days not worked between 2009 and 2010

|	Manufacturing (1)	Construction (2)	Services (a) (3)	Services (b) (4)
Signed before 2008q4 *	-.0871	.0015	**.0295**	.030
(20pp above minimum)	(.0489)	(.0103)	**(.0127)**	(.092)
Signed before 2008q4 *	.0189	.0015	-.0000	.0676
(20pp <wage< 40pp)	(.0312)	(.0175)	(.010)	(.0406)
Wage in 2008	.133	-.0259	.0386	.1076
20 pp above minimum	(.0281)	(.0240)	(.0069)	(.0246)
Wage in 2008	.0685	.0624	.0337	.020
20-40pp above minimum	(.0207)	(.0188)	(.0083)	(.0135)
Constant	.13	.172	.054	.144
	(.04)	(.035)	(.011)	(.029)
Indicator of skill level	yes	yes	yes	yes
Province-industry fixed effect	yes	yes	yes	yes
Number of observations:	4693	14791	14630	10130
R-squared	.130	.123	.073	.0722

See notes to Table 5.

(a) Retail, Wholesale, Food and Accommodation and Transportation (b) Personal and business services, health, education

Figure 1: Agreed wage growth for 2009, by quarter of signature
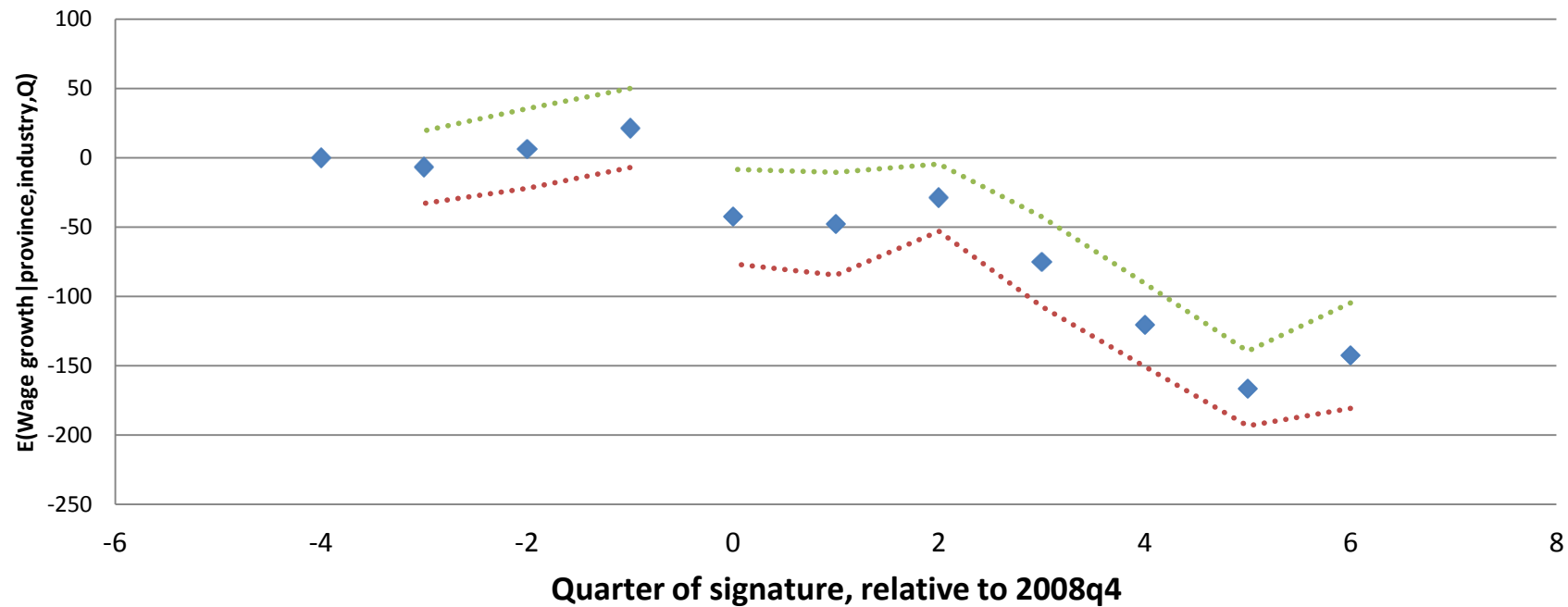
The graph shows quarter dummies of a regression where:

