

Collective contract representativeness and Pirate agreements: what are the effects on wages?

Claudio Lucifora*¹ and Daria Vigani^{†2}

¹Università Cattolica di Milano, IZA and CNEL

²Università Cattolica di Milano

April 2019

Abstract¹

Over the last decade, regulatory uncertainty characterizing the Italian system of collective bargaining and increasing fragmentation of social partners led to a dramatic expansion in the number of collective labor agreements and to the spread of the so-called “pirate” agreements – i.e. signed by ambiguous associations to grant formal cover for downward contractual dumping. In this paper, we start from a thorough examination of national collective agreements within each sector of economic activity to successively identify specific parameters for the definition of their representativeness. Once classified according with their level of representativeness, we use a longitudinal sample of working histories of Italian employees to explore wage outcomes associated with different labor agreements. We find evidence of a significant negative wage gap for workers employed under less representative agreements, that becomes even larger when considering pirate contracts only. The extent of the gap varies by job titles, firm size as well as industrial sectors, but it remains mostly negative across groups. Moreover, workers with a non-representative contract are also more likely to be paid below the collectively agreed minimum wage (defined at the industry-wide level). Finally, we move to the firm's perspective and explore how choosing to opt out of national collective bargaining relates with wages and employment adjustments in times of economic distress.

JEL classification: J52, J31, J41

Keywords: collective bargaining, collective agreements, representativeness, wage differentials

*Corresponding author: Department of Economics and Finance, Università Cattolica, Largo Gemelli, 1 (20123) Milan. e-mail: claudio.lucifora@unicatt.it

[†]Department of Economics and Finance, Università Cattolica, Largo Gemelli, 1 (20123) Milan. e-mail: daria.vigani@unicatt.it

¹We are grateful to Pedro Martins, Daphne Nicolitsas, Jonathan Thomas, Ernesto Villanueva, and participants to the CoBExt institutional meeting in Brussels for helpful comments. We acknowledge financial support from the European Commission DG-Employment under Grant Agreement VS-2016-0340.

1 Introduction

The Italian system of industrial relations has been under increasing pressure and in transition over the last decade. The hit of the Great Recession together with structural weaknesses of the Italian economy have stressed its traditional limits, calling for regulatory reforms aimed at shifting from highly centralized multi-employer collective bargaining to more decentralized negotiations.

The current two-tier collective bargaining structure, that is virtually unchanged with respect to the early '90s, has in fact been widely criticized for its rigidity, for the limited diffusion of plant-level bargaining as well as for the lack of clear rules establishing the scope of collective agreements and operational criteria for the assessment of social partners' representativeness (European Commission, 2016).

Over and above historical frailties of industrial relations, increasing fragmentation of unions and employers' associations together with a gradual erosion of their bargaining power led to an impressive increase in the number of national collective labor agreements over the last few years. Periodical reports disseminated by the National Council of Economics and Labour (CNEL) document an average 10% annual expansion in collective agreements from 2010 onward, with only one third of currently filed agreements that is signed by representative social partners.

Such unprecedented increase in collective bargaining agreements imposes additional complexity on a collective bargaining system characterized by “unclear and not well specified” rules (European Commission, 2016), while paving the way for “contractual shopping” or even unfair practices among firms. In the first case, the lack of a clear scope of collective agreements leads firms to simply go through the different contracts available and choose the most *competitive* one in terms of pay levels and minimum standards that have to be granted on other provisions. In the second scenario, some firms may even decide to opt out of the system of nationally bargained agreements and enforce their own contract, that is often signed by smaller unions and compliant employers' associations without real representation and granting formal cover to downward contractual dumping (the so-called *pirate contracts*). In either cases, however, wages and working conditions are likely to be negatively affected.

As the rise in the number of collective agreements and the spread of *pirate* contracts are relatively recent and fast-growing phenomena, they are still largely unexplored, along with their potential consequences on both workers and industrial relations.

Starting from a thorough examination of national collective agreements within sectors of economic activity and successive identification of specific parameters to define their *representativeness*, in this paper we take a first step in the direction of disentangling contractual pluralism, granted by the Constitution through freedom of association, from unfair practices and misconducts of firms.

Moreover, once national collective labor agreements are classified according with their level of representativeness, we explore potential economic outcomes associated with the existence of non-representative contracts.

In particular, using a longitudinal sample of working histories of Italian employees, we investigate whether different labor agreements are associated with different pay levels. In other words, we ask whether workers employed under less representative or *pirate* contracts earn lower wages with respect to their counterpart employed under representative labor agreements. We then further characterize collective agreements by complementing existing data with information on minimum wages (defined at the industry-wide level) and examining the relationship between contract representativeness and compliance with base pay. Finally, as the choice of whether and how to enforce specific labor agreements is up to the company, we move from the individual to the firm's perspective and explore the relationship between contract representativeness and firm-level outcomes (average wages and level of employment).

The rest of the paper is organized as follows. In the next section, we briefly describe the institutional framework and review the main contributions on the economics of collective bargaining. Section 3 presents the database and methodological issues, along with preliminary evidence on wage differentials among labor agreements. In Section 4 we present the results, while concluding remarks are provided in Section 5.

2 Institutional context and related literature

2.1 Collective Bargaining in Italy

The Italian collective bargaining system is characterized by a two-tier structure, where national collective agreements (*Contratti Collettivi Nazionali di Lavoro* - CCNL) set minimum wages and conventional standards at the industry level, while second-level bargaining (local or plant) negotiates over additional wage components and regulative aspects. According with the 1993 Protocol, signed by the government and social partners, national collective agreements' role is to provide a legislative framework for the use of labor and to preserve the purchasing power of wages – through the definition of inflation-targeted minimum wages –, and have primacy over lower level bargaining. As a matter of fact, lower-level agreements are not allowed to deviate from minimum standards set by CCNL in a way which would be unfavorable to employees (i.e. CCNL cannot be derogated *in pejus*).

There is no national statutory minimum wage and collective agreements are not legally binding, so, formally, their contents only apply to workers and firms affiliated to the signatories' affiliates. However, even in the absence of a formal extension mechanism for

national agreements, labor courts usually refer to collectively agreed base pay in order to assess the appropriateness of actual wages in individual disputes, according to Article 36 of the Constitution. Hence, minimum standards from agreements are also widely followed by non-affiliated firms, resulting in a *de facto* extension (“*erga omnes*” effect).

Since the early '90s, the CB system has remained fairly stable until the crisis hit. The increasing need of flexibility to counteract the economic effects of the business cycle led to the Framework Agreement of 2009, that broadened the scope of decentralized bargaining introducing the possibility for the firm to deviate from the national collective agreements. However, lower-level bargaining could not alter minimum pay rates, which remained as set out in the national agreement. Also, the plant-level agreements still have limited diffusion (D'Amuri and Giorgiantonio, 2014).

2.2 Actors in industrial relations, representativeness and collective agreements

Within the aforementioned collective bargaining structure, that lies on mutual recognition by social partners, there are no clear and certified rules governing who is entitled to bargain. Unlike in the public sector, where since the late 1990s representativeness criteria for trade unions' are clearly stated (DLgs No. 396/1997 and 165/2001, Art. 43), in the private sector until recently there were no rules on representativeness.

After one of the biggest companies in Italy (FCA-Fiat Chrysler Auto) decided to leave one of the largest employers' associations (Confindustria) in 2011 and signed a separate agreement - ceasing to be covered by the national metalworking agreement -, a lively debate on the need of transparent and certified parameters to assess signatory representativeness of social partners led to several industrial agreements (June 2011, May 2013 and January 2014). These agreements establish that a trade union need to pass a 5-per-cent threshold (calculated as a weighted average between obtained in works council elections and among branch members) to be considered *representative* and take part in national collective bargaining, whereas an agreement is binding if signed by unions representing at least 50%+1 of the relevant workforce (Leonardi et al., 2017).

However, as the assessment of unions' representativeness is not an easy task – membership data are to be provided (on a voluntary basis) by companies within their contributory statements to the National Social Security Institute (INPS) while the election results are to be collected by CNEL –, it remains not yet operational. Moreover, signatory representativeness for employers' associations it is still not defined by any law.

Within the present legal framework, each self-proclaimed *representative* association is allowed to bargain and sign a national collective agreement – that is successively filed within the CNEL's archive –, even in sectors that are already covered by pre-existing contracts, thus paving the way for the proliferation of CCNL. Furthermore, no firm

is constrained to the application of a nationally bargained collective agreement. On top of this contractual anarchy, recent labor market reforms appointed the system of industrial relations to the implementation of some novelties regarding financial incentives to stimulate firms' productivity. Such delegation fostered further competition among collective agreements, as a considerable amount of provisions concerning productivity and work organization are regulated within the latter.

2.3 Collective bargaining in economics literature

Collective bargaining has been widely studied in labor economics as it represents a key aspect of industrial relations, assuming a protective and distributive function for workers as well as a stabilizing function in the economy. Collective bargaining (CB) institutions can in fact mediate economic and social pressures, redistribute power among actors, solve coordination problems and, from a macroeconomic perspective, reduce uncertainty (Visser, 2013). However, the contribution of CB to employment, wages and inequality depends on how it is organized, on the structure and strength of its institutions and on the policies conducted by the latter (e.g. the levels at which bargaining takes place, representation and representativeness of social partners that are entitled to bargain and the existence of extension mechanisms broadening the scope of collective agreements).