(a) The dependent variable is agreed wage growth for 2009 (in basis points)

(b) Quarter of contract signature dummies between 2008q1 and 2010q2, 2007q4 omitted.

(c) The covariates are 49 province dummies and 141 industry dummies

Standard errors permit arbitrary correlation at the province-industry cell.
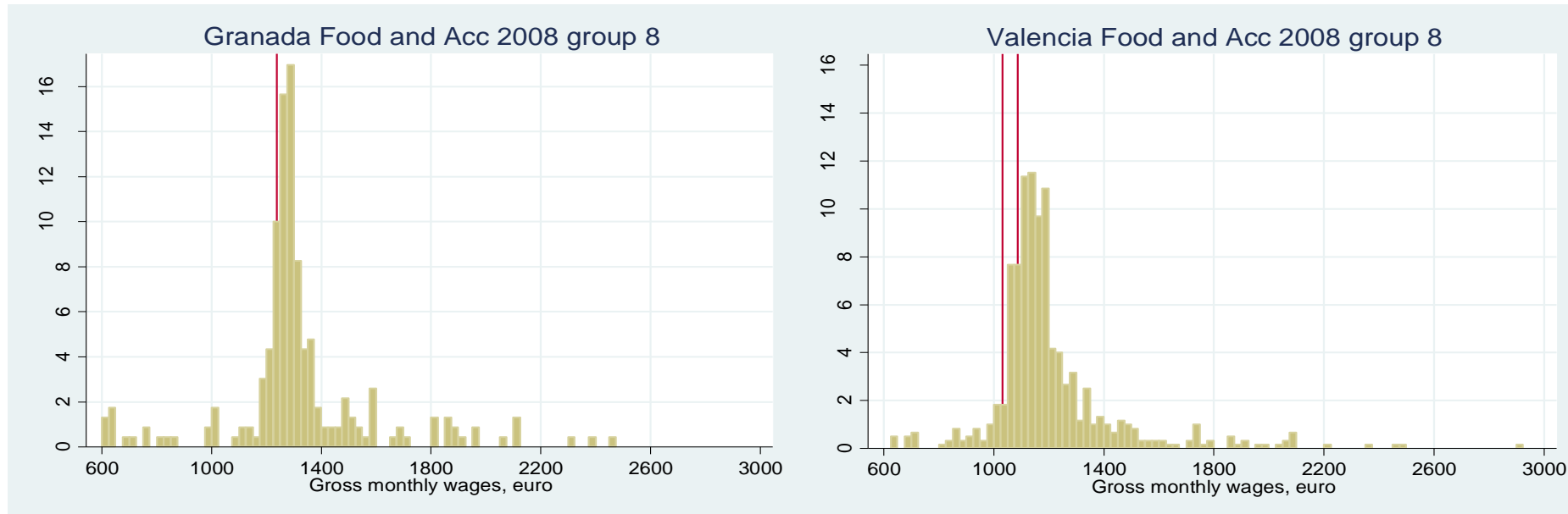
Figure 2: Histogram of monthly wages (2008m12) in selected provinces -Valencia and Granada

The Figures display histograms of monthly wages in Food and Accommodation as of 2008 in two provinces, Valencia and Granada.

The Food and Accommodation agreement in Valencia was signed in 2007, and it set a 5% wage increase. That in Granada was signed in 2010, after expiring in 2009, and the agreed wage increase was below 1%.

There are two vertical lines in each Figure.

The line in the left represents the minimum statutory wage for waiters in 2008 in each province. The second one is the statutory minimum wage in 2009 (not visible in Granada, as it coincides with that in 2008)

TABLA DE RETRIBUCIONES BRUTAS DEL CONVENIO DE LA CONSTRUCCIÓN Y OBRAS PÚBLICAS DE NAVARRA

Revisión salarial. Efectos: 1-1-2010 a 31-12-2010. Incremento: 4,5%

NIVELES	SALARIO BASE	COMPL. CONVENIO	PLUS EXTRASAL.	TOTAL MES	JULIO	NAVIDAD	VACACIONES	TOTAL ANUAL
II Titulado Superior	2.102,35	555,97	65,54	2.723,86	3.467,27	3.467,27	3.467,27	40.364,27
III Titulado Medio	1.725,24	467,14	65,54	2.257,92	2.873,88	2.873,88	2.873,88	33.458,76
IV Encargado General	1.670,51	453,53	65,54	2.189,58	2.795,09	2.795,09	2.795,09	32.470,65
V Jefe Admon. 2.ª	1.498,57	410,43	65,54	1.974,54	2.519,81	2.519,81	2.519,81	29.279,37
VI Delineante 1.ª	1.285,55	357,97	65,54	1.709,06	2.179,21	2.179,21	2.179,21	25.337,29
VII Capataz	1.262,40	355,72	65,54	1.683,66	2.144,91	2.144,91	2.144,91	24.954,99
VIII Oficial 1.ª	1.234,36	358,33	65,54	1.658,23	2.110,66	2.110,66	2.110,66	24.572,51
IX Oficial 2.ª	1.085,89	326,52	65,54	1.477,95	1.878,53	1.878,53	1.878,53	21.893,04
X Especialista	1.022,26	315,92	65,54	1.403,72	1.782,02	1.782,02	1.782,02	20.786,98
XI Peón Especializado	1.004,83	317,78	65,54	1.388,15	1.760,69	1.760,69	1.760,69	20.551,72
XII Peón Ordinario	969,67	313,00	65,54	1.348,21	1.708,38	1.708,38	1.708,38	19.955,45
XIII Aspirante Admon.	689,31	222,80	65,54	977,65	1.239,23	1.239,23	1.239,23	14.471,84
XIV Aprendices:								
De 16 y 17 años: 1.er año	597,24	179,58	65,54	842,36	1.033,19	1.033,19	1.033,19	12.365,53
De 16 y 17 años: 2.º año	651,53	195,91	65,54	912,98	1.127,12	1.127,12	1.127,12	13.424,14
De 18 a 21 años: 1.er año	705,83	212,24	65,54	983,61	1.221,05	1.221,05	1.221,05	14.482,86
De 18 a 21 años: 2.º año	760,12	228,56	65,54	1.054,22	1.314,97	1.314,97	1.314,97	15.541,33

Figure A.1. An example of collective agreement: construction in Navarre

Each of the entries in the Table spells a statutory minimum wage (in euros) for different wage concepts (columns).The rows in the first column represent skill levels, from top (college graduates) to bottom (laborers). The last four rows represent four types of apprenticeship, depending on age and seniority.