From a theoretical perspective, the idea that collective bargaining institutions are able to influence macroeconomic performances has long been established in economics literature. Starting from the analysis of cross-country stylized facts on unemployment in the '80s, a hump-shaped relationship between the extent of centralization of wage-setting institutions and real wages has been proposed by (Calmfors and Driffill, 1988), challenging the conventional wisdom that 'corporatist' collective bargaining frameworks produce better macroeconomic outcomes. Within this view, while an intermediate level of bargaining is sub-optimal, "both heavy centralization and far-reaching decentralization are conducive to real wage restraint", that in turn lead to lower unemployment. The latter is achieved through competition when bargaining takes place at the firm-level, while, at the national-level, bargainers are able to internalize the effects of wage growth. Moreover, allowing firms to differ according with productivity, more recent studies have shown that unemployment is lower under firm-level bargaining, as compared to sector-level bargaining, due to lower job destruction rates and higher job-finding rates (Jimeno and Thomas, 2013). In this setting, sector-level bargaining is able to achieve the level of unemployment associated with decentralization only if firms are allowed to opt out of sectorial agreements.

On top of the level at which bargaining takes place, the mechanisms that extend the provisions of collective agreements beyond the members of the signatories – either explicitly issued by governments or simply representing benchmarks within sectors –, are

also likely to affect wages and employment. As a matter of fact, under multi-employer collective agreements such extensions require all firms in a sector to comply with the same set of minimum standards, thus promoting the leveling in terms of both working conditions and wages, but may also distort competition, as different firms are likely to require different settings (Haucap et al., 2001).

Theoretical predictions on the economic effects of collective bargaining have been tested in a large number of empirical studies, that have mainly focused on the impact of wage-setting institutions on wage rigidity (Avouyi-Dovi et al., 2013), wage distribution (Cardoso and Portugal, 2005) and wage inequality (Card et al., 2013; Devicienti et al., 2018), as well as on the role played by CB systems in shaping employment and unemployment dynamics (Brändle and Goerke, 2018; Bryson and Dale-Olsen, 2008; DiNardo and Lee, 2004; Martins, 2014) or employer-specific wage differentials (Gürtzgen, 2009; Martins, 2009; Rusinek and Rycx, 2013).

However, in recent years, the extent of centralization in wage-setting institutions and downward wage rigidity have been further investigated, as these are deemed to be responsible for the loss of competitiveness of a number of countries faced with the Great Recession. Empirical evidence on the relationship between different wage-setting regimes and firms' response to economic downturns suggests that, under centralized bargaining, negative shocks are more likely to translate into adjustments of the employment level, as wages are prevented to adjust downward (Izquierdo et al., 2017; Ronchi and Di Mauro, 2017). Moreover, Boeri (2015) shows that two-tier bargaining structures – where national or sector-level bargaining set minimum wages, that are then supplemented by firm-level negotiations over additional wage components – “may result in the worst of both fully centralized and fully decentralized systems”, as they do not allow wages to adjust downward during economic downturns nor link pay to productivity. Data from the European Central Bank's Wage Dynamics Network survey indicate that countries like France, Greece, Italy, Portugal and Spain, that are particularly interested by two-tier bargaining, suffered from significant downward wage rigidity at the outset of the crisis, and negative real effects of nominal wage stickiness have been uncovered for Spain during the Great Recession (Díez-Catalán and Villanueva, 2015). Conversely, decentralization in the wage-setting process and the possibility to cut unit labor costs have made it possible for Germany to improve competitiveness and experience almost no increase in unemployment during the Great Recession, as pointed out by (Dustmann et al., 2014).

Finally, membership erosion of both trade unions and employers' associations experienced by most European countries over the last decades is raising concerns about the effectiveness of social partners as well as on their legitimacy in engaging collective bargaining, drawing attention on the issue of representativeness of the latter and, in turn, of labor agreements. Following the definition by the European Commission of social

partners' representativeness (European Commission, 1993), “in most countries mutual recognition is the basic mechanism, but [...] in several countries there are mechanisms (for example quantitative criteria established by law or otherwise) to make a distinction between organisations with (the most) substantial membership and those which are less representative”. Over the last two decades several novelties have been introduced in national legal frameworks of many countries (Eurofound, 2016), however – with the exceptions of Italy, France and Portugal –, there has been relatively little public debate about the concept of representativeness and the level of collective bargaining.

In this respect, this paper contributes to the extensive empirical literature on the economic effects of collective bargaining by investigating, within the Italian institutional context, the role of representativeness in shaping employees' wage profiles.

3 Data and methods

3.1 Data and descriptive statistics

Data are drawn from INPS longitudinal archives, collecting working histories of a 1/90 random sample of private sector employees over the period 1985-2014. The data contain information on gross annual wages for each job spell of the employee, working weeks/days, type of contract and occupation, and also provide some limited information on demographics (age and gender) and firms' characteristics (number of employees and industrial sector). Moreover, through social security contributory statements that firms are required to file on a monthly basis, INPS collects and provides information on the national collective bargaining agreement under which workers are employed: a numerical code is assigned to each CCNL applied within firms, while workers employed under different agreements or no contract are assigned with the label “different contract”. Note that currently, more than 750 contracts are registered at CNEL, but only 34% of them are also coded within the INPS database, meaning that almost 500 labor agreements are to be considered “different contracts”.

In what follows, we focus on a restricted sample of employees aged 20 to 60, working in the private sector², with positive earnings between 2005³ and 2014. For workers with multiple job spells within the same year we select the most representative in terms of weeks, and use gross weekly wage as our measure of earnings⁴, after trimming it at the

²We exclude public administration and defence, as well as extra-territorial organizations. Moreover, we drop all observations for individuals working in the private sector but employed under a PA labor agreement.

³We exclude the years before 2005 as the classification of CCNL, provided by INPS, was significantly different (4-digit including an alphabetical reference to the level of application - national, regional or company) and information were mostly incomplete.

⁴Results are robust to the use of daily wages, see Table A4.

1st and 99th percentiles.

Our final sample consists of 1,474,891 workers (9,078,834 observation) and 1,036,408 firms, with the average worker being a 39 year-old blue-collar, employed under an open-ended contract, in a very small firm (15 employees or less) and working full time⁵.

In order to investigate potential economic outcomes associated with the recently witnessed proliferation of collective bargaining agreements, we start from a thorough examination of all CCNL filed within the CNEL’s archive to successively identify suitable parameters for the definition of their representativeness.

The sector of economic activity⁶ identifies the outermost boundary delimiting the scope of national collective agreements, and it represents the starting point of our analysis. Within each sector, we identify two additional parameters used to define contracts’ representativeness: *i*) the type of firms to which the contract applies (industries, SMEs, cooperatives and craftmen) and *ii*) representativeness of the signatories⁷.

Based on these criteria, we then group labor agreements according with representativeness to define three categories: 1) *most representative CCNL*, that are collective agreements signed by the “comparatively most representative” social partners in the sector and applied to the main type of firms (industries, SME, cooperatives or craftmen); 2) *other CCNL*, that include all other CCNL that are coded by INPS but *i*) belong to a contractual sector that differs from the firm’s sector of economic activity and/or *ii*) are “comparatively less representative”; 3) non-representative labor agreements (*NRLAs*), that are coded as “different contracts” within the INPS archive and refer to situations where the worker is either employed under a collective agreement that is not coded by INPS or without any contract. As an illustrative example, in Table A2 in the Appendix we provide a list of all CCNL classified as *most representative* for selected sectors, along with the share of workers (firms) covered by (applying) the latter agreements, *other CCNL* and non-representative contracts.

Following the above mentioned definition, Table 1 presents the incidence of the three different types of labor agreements within each sector of economic activity for the most

⁵Sample descriptive statistics are provided in Table A1 in the Appendix.

⁶We use 2-digit NACE rev.1 classification of economic activity to define 12 sectors, based on the 12 contractual sectors defined by CNEL and delimiting the scope of collective agreements: Agriculture [NACE 01 and 02], Chemicals [NACE 10 to 14, 23 to 25], Metalmechanic [NACE 27 to 35], Textile and other manufacture [NACE 17 to 20, 36], Food and Agrifood [NACE 05, 15 and 16], Construction [NACE 45 and 26], Communication, Arts and Entertainment [NACE 21, 22, 72 and 92], Retail trade [NACE 50 to 52, 55, 70, 71, 73, 74, 91 and 93], Transports [NACE 60 to 63], Financial services [NACE 65 to 67], Service providers [NACE 37, 40, 41, 64 and 90] and Education, Health and Social work [NACE 80 and 85].

⁷As already mentioned, there are no certified criteria for the definition of representativeness of social partners. In what follows we consider the “comparatively most representative” social partners of each sector.

recent year, 2014. Overall, 75% of workers are employed under “comparatively most representative” labor agreements, while less representative and *pirate* contracts are applied respectively to 23.5% and 1.3% of the sample of employees. *Most representative CCNL* cover more than 70% of workers in all but three sectors: agriculture, construction and communication&art. However, while in the construction sector the share of workers covered by CCNL is still well above 50%, agriculture and communication have a much lower incidence of representative contracts (47% and 37%, respectively). Note that the communication sector is typically characterized by significant heterogeneity in the range of economic activities across firms and by a huge number of CCNL (currently 47), so that the share of “comparatively less representative” CCNL that fall into the *other* category is larger. Conversely, the relevant fraction of *other CCNL* found in agriculture is mainly consisting of labor agreements that do not belong to the proper contractual sector, i.e. contracts belonging to the *Food & Agrifood* sector.