The columns represent different wage concepts, including the base monthly wage (first column), and a series of complements, including Chistmas and Summer bonuses. The last column represents a minimum yearly wage by skill group.
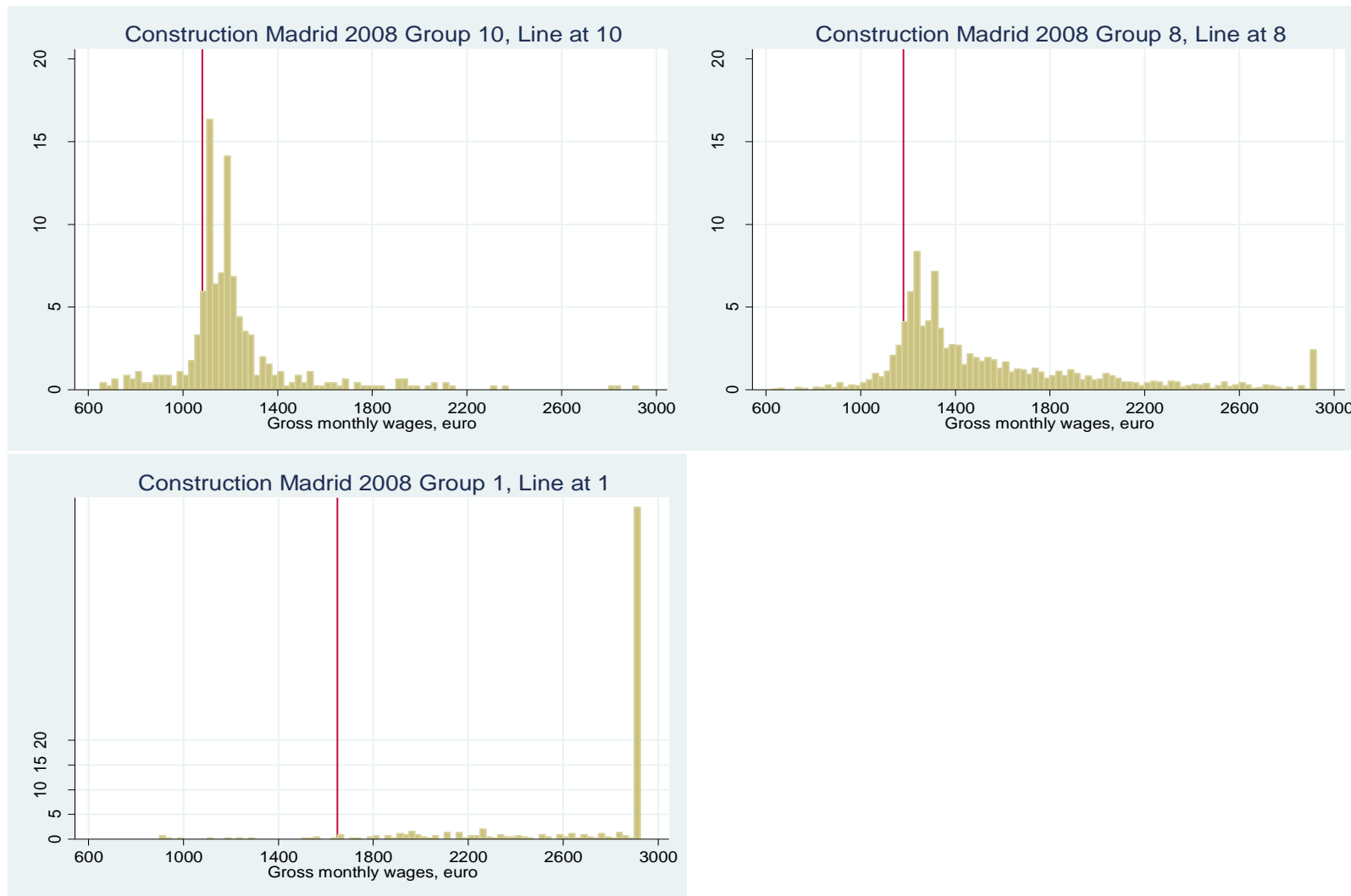
Figure A.2. The distribution of monthly wages and the statutory minimum wage, by skill level