Some degree of heterogeneity across sectors can also be found when looking at the share non-representative labor agreements, with manufacturing industries generally characterized by a lower incidence of NRLAs as compared to the service area, with a notable exception represented by the metalmechanical sector. The latter industry indeed records the highest incidence of NRLAs in 2014 (3.8%), which is easily explained by the the fact that in 2012 FCA-Fiat Chrysler Auto (the largest automotive company in the sector, with over 80,000 employees) had already ceased to be covered by the CCNL for the sector and signed its separate agreement (coded with the “different contract” label).

Finally, the share of NRLAs is increasing with firm size (0.2% among firms with 15 employees or less while over 1% in very large firms).

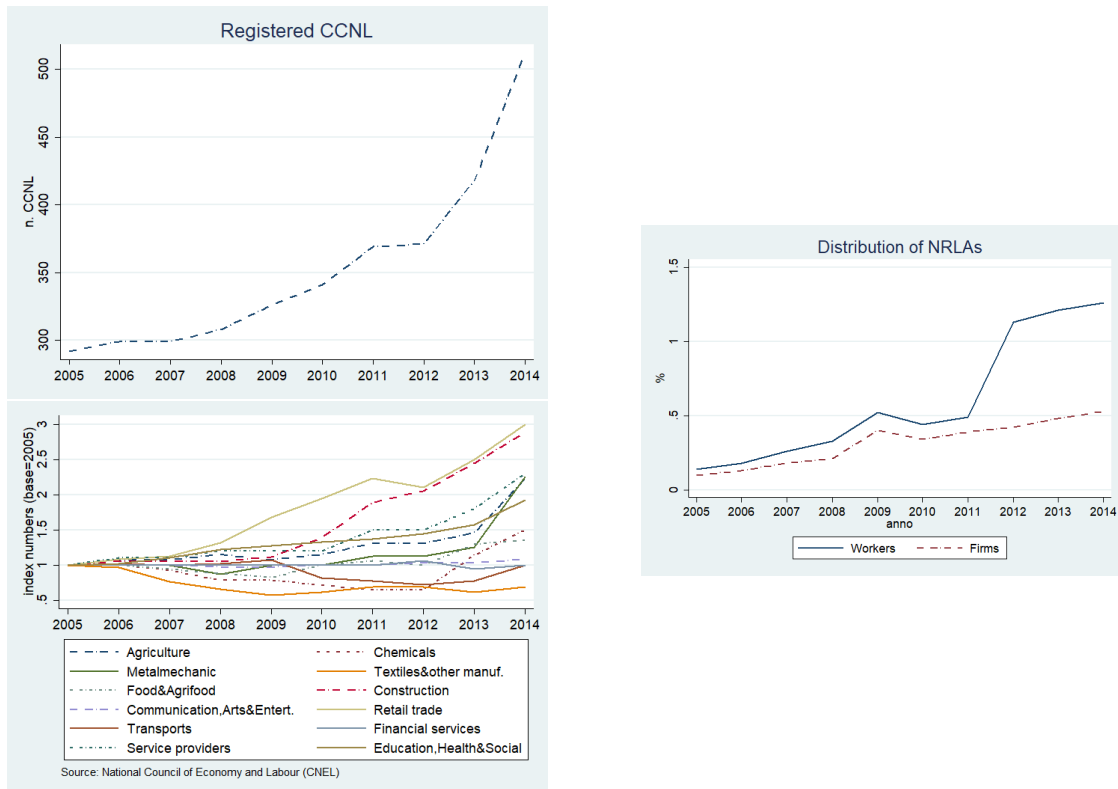
However, as the proliferation of CCNL and the associated spread in *pirate* agreements are relatively recent phenomena, the sectorial composition in terms of workers (firms) employed under (applying) different types of labor agreements varies considerably over the period under consideration.

To get a sense of the evolution of such phenomena over time, Figure 1 pairs time trends for the number of CCNL filed at CNEL (left panel) with the share of workers and firms involved with NRLAs in our sample (right panel).

The expansion of CCNL began in 2009, with a 6% increase in the number of filed agreements with respect to the previous year, and has been growing exponentially since 2011. The main sectors driving this upward trend are retail trade, construction, agriculture and health services, while most manufacturing industries remained fairly stable at least until the very last years.

The rise in the number of filed CCNL shown in the left panel of Figure 1 appears to be mirrored, in the right panel, by an increasing share of non-representative labor agreements in the sample of workers and firms considered. Although on average *pirate* contracts only involve a small fraction of workers (1.5%) and less than 1% of firms over the period, the

Figure 1 CCNL and non-representative contracts (NRLAs)



incidence of such agreements has grown tenfold from 2005 to 2014, pointing toward an increasing relevance of such phenomenon.⁸

In the current context of contractual anarchy, such proliferation of collective agreements and the increasing spread of *pirate* contracts might translate into a *race-to-the-bottom* competition between firms to make wages (minimum pay) and other collectively agreed provisions less burdensome.

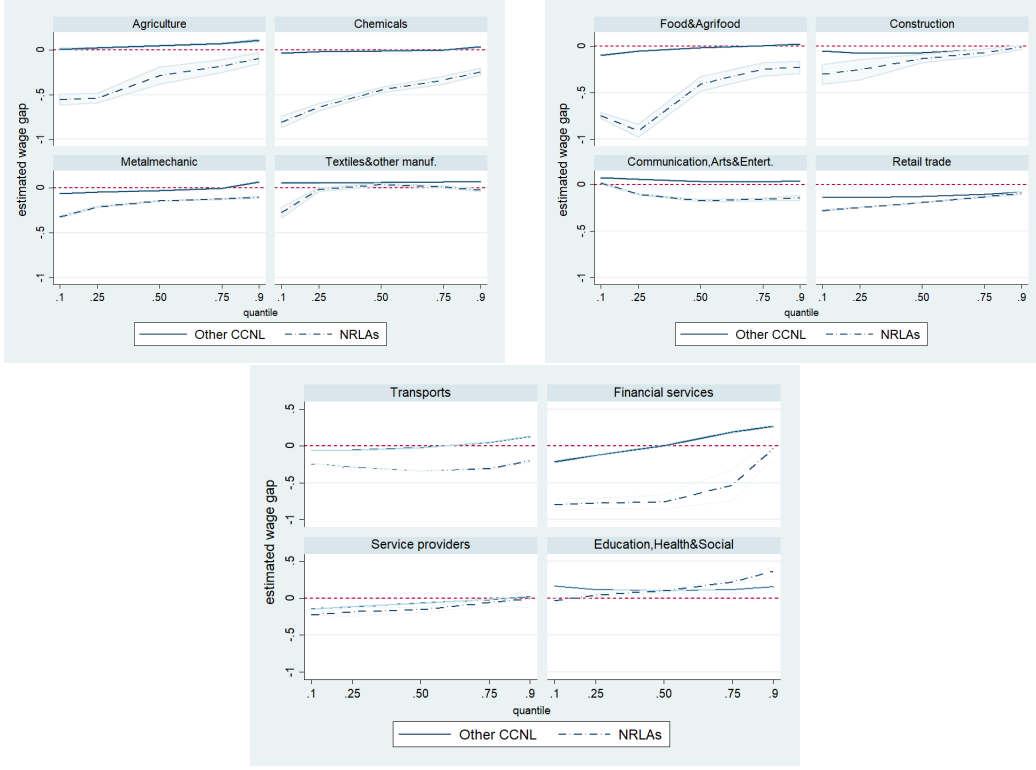
Figure 2 presents preliminary evidence on wage gaps across the different types of labor agreements, at different quantiles of the distribution of wages and separately for each sector of economic activity. By fitting simple quantile regression accounting for a set of job and firm characteristics⁹, we observe negative wage differentials for NRLAs across all industrial sectors. Wage gaps are particularly pronounced at the first quartile of the wage distribution and tend to shorten for most sectors once approaching the top 25 per cent. Interestingly, sectors with the lowest incidence of NRLAs and those that experienced a rapid increase in the the use of the latter, are associated with very large wage gaps, suggesting that these agreements might be significantly different from CCNL

⁸Notice that the spike in the share of workers employed under NRLAs in 2011 and the widening gap between the two lines observed afterwards is partly explained by the FCA episode. The plot obtained excluding the metalmechanical sector still shows upward trends for both workers and firms involved with NRLAs, albeit smoother and less steep.

⁹The set of covariates included in the estimation of quantile regressions is the full set used in our baseline model, presented in Section 3.2.

in terms of minimum pay rates as well as other provisions.

Figure 2 Preliminary evidence on wage differentials between CCNL and less representative labor agreements



On the other hand, differences between wages paid to workers employed under “comparatively most representative” CCNL and *other CCNL* are much less pronounced, and in some cases the latter are associated with slightly higher pays at the top of the distribution.

3.2 Methodology

In our empirical exercise, we start from the estimation of wage outcomes associated with the use of non-representative labor agreements using cross-sectional linear regression models. At this stage, we simply pool the data for the same workers in different years and estimate wage differentials by OLS, including a rich set of covariates to account for observed heterogeneity at the job, firm and sector level.

However, wages are also likely to depend on several unobservable characteristics of workers that may also affect their probability of being employed under a specific type of contract. For this reason, as a second step in the analysis we also control for workers’ time-invariant unobserved heterogeneity by means of a fixed-effects linear regression model of the form:

$$\log Y_{it} = \beta \text{NRLA}_{it} + X'_{it} \gamma + \alpha_i + \epsilon_{it} \quad (1)$$

where $\log Y_{it}$ is the log of weekly nominal wages of worker i in year t ; NRLA_{it} is a

binary variable that takes value 1 if the worker is employed under a non-representative labor agreement; X_{it} is a vector of demographic, job and firm characteristics¹⁰; α_i are individual fixed effects and ϵ_{it} is the error term¹¹. In our preferred specification standard errors are clustered at the worker level, to account for serial correlation within i , but we also run sensitivity checks clustering at the firm and job match level (i.e. worker-firm pair), since errors may also be correlated across individuals but within the same firm or specific job match.¹²

As long as unobserved heterogeneity is time-invariant, the inclusion of worker fixed effects in the regression delivers consistent estimates. However, an additional threat to the identification of wage effects of non-representative labor agreements might come from possible sorting of low-wage workers into less productive firms, that in turn might be more likely to opt out of the national collective bargaining system and apply non-representative agreements. In order to control for unobserved worker and firm characteristics that might simultaneously affect wages and the probability of being employed under non-representative agreements, as a robustness check we estimate equation (1) including job-match fixed effects.¹³ In this setting, we are able to identify wage outcomes for individuals that move from a CCNL to a non-representative labor agreement within the same firm (i.e. the firm is switching contract).

Using equation (1) as our preferred specification, we first estimate wage differentials between workers employed under CCNL and those with a *pirate* contract in our baseline model, and then broaden the definition of representativeness to take a step in the direction of disentangling the effect of “contractual shopping” from that of unfair practices. To this end, we consider both *NRLAs* agreements as well as all CCNL that are not “comparatively most representative” (i.e. *other CCNL*), and estimate equation (1) replacing $NRLA_{it}$ with i) a more comprehensive measure of non-representativeness, including both types of agreements ii) two dummies for *other CCNL* and *NRLAs*. Moreover, we explore heterogeneity across sectors, firms and workers by estimating equation (1) separately for each industry, for firms of different dimensions and by job titles (blue collars, white collars and apprentices).

Finally, in Sections 4.3 and 4.4 we delve deeper into the issue of non-representative labor agreements by looking at possible consequences in terms of compliance with minimum wages and firms’ behavior.

¹⁰The vector of controls includes age (and its square), regional dummies for place of work, occupational dummies (white collar, blue-collar, apprentice or other job title), a dummy for part-time workers, type of contract (open-ended, fixed-term and seasonal), firm size (≤ 15 employees, $16 - 50$, $51 - 300$, > 300) and sectorial dummies (ATECO2002 recoded into 10 categories according with contractual sectors).

¹¹As an additional exercise, we augment our baseline specification including sector, region and sector \times region time trends, to capture

¹²See Section 4.4 and Table A5.

¹³Results can be found in Table A6.

4 Results

4.1 Baseline results

To provide a benchmark, we first estimate wage differentials between CCNL and non-representative contracts by pooled OLS (model A), on the whole sample and separately by gender, and then implement fixed-effects linear regression models (model B). In the OLS (column A) we include demographic controls, job and firm characteristics as well as year fixed effects and regional dummies for place of work. We then add individual fixed effects with only time-varying controls (column B). The main results are reported in Table 2.

Workers employed under NRLAs on average earn 14% less with respect to their counterpart employed under CCNL, with an almost threefold differential observed for men as compared to women (-19% vs -7%).

However, once time-invariant unobserved heterogeneity is accounted for by the inclusion of individual fixed effects, the estimated wage gap between *regular* and non-representative labor agreements narrows down to 7% for the whole population, and gender differences almost disappear.

When we enlarge the definition of non-representativeness to include also *other CCNL*, we still find a 4% lower wage associated with non-representative agreements as compared to their “comparatively most representative” counterpart, suggesting that contractual pluralism *per se* might have an impact on workers’ wages.

As a matter of fact, if we estimate our wage equation including both *other CCNL* and *NRLA* dummies to disentangle the effect of “contractual shopping” from that of *pirate* agreements, we find negative and statistically significant coefficients for both variables. Workers moving from one of the most representative CCNL to a contract that is less representative are associated with a 3.7% reduction in wages, 8% if they move into a NRLA. Hence, wage outcomes of workers are not only affected by firms’ decision to opt out of the national bargaining system, but also by the presence of a multiplicity of CCNL with limited representativeness. No meaningful differences can be found between men and women.¹⁴

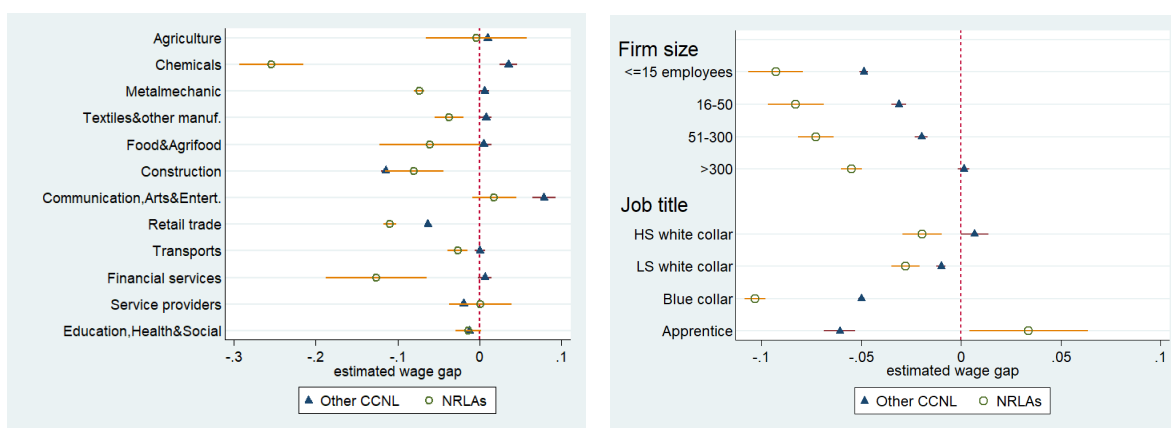
As a final step, we explore whether wage penalties associated with lack of contract’s representativeness differ across industrial sectors, firm size or job titles. Figure 3 presents the β ’s for both *other CCNL* and *NRLAs*, obtained estimating equation (1) separately by each dimension, along with 95% confidence intervals.

Results from this exercise confirm what emerged as preliminary evidence from quantile regressions, that sectors recording the largest wage penalties associated with NRLAs

¹⁴Since no significant differences exist by gender in terms of wage differentials associated with non-representative labor agreements, in the rest of the paper we focus on the sample of workers as a whole.

are also those where the latter are less developed (chemicals, construction and financial services). *Pirate* agreements in such industries are likely to be very different from regular CCNL, thus driving negative and significant wage differentials. In this respect, it has to be noticed that our measure of income is derived from gross annual wage, including all bonuses and extra payments, so that it is likely to reflect a number of additional provisions of labor contracts (e.g. contractual hours, overtime compensation, allowances for shift work, annual leave etc.).¹⁵ Moreover, a 12% negative wage differential is also found in the retail trade sector, that is characterized by a large (currently 216) and steadily increasing number of CCNL and it is severely affected by the phenomenon of *pirate* agreements.

Figure 3 Heterogeneity - by sector, firm size and job title



Retail trade is also one of the few sectors with negative and significant wage gaps between most representative CCNL and *other CCNL*, driving the overall negative effect found for the pooled sample. As a matter of fact, once workers are employed under a CCNL, the wage effects of lack of representativeness appear to be negligible in most sectors, or even positive in some service industries.

While considerable heterogeneity can be found across sectors of economic activity, no big differences exist in terms of wage penalties when considering firm size. Earnings of workers employed in very large firms tend to be slightly less affected by NRLAs with respect to smaller firms, while no differences can be found between SMEs and companies with 15 employees or less. On the other hand, wage outcomes associated with lack of contract representativeness tend to be highly heterogeneous across job titles, with blue collars recording an almost 11% wage gap if employed under NRLAs, as compared to 2-3% among white collars.¹⁶

¹⁵As an example, while CCNL signed by the comparatively most representative union federations (CGIL, CISL, UIL and UGL) overtime work is compensated with a 20 to 25% premium for the first 2-3 hours and 30 to 50% for the following hours, in some other less representative CCNL overtime compensation does not exceed 15% of base wage.

¹⁶The positive coefficient of *NRLAs* associated with apprentices (or workers in residual occupations) is poorly estimated, due to a very small number of observations, and difficult to interpret, as it probably reflects extreme cases.

As for less representative CCNL, wage differentials goes in the same direction of NRLAs, except for high-skilled white collars and workers employed in very large firm, where wages do not differ according with representativeness.

4.2 Minimum wage compliance

One additional outcome that has emerged from regulatory uncertainty and the gradual erosion of the relevance of collective bargaining institutions is increasing non-compliance with minimum wages set by collective agreements. As a matter of fact, if enforcement of minimum wages is not perfect, non-compliance with the latter is a clear-cut instrument to evade wage stickiness and gain the needed flexibility to cope with economic downturns, without employment or productivity adjustments. Recent empirical evidence from Italy uncovers that around 10% of workers are paid 20% less than the minimum wage for the specific sector, and that non-compliance tends to be higher where collectively agreed minima are relatively high with respect to the median wage – i.e. in the South and in micro and small firms (Garnero, 2018; Garnero and Lucifora, 2018). In this context, contractual anarchy and the availability of opting-out strategies might be effective channels to pay lower minimum wages.