The Figure shows the distribution of monthly wages in construction in Madrid for 3 skill levels. The top left chart shows the distribution of wages of laborers, the top right chart shows the distribution of monthly wages of foremen, and the bottom chart that of college graduates in the sector. The red line indicates the minimum compulsoty wage for each group.
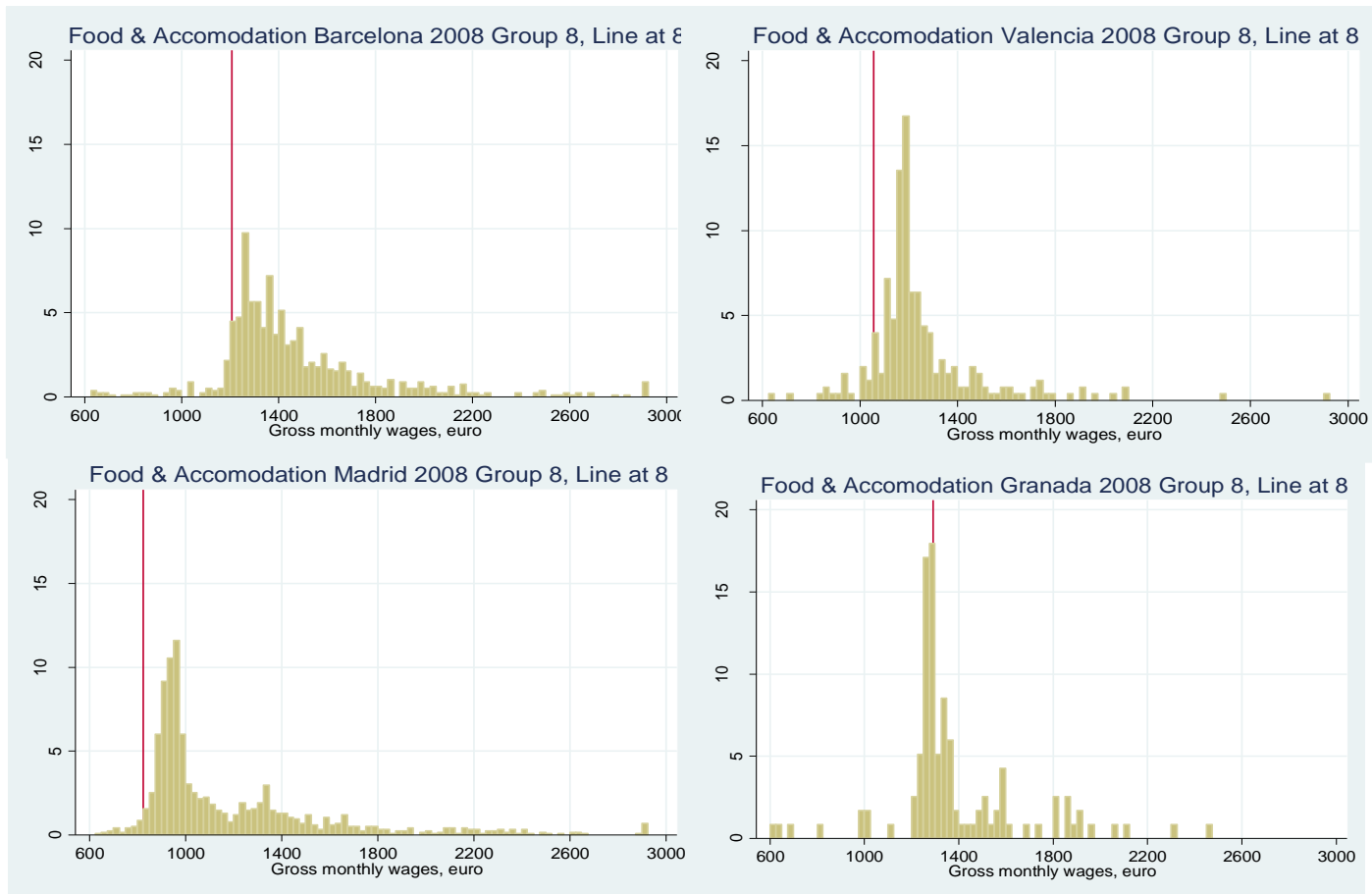
Figure A.3 Distribution of monthly wages in 2008 in Food and Accommodation sector, waiters

Distribution of monthly wages as of December 2008 of Food and Accommodation. The skill group
corresponds to waiters, and each of the provinces represents a different province.
The size of each bin is 25 euros.