In this section we further investigate the range of potential consequences of contractual pluralism, by analyzing the relationship between contract’s representativeness and non-compliance with minimum pay rates. To this end, we complement our data with information on minimum wages drawn from ISTAT.¹⁷ The latter collects information on negotiated wages before taxes and transfers (also including 13th or 14th monthly payment, where applicable)¹⁸ in around 90 CCNL for its database on contractual wages. Minimum wages refer to the *minima minimorum* (i.e. the minimum value in each agreement) and are classified according with 2-digit NACE rev.1.

In order to investigate whether lack of representativeness in collective agreements also translates into non-compliance with minimum wages, we estimate, by means of a fixed-effect linear probability model¹⁹, the likelihood that workers employed under non-representative agreements actually earn a wage that is below the collectively agreed minimum for the sector, both on the pooled sample and separately on each industry.

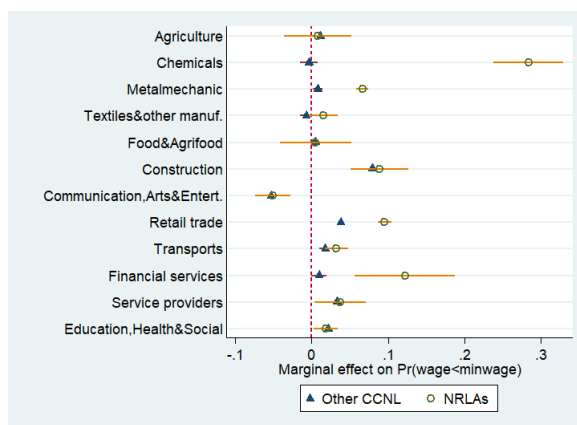
¹⁷See (Garnero and Lucifora, 2018).

¹⁸Payments related to individual performance, seniority or other payments agreed at the company level are not included.

¹⁹Since the inclusion of individual fixed effects does not provide consistent estimates for binary choice models in panel data, and unobserved time-invariant heterogeneity is likely to be a relevant issue in our model, we estimate minimum wage compliance through a LPM. One viable alternative with binary dependent variables would be to use a conditional logit fixed-effects (CLFE) model to estimate minimum wage compliance. However, CLFE strongly relies on functional form, interpretation is severely limited (no marginal effects or predicted probabilities are available due to the estimation procedure) and it is computationally intensive with very large datasets. For this reason, to account for the binary nature of the dependent variable, we estimate minimum wage compliance by random-effects logit models, both on the pooled sample and separately by sector. Results are comparable.

Overall, non-representativeness is associated with a 3% increase in non-compliance, reaching 8% if the worker is employed under NRLAs.

Figure 4 NRLAs and minimum wage compliance



The latter workers are more likely to be paid below the minima across almost all sectors of economic activity, even though with different probabilities. Sectors where NRLAs are less relevant also show significantly higher non-compliance associated with these contracts, while lack of representativeness has no effect on the likelihood of being paid below the minimum for workers employed under CCNL. This finding is in line with the evidence presented so far, suggesting that, in these sectors, *pirate* contracts might represent extreme arrangements, encompassing significantly worse provisions.

Conversely, in retail trade and construction sectors, that are characterized by relatively high minimum wages as compared to the median wage (i.e. Kaitz index) and have witnessed a dramatic increase in the number of contracts, lack of contracts' representativeness shifts up the probability of non-compliance with minimum wages both for *other CCNL* (4 to 8%) and *NRLAs* (around 9%).

4.3 Non-representative labor agreements and firms' behavior

The empirical analysis presented so far has focused on the potential wage outcomes for workers employed under different types of labor agreements. Findings indicate that wage effects are heterogeneous across groups of workers but that lack of representativeness is negatively correlated with wages and also driving non compliance with respect to minimum pay rates.

In the current legislative framework, however, the choice of whether and how to enforce specific labor agreements is up to the company. In this context, exploring *who* are the firms applying non-representative contracts and *why*, is an important step toward a more comprehensive understanding of the phenomenon of *pirate* contracts.

In the remaining part of the paper, we move to the firm's perspective to draw up a profile of companies that apply non-representative agreements and investigate wage and

employment trends of these firms over the period under consideration.

In particular, we distinguish between firms that ever applied a *pirate* contract to at least one worker and firms whose entire workforce is employed under CCNL²⁰ and compare the two groups according with several characteristics.

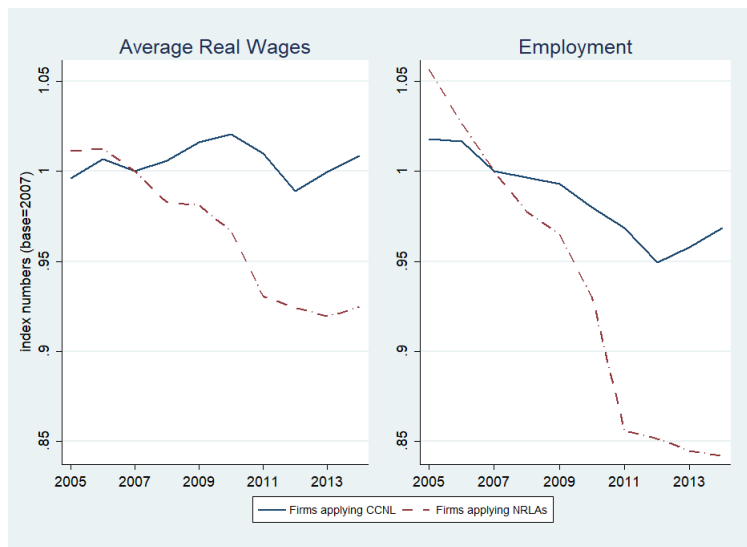
Overall, the sectorial and dimensional distribution of firms reveals that service and transport sectors are more exposed to NRLAs as compared to most manufacturing sectors, and that companies applying the latter agreements tend to be larger than those who enforce CCNL (Figure A2).

Moreover, the number of firms applying NRLAs follows an upward trend between 2005 and 2014, with a spike observed in 2009 – right after the hit of the great crisis in 2008– and a steady increase afterward (see Figure A1).

In this context, we make use of the economic crisis to investigate potential differences in the behavior of the two groups of firms – in terms of average wages paid to their workers and level of employment – when faced with bad economic conditions. On the one hand, if opting out of nationally bargained agreements is used by firms as an effective strategy to gain the needed downward wage flexibility to cope with cyclical distress, then these companies should be able to retain the desired level of employment as compared with firms that are forced to comply with CCNL wage minima. On the other hand, increasing resort to *pirate* contracts might simply reflect firms’ rent-seeking behaviors, with negligible employment effects.

Figure 5 presents a preliminary inspection of the time trends in average real wages and employment levels for the two groups of firms, setting 2007 as base year (the last period before the crisis hit).

Figure 5 Time trends in average real wages and employment



The left panel of the figure shows that wage profiles of firms applying national collec-

²⁰Note that such definition of companies involved with NRLAs is time invariant.

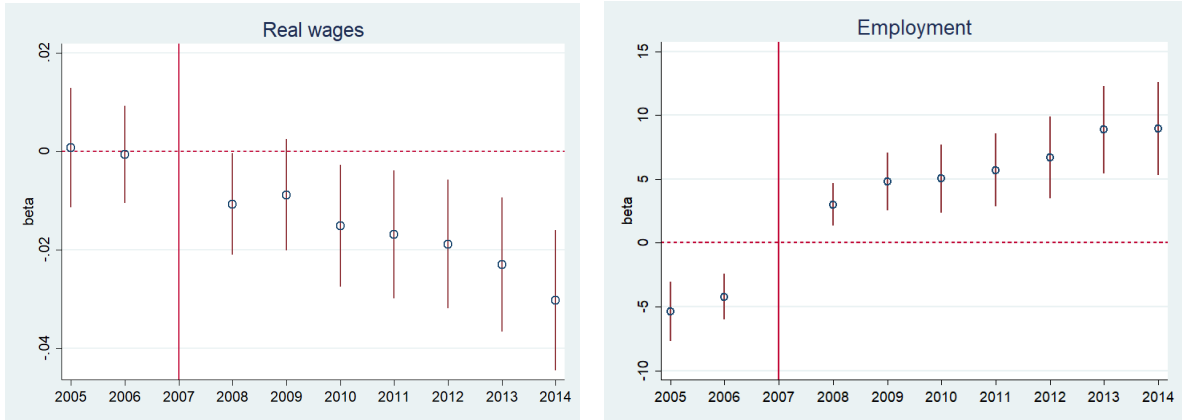
tive bargaining agreements are relatively stable over the entire period, while companies with NRLAs are associated with a significant drop in the level of pay after the crisis hit. Interestingly, in the right panel, employment profiles appear to be downward sloping for both groups of firms, but steeper for firms applying NRLAs. At this stage, however, the larger contraction in employment for the latter group might simply reflect compositional effects.

In order to control for sample composition and observe the behavior of a firm through the crisis, we set 2007 as baseline year and estimate a fixed-effects model that allows for leads and lags of our variable of interest – i.e. the presence of NRLAs in the firm –, and saturated with sector- and region-specific time trends:

$$Y_{jt} = \sum_{k \neq -m}^q \gamma_{t+k} Year_{t+k} + \sum_{k \neq -m}^q \beta_{j,t+k} (NRLA_j * Year_{t+k}) \\ + \sum_j \sum_t \delta_{jt} (S_j * Year_t) + \sum_j \sum_t \lambda_{jt} (R_j * Year_t) + \alpha_j + \epsilon_{jt}$$

where Y_{jt} represents either the log of real average wages paid in firm j in year t , or firm j 's number of employees²¹ in year t ; $NRLA_j$ is a binary variable that takes value 1 if the firm applies a non-representative contract, 0 if it applies a CCNL; δ_{jt} and λ_{jt} measure sector and region-specific time trends, respectively; α_j are firm fixed effects.

Figure 6



Results from this exercise are presented in Figure 6. Firms applying NRLAs have been paying lower wages since 2010 as compared to companies enforcing CCNL, while no significant differences are found in the two years immediately after the crisis hit. On the

²¹The information on firm size is coded as a categorical variable with 29 unique values: the first 20 categories are 5-employees-ranges for firms with 1 to 100 workers, 9 categories follow for firms with 100 to 500 workers (50-employees-range) and firms with more than 500 workers are coded with value 29. To perform our exercise we recoded such measure into a continuous variable using the upper bound of each interval.

other hand, the level of employment appears to be higher for firms with *pirate* agreements for the whole period 2008-2014.

Whilst particular care should be used in interpreting the differences across the two groups of firms – as due to possible endogeneity of contract choice they might simply reflect correlations –, the above findings, if anything, provide support to the rebuttal of the hypothesis of pure rent-seeking behavior associated with the use of *pirate* agreements.

4.4 Sensitivity analysis

In order to check the robustness of our main findings, in this section we perform a number of sensitivity analyses, testing our baseline model against alternative specifications and samples.

In our baseline model, we use the log of gross weekly wages as a measure of earnings. However, since the number of paid weeks refers to weeks during which the employee has worked at least one day, daily wages might be a more precise measure of earnings. To check the sensitivity of our results to the choice of the dependent variable, we re-estimate our baseline model (as in Table 3, column 2) using log daily wages. Wage differentials associated with workers employed under less representative national collective agreements are comparable with those found for weekly wages (see Table A4), while NRLAs have a milder effect on daily wages as compared with baseline results.

As already mentioned in the methodological section, one problem in estimating wage effects of contract’s representativeness comes from possible sorting of low-wage workers into firms that are more likely to apply non-representative agreements. To control for unobserved worker and firm characteristics that might affect both wages and the probability of being employed under NRLAs, we estimate equation (1) including job match fixed effects. Results from this exercise are presented in Table A6 in the Appendix, along with the baseline estimates. The coefficient of *NRLAs* is slightly lower when unobserved heterogeneity at the worker-firm level is accounted for, as it identifies the wage effect of lack of contract representativeness for those workers who move from a *CCNL* to a *pirate* agreement within the same firm. Conversely, switching from a *CCNL* that is among the “comparatively most representative” to *other CCNL* has no statistically significant effect on wages, suggesting that wage differentials associated with different *CCNL* are mainly driven by workers’ sorting into different firms.

Moreover, in our baseline model we correct the standard errors for possible correlation within i , since the errors in equation (1) are probably not independent for the same worker. However, as errors might also be correlated across individuals within the same firm or within job matches, we repeat our estimation exercise using alternative clustering. Results are virtually unchanged, even though standard errors clustered at the firm level are slightly larger than those clustered at the worker level, suggesting that part of the

residual variance is shared across individuals.

Finally, we take into consideration the fact that, since 2012, a relevant share of workers in the metalmechanical sector ceased to be covered by the leading CCNL and moved to a “pirate” agreement, after FCA decided to opt out of the national collective bargaining system. Since the first-level agreement signed in December 2011 introduced some major novelties with respect to work organization, union rights and economic benefits, and involved more than 86 thousands workers, our results might be somewhat affected. In order to clean out any possible effect of the opting out behavior of FCA, we re-estimate our baseline model excluding the whole metalmechanical sector. Results from this exercise are consistent with baseline estimates (see Table A4 in the Appendix). , with a coefficient of NRLAs that is even larger in absolute value, reflecting the presence of non-negligible economic benefits within FCA 2011’s contract.

5 Conclusions

In recent years, as the Italian collective bargaining framework has come under pressure due to the excessive wage rigidities that limit flexibility in time of difficulties, the country has been called to the implementation of regulatory reforms aimed at broadening the scope of decentralized wage-bargaining as well as establishing clear rules to define the scope of collective agreements and representativeness of social partners. However, increasing fragmentation of unions and employers’ associations together with a gradual erosion of their bargaining power and current regulatory uncertainty raised the number of national collective labor agreements (from around 300 in 2008 to over 760 in 2018), with a consequent spread of contracts signed by ambiguous or obscure associations granting formal cover to downward contractual dumping (*pirate* contracts). Beside imposing additional complexity to the CB system, the proliferation of national collective labor agreements and the associated phenomenon of *pirate* contracts are paving the way for “contractual shopping” or even unfair practices among firms, with possible detrimental effects on both workers wages and working conditions.

In this paper, we take a first step in the direction of disentangling contractual pluralism from unfair practices and misconducts of firms, starting from a thorough examination of existing national collective agreements and successive identification of specific parameters to define contract *representativeness*. Once classified according with their level of representativeness, we use a longitudinal sample of Italian employees to explore potential economic outcomes associated with different labor agreements and with the phenomenon of *pirate* contracts.

Results show that the latter is associated with significant wage penalties, as workers employed under such contracts on average earn 8% less with respect to their counterpart employed under CCNL. Moreover, when we enlarge the definition of non-representativeness

to include also CCNL that are less representative with respect to the “comparatively most representative” ones, we still find a 4% negative wage differential, suggesting that the presence of a multiplicity of contracts *per se* might have an impact on workers’ wages. The lack of a clear scope of collective agreements might in fact trigger “contractual shopping” behaviors of firms, that choose to apply the most *competitive* labor agreement in terms of pay levels and minimum standards granted on other provisions, resulting in lower wages. Such negative effect of non-representativeness on wage profiles also appears to be particularly pronounced in specific industrial sectors and for blue-collar workers.

As a second step, we further investigate the range of potential consequences of contractual pluralism, by analyzing the relationship between contract’s representativeness and non-compliance with minimum pay rates, since recent empirical evidence from Italy uncovered that increasing non-compliance has emerged as an outcome of regulatory uncertainty and the gradual erosion of the relevance of CB institutions. Complementing our data with information on minimum wages drawn from ISTAT, we estimate the probability that workers employed under non-representative agreements actually earn a wage that is below the collectively agreed minimum for the sector, both on the pooled sample and separately by each industry. Overall, lack of representativeness is associated with a 3% increase in the probability of being paid below the minimum, reaching 8% if the worker is employed under a *pirate* agreement. The latter workers are more likely to be paid below the minima across almost all sectors of economic activity, even though some degree of heterogeneity is found in the probabilities.

Finally, as in the current Italian legislative framework the choice of whether and how to enforce specific labor agreements is up to the company, in the last part of the paper we draw up a profile of companies that apply non-representative agreements, as compared to those enforcing CCNL, and explore wage and employment outcomes associated with the two groups of firms over the period under consideration. In particular, we make use of the economic crisis to investigate whether the availability of opting out strategies translates into different wage and employment outcomes for firms, when faced with negative shocks. On the one hand, if opting out of nationally bargained agreements is an effective way to circumvent downward wage rigidity, one might expect adjustments along the employment margin to be less frequent or smaller among firms applying *pirate* agreements as compared with firms that are forced to comply with CCNL wage minim. On the other hand, increasing resort to *pirate* contracts might simply reflect firms’ rent-seeking behaviors, with negligible employment effects.

Setting 2007 as baseline year and estimating a model that allows for leads and lags of our variable of interest (i.e. the presence of NRLAs), we find that firms applying NRLAs have been paying lower wages since 2010 as compared to companies enforcing CCNL, while the level of employment appears to be higher for the whole period 2008-2014, providing support to the rebuttal of the hypothesis of pure rent-seeking behavior

associated with the use of *pirate* agreements.

References

- Avouyi-Dovi, S., Fougère, D. and Gautier, E. (2013), ‘Wage rigidity, collective bargaining, and the minimum wage: evidence from French agreement data’, *Review of Economics and Statistics* **95**(4), 1337–1351.
- Boeri, T. (2015), ‘Perverse effects of two-tier wage bargaining structures’, *IZA World of Labor* . doi: 10.15185/izawol.101.
- Brändle, T. and Goerke, L. (2018), ‘The one constant: a causal effect of collective bargaining on employment growth? Evidence from German linked-employer-employee data’, *Scottish Journal of Political Economy* **65**(5), 445–478.
- Bryson, A. and Dale-Olsen, H. (2008), ‘A tale of two countries: unions, closures and growth in Britain and Norway’, *CEP Discussion Paper* (DP No.867).
- Calmfors, L. and Driffill, J. (1988), ‘Bargaining structure, corporatism and macroeconomic performance’, *Economic policy* **3**(6), 13–61.
- Card, D., Heining, J. and Kline, P. (2013), ‘Workplace heterogeneity and the rise of West German wage inequality’, *The Quarterly journal of economics* **128**(3), 967–1015.
- Cardoso, A. R. and Portugal, P. (2005), ‘Contractual wages and the wage cushion under different bargaining settings’, *Journal of Labor Economics* **23**(4), 875–902.
- D’Amuri, F. and Giorgiantonio, C. (2014), ‘Diffusion and outlook of firm-level bargaining in Italy’, *Questioni di Economia e Finanza - Occasional Papers* **21**.
- Devicienti, F., Fanfani, B. and Maida, A. (2018), ‘Collective Bargaining and the Evolution of Wage Inequality in Italy’, *British Journal of Industrial Relations* .
- Díez-Catalán, L. and Villanueva, E. (2015), ‘Contract staggering and unemployment during the great recession: evidence from Spain’, *Banco de España working paper* (WP No.1431).
- DiNardo, J. and Lee, D. S. (2004), ‘Economic impacts of new unionization on private sector employers: 1984–2001’, *The Quarterly Journal of Economics* **119**(4), 1383–1441.
- Dustmann, C., Fitzenberger, B., Schönberg, U. and Spitz-Oener, A. (2014), ‘From sick man of Europe to economic superstar: Germany’s resurgent economy’, *Journal of Economic Perspectives* **28**(1), 167–88.
- Eurofound (2016), ‘The concept of representativeness at national, international and European level’, *Publication Office of the European Union, Luxembourg* . https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1644en.pdf.

- European Commission (1993), ‘Communication concerning the Application of the Agreement on Social Policy’, *COM* (93), 600.
- European Commission (2016), ‘Country Report Italy’, *Publication Office of the European Union, Luxembourg* . http://ec.europa.eu/info/sites/info/files/cr_italy_2016_en.pdf.
- Garnero, A. (2018), ‘The dog that barks doesn’t bite: coverage and compliance of sectoral minimum wages in Italy’, *IZA Journal of Labor Policy* **7**(1), 3.
- Garnero, A. and Lucifora, C. (2018), ‘Collective bargaining, minimum wage compliance and employment’, *CoBExt Working Paper* .
- Gürtzgen, N. (2009), ‘Rent-sharing and collective bargaining coverage: Evidence from linked employer–employee data’, *Scandinavian Journal of Economics* **111**(2), 323–349.
- Haucap, J., Pauly, U. and Wey, C. (2001), ‘Collective wage setting when wages are generally binding: An antitrust perspective’, *International Review of Law and Economics* **21**(3), 287–307.
- Izquierdo, M., Jimeno, J. F., Kosma, T., Lamo, A., Millard, S., Rõõm, T. and Viviano, E. (2017), ‘Labour market adjustment in Europe during the crisis: microeconomic evidence from the Wage Dynamics Network survey’, *European Central Bank Occasional Paper Series* (OP No.192).
- Jimeno, J. F. and Thomas, C. (2013), ‘Collective bargaining, firm heterogeneity, and unemployment’, *European Economic Review* **59**, 63–79.
- Leonardi, S., Ambra, M. C. and Ciarini, A. (2017), Italian collective bargaining at a turning point, in S. Leonardi and R. Pedersini, eds, ‘Multi-employer bargaining under pressure: decentralisation trends in five European countries’, ETUI, Brussels.
- Martins, P. (2014), ‘30,000 minimum wages: The economic effects of collective agreement extensions’, *IZA Discussion Paper* (DP No.8540).
- Martins, P. S. (2009), ‘Rent sharing before and after the wage bill’, *Applied Economics* **41**(17), 2133–2151.
- Ronchi, M. and Di Mauro, F. (2017), ‘Wage bargaining regimes and firms’ adjustments to the Great Recession’, *European Central Bank Working Paper Series* (WP No.2051).
- Rusinek, M. and Rycx, F. (2013), ‘Rent-Sharing under Different Bargaining Regimes: Evidence from Linked Employer–Employee Data’, *British Journal of Industrial Relations* **51**(1), 28–58.
- Visser, J. (2013), Wage Bargaining Institutions—from crisis to crisis, Technical report, Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

6 Tables

Table 1 Incidence of CCNL and non-representative contracts within industrial sectors (2014)

<i>Sector</i>	<i>Most repr. CCNL</i>	<i>Other CCNL</i>	<i>NRLAs</i>
Agriculture	0.472	0.519	0.009
Chemicals	0.777	0.217	0.006
Metalmechanic	0.881	0.081	0.038
Textiles & other manuf.	0.777	0.214	0.009
Food & Agrifood	0.867	0.132	0.001
Construction	0.647	0.352	0.001
Communication,Art & Entert.	0.371	0.615	0.014
Retail trade	0.757	0.234	0.009
Transports	0.764	0.220	0.016
Financial services	0.888	0.110	0.001
Service providers	0.782	0.215	0.002
Education,Health & Social work	0.715	0.270	0.015
Total	0.752	0.235	0.013

Note: Figures reported are percentages by row.

Table 2 Estimated wage gaps for NRLAs

	(A)			(B)		
	<i>Pooled</i>	<i>Males</i>	<i>Females</i>	<i>Pooled</i>	<i>Males</i>	<i>Females</i>
NRLAs	-0.144*** (0.00298)	-0.187*** (0.00375)	-0.0734*** (0.00469)	-0.0723*** (0.00208)	-0.0767*** (0.00246)	-0.0611*** (0.00384)
Worker FE		✓	✓		✓	✓
R^2	0.432	0.455	0.374	0.814	0.837	0.764
N	9,078,834	5,573,876	3,504,958	8,911,350	5,479,845	3,431,505

Robust standard errors in parentheses, clustered at the worker level. Significance: * $p < .1$, ** $p < .05$, *** $p < .01$. Each model includes the full set of controls for age (quadratic), regional dummies for place of work, occupation (white collar, blue-collar, apprentice), part-time, type of contract (open-ended, fixed-term and seasonal), firm's number of employees (≤ 15 , $16 - 50$, $51 - 300$, > 300) and industrial sector (ATECO-2002 recoded into 10 categories according with CCNL sectors).

Table 3 Estimated wage gaps for NRLAs - alternative definitions of representativeness

	<i>Pooled</i>		<i>Males</i>		<i>Females</i>	
Broad def. NRLAs	-0.0393*** (0.000596)		-0.0429*** (0.000754)		-0.0317*** (0.000978)	
Other CCNL		-0.0368*** (0.000609)		-0.0400*** (0.000775)		-0.0299*** (0.000990)
NRLAs		-0.0819*** (0.00208)		-0.0863*** (0.00247)		-0.0704*** (0.00385)
Worker FE	✓	✓	✓	✓	✓	✓
R^2	0.815	0.815	0.837	0.837	0.764	0.764
N	8,911,350	8,911,350	5,479,845	5,479,845	3,431,505	3,431,505

Robust standard errors in parentheses, clustered at the worker level. Significance: * p<.1, ** p<.05, *** p<.01. Results are obtained using the full set of controls.

7 Appendix

Figure A1 Number of firms applying non-representative contracts (2005-2014)

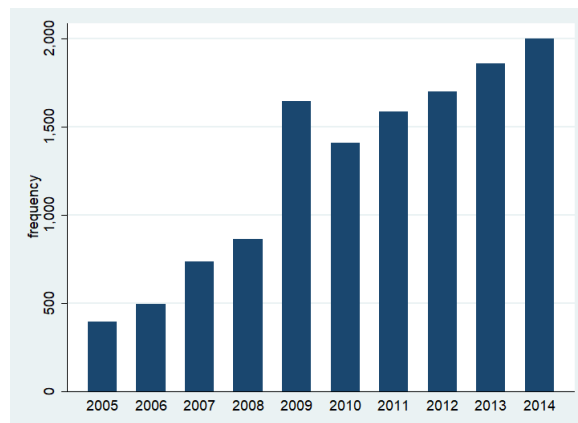


Table A1 Sample descriptive statistics

<i>Variables</i>	<i>Whole sample</i>	<i>Males</i>	<i>Females</i>
<i>Average</i>			
Age	38.81	39.27	38.08
<i>Median</i>	(38)	(39)	(38)
Weekly wage	453.85	477.94	415.55
<i>Median</i>	(400)	(416)	(375)
<i>Proportion</i>			
Female	0.398		
Part-time	0.222	0.107	0.404
Open-ended contract	0.825	0.840	0.802
Fixed-term contract	0.161	0.149	0.179
Seasonal contract	0.013	0.01	0.019
White-collar	0.358	0.264	0.508
Blue-collar	0.598	0.696	0.443
Apprentice	0.043	0.040	0.049
Firm with 15 employees or less	0.401	0.390	0.418
16-50 employees	0.165	0.177	0.146
51-300 employees	0.191	0.199	0.178
300+ employees	0.243	0.234	0.258
<i>Industrial sector</i>			
Agriculture	0.006	0.006	0.005
Chemicals	0.034	0.041	0.025
Metalmechanic	0.148	0.194	0.074
Textiles & other manuf.	0.066	0.057	0.079
Food & Agrifood	0.033	0.033	0.033
Construction	0.113	0.170	0.023
Communication, Arts & Entert.	0.047	0.045	0.051
Retail trade	0.381	0.298	0.514
Transports	0.057	0.076	0.027
Financial services	0.037	0.031	0.046
Service providers	0.024	0.030	0.014
Education, Health & Social work	0.054	0.019	0.109
Workers with a pirate contract	0.016	0.017	0.015
Obs.	9,078,834	5,573,876	3,504,958

Table A2 Metalmechanical, Chemical and Transports: CCNL and non-representative contracts in detail (2014)

Contract	Employers' Associations	Unions	Workers		Firms	
			%	Cum.	%	Cum.
METALMECHANICAL						
Industries	CONFINDUSTRIA;FEDERMECCANICA; Assistal	From-CGIL;Fim-CISL;Uilm-UIL	58.75	58.75	40.08	40.07
S.M.I.	UNIONMECCANICA CONFAPI	From-CGIL;Fim-CISL;Uilm-UIL	15.45	74.20	20.43	60.50
Artisans	CNA;CONFARTIGIANATO; Casartigiani;CLAAI	From-CGIL;Fim-CISL;Uilm-UIL	13.88	88.08	31.38	91.88
Other CCNL			8.08	96.17	7.94	99.82
NRLAs			3.83	100.00	0.18	100.00
CHEMICALS						
GHEM/PHARMA Industries	FEDERCHIMICA;FARMINDUSTRIA	Filctem-CGIL;Femca- CISL;Uiltec-UIL	35.99	35.99	21.35	21.34
CHEM/PHARMA S.M.I.	UNIONCHIMICA CONFAPI	Filctem-CGIL;Femca-CISL;Uiltec-UIL	3.08	39.07	5.71	27.05
PLASTICS/RUBBER:Industries	CONFINDUSTRIA;FEDERAZIONE G&P; ASS.IT.PNEUMATICI	Filctem-CGIL;Femca-CISL;Uiltec-UIL	27.92	66.99	25.25	52.30
PLASTICS/RUBBER:S.M.I.	UNIONCHIMICA CONFAPI	Filctem-CGIL;Femca-CISL;Uiltec-UIL	6.08	73.07	9.44	61.74
CHEM&others:	FEDARCOM;CIFA	Pesica-CONFESAL;Fisals-CONFESAL; CONFESAL	2.72	75.8	7.47	69.22
S.M.I.Coop,Artisans			1.93	77.73	1.00	70.22
ENERGY&COIL		Filctem-CGIL;Femca-CISL;Uiltec-UIL	21.69	99.41	29.60	99.82
Other CCNL			0.59	100.00	0.18	100.00
NRLAs						
TRANSPORTS						
TRANS&LOGISTICS	AITE;AITI;Assoespressi; Assogistica;Fedespedi; Trasportounito FIAP;FISI; CONFETRA;FEDIT;ANITA; FAI;Assotir;Federtraslochi; Federlogistica;FIAP;UNITAI; Conftrasporto;CNA-FITA; Confartigianato TRASPORTI; SNA-Casartigiani;CLAAI Federimprenditori	FAMAR;CONFAMAR	2.07	48.54	3.74	58.43
S.M.I., Artisans and Coop						
PUBLIC TRANS. workers	ASSTRA;ANAV	Filc-CGIL;Fit-CISL;Ultraspolti-UIL	15.45	63.99	4.62	63.05
CAR RENTAL	UNCI	FAST Confisal;FAST Noleggio Confisal	3.49	67.48	6.03	69.08
CABLEWAYS	ANEF	Filc-CGIL;Fit-CISL;Ultraspolti-UIL; SAVT	1.05	68.54	1.15	70.23
AIR Transport	Assaereo;Assaeroporti; Assohandlers;Assocontrol;Assocatering Assiterminal;Assogistica; Assoportit;FISE-Uniport	Filc-CGIL;Fit-CISL;Ultraspolti-UIL UGL-Trasporti Filc-CGIL;Fit-CISL;Ultraspolti-UIL	6.23	74.77	2.58	72.83
Other CCNL			1.67	76.43	0.88	73.69
NRLAs		21.99	98.42	25.50	99.17	
			1.58	100.00	0.83	100.00

Table A3 Proportion of non-representative contracts among workers and firms (2005-2014)

<i>Year</i>	<i>Workers</i>	<i>Firms</i>
2005	0.0014	0.0010
2006	0.0018	0.0013
2007	0.0026	0.0018
2008	0.0033	0.0021
2009	0.0052	0.0040
2010	0.0044	0.0034
2011	0.0049	0.0039
2012	0.0113	0.0042
2013	0.0121	0.0048
2014	0.0126	0.0053
Total	.0158	0.0060

Note: Figures reported are the share of workers employed under a non-representative contract and the share of firms with at least one worker employed under a non-representative contract.

Table A4 Estimated wage gaps for NRLAs - different sample and dependent variable

	<i>Baseline</i>		<i>Log(daily wages)</i>		<i>Excluding metal sector</i>	
Broad def. NRLAs	-0.0393*** (0.000596)		-0.0508*** (0.000567)		-0.0416*** (0.000662)	
Other CCNL		-0.0368*** (0.000609)		-0.0515*** (0.000581)		-0.0397*** (0.000667)
NRLAs		-0.0819*** (0.00208)		-0.0389*** (0.00190)		-0.100*** (0.00278)
Worker FE	✓	✓	✓	✓	✓	✓
R^2	0.815	0.815	0.775	0.775	0.812	0.812
N	8,911,350	8,911,350	8,911,222	8,911,222	7,561,354	7,561,354

Robust standard errors in parentheses, clustered at the worker level. Significance: * $p < .1$, ** $p < .05$, *** $p < .01$. Results are obtained using the full set of controls.

Figure A2 Differences between firms applying CCNL and non-representative contracts

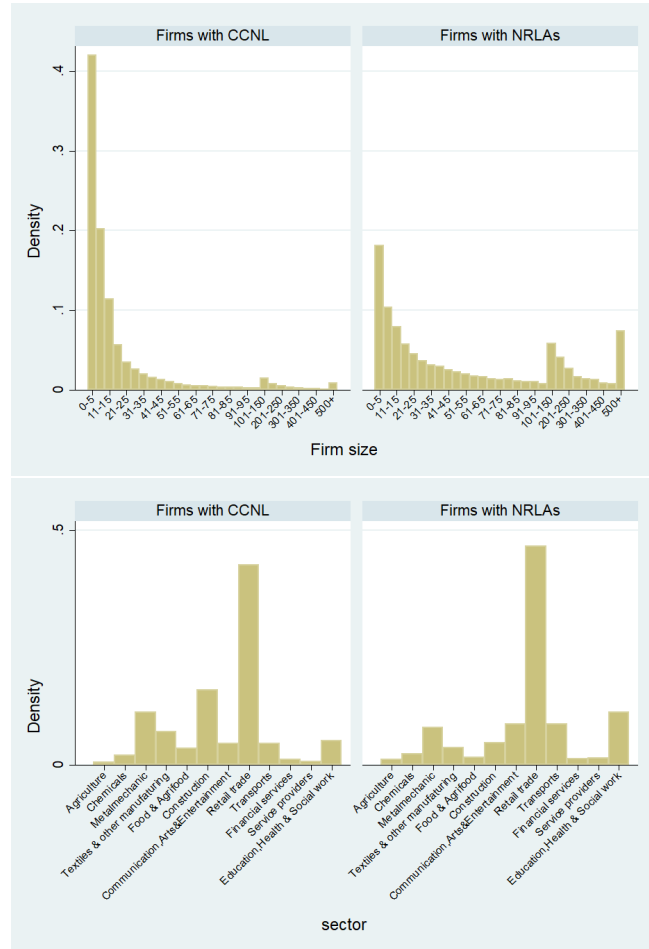


Table A5 Estimated wage gap for NRLAs - alternative clustering of the std errors

	(1)	(2)	(3)
Broad def. NRLAs	-0.0393*** (0.000596)	-0.0393*** (0.00271)	-0.0393*** (0.000526)
Other CCNL	-0.0368*** (0.000609)	-0.0368*** (0.00263)	-0.0368*** (0.000535)
NRLAs	-0.0819*** (0.00208)	-0.0819*** (0.0105)	-0.0819*** (0.00195)
Worker FE	✓	✓	✓
Std err. clustering	Worker	Firm	Worker×Firm
R^2	0.815	0.815	0.815
N	8,911,350	8,911,350	8,911,350
N. clusters	1,307,407	990,490	2,678,488

Robust standard errors in parentheses, clustered at the worker (col.1), firm (col.2) and worker×firm level (col.3). Significance: * p<.1, ** p<.05, *** p<.01. Results are obtained using the full set of controls.

Table A6 Estimated wage gaps for NRLAs - adding job-match fixed effects

	<i>Baseline</i>		<i>Job match FE</i>	
Broad def. NRLAs	-0.0393*** (0.000596)		-0.0102*** (0.000995)	
Other CCNL		-0.0368*** (0.000609)		-0.00111 (0.00101)
NRLAs		-0.0819*** (0.00208)		-0.0516*** (0.00244)
Worker FE	✓	✓		
Worker×Firm FE			✓	✓
R^2	0.815	0.815	0.891	0.891
N	8,911,350	8,911,350	7,958,305	7,958,305

Robust standard errors in parentheses, clustered at the worker (col. 1 and 2) and worker×firm (col. 3 and 4) level. Significance: * $p < .1$, ** $p < .05$, *** $p < .01$. Results are obtained using the full set of controls.