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# ABSTRACT

## Contractual Minimum Wages and Collective Bargaining. Italian Evidence from Forty Years of Data

This paper documents the evolution of minimum wages bargained in Italian private sector collective contracts over a forty-year period (1983-2023). Minimum wages have grown in real levels over the last three decades, particularly among high-skilled occupations, but this growth has been partially eroded by the 2022-2023 inflation crisis. Nominal minimum wage growth is strongly correlated with past inflation and very weakly correlated with sectoral productivity growth and unemployment dynamics, which is consistent with strong coordination across industries and real wage rigidity. Increasing differences between high- and low-skilled occupation minimum wages can explain around one-third of the overall growth in the inequality of full-time equivalent daily wages that has occurred in Italy during the 1990s.

**JEL Classification:** J31, J38, J52

**Keywords:** collective bargaining, minimum wage, wage inequality, wage rigidity, industrial relations

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## 1. INTRODUCTION

Noncompetitive wage-setting mechanisms, such as collective bargaining, have attracted considerable interest in the recent literature (Card et al. 2022; Buhller et al. 2023; Jäger et al. 2024). One of the main purposes of collective bargaining is to set wages, even if there are relevant differences between countries in the actual functioning of this institution. Collectively bargained wages (hereafter contractual wages or minimum wages) often play a particularly important role in shaping actual wage dynamics, inequalities, and several firm and worker outcomes. However, the evidence on the dynamics and determinants of contractual wages is not abundant, apart from several old contributions (e.g., Hamermesh 1970; Christofides et al. 1992), and a few more recent analyses (Adamopoulou et al. 2022; Campolieti et al., 2016; Campolieti 2025).

The objective of this study is to shed light on the evolution of contractual wages using a long-term perspective. It provides direct evidence on the minimum wages set by collective bargaining in the Italian private sector over a period of 40 years, from 1983 to 2023. In Italy, the minimum wages established by collective contracts apply regardless of workers' unionization or of the membership of firms to employers' associations. The influence of this institution on the wage structure and on workers' and firms' outcomes has been studied and highlighted by several recent contributions (Adamopoulou et al. 2024; Boeri et al. 2022; Devicienti et al. 2019, 2024; Fanfani 2023; Ramazzotti 2024).

This study exploits data on three of the largest Italian collective contracts: the trade, metal-manufacturing and construction agreements. Taken together, these three contracts cover approximately one third of the entire population of private sector employees in Italy. Their indirect influence on bargained minimum wage levels extends also beyond their coverage, given that they are often taken as a reference target in negotiations occurring within smaller collective contracts, particularly in the services, manufacturing, and construction-related sectors.

The evolution of minimum wages set for different occupations within each collective agreement reveals that several structural changes occurred during the analysis period. In the 1980s, real minimum wage growth was generally flat and very similar across high- and low-skilled occupations. A sharp growth in real minimum wages characterized the first years of the 1990s, which was shortly followed by a sharp decline in their level associated to a series of reforms of bargaining negotiations that gradually took place during 1992 and 1993.

Since the mid-1990s the growth of real minimum wages became generally positive across time and more so among high-skilled occupations. Most pay floors were at or close to an historical peak by the end of 2021, even if their growth rate started to slow down during the second half of the 2010s.

From 2022 onward, the post-pandemic inflation crisis determined a very sharp decline in the real level of minimum wages, with a few low-skilled occupations even reaching an all-low historical level by the end of 2023. Differences in wage dynamics across sectors were quite limited overall, and particularly since the mid-1990s onward, reflecting a considerable amount of coordination across contracts.

Given the presence of several structural brakes in minimum wage dynamics set by collective bargaining, its influence on actual wages, workers' and firms' outcomes could depend on the period of analysis. More generally, the interaction between institutional mechanisms that influence wage setting outcomes, business cycle dynamics, and inflation should be properly considered when evaluating the effects of collective bargaining.

To shed more light on the wage setting process, we investigate whether price, productivity, and unemployment dynamics were relevant determinants of the bargained minimum wage increases. For this purpose, we rely on a time series of sector-specific measures of productivity (value added per hour worked), nation-wide inflation, and unemployment dynamics. Using these variables to predict nominal wage growth set by collective contracts, we find that inflation was a strong and significant determinant of minimum wages. This evidence suggests that the dynamics of cost of living have a strong influence on wage negotiations, which is consistent with the institutional characteristics of collective bargaining in Italy. Indeed, before the 1990s, there were automatic adjustments of minimum wages to the cost of living. Since the 1990s, negotiations on base wages have tended to follow a target inflation level set by the government, which typically depends on past price dynamics.

The relationship between minimum wages and sectoral productivity was slightly negative or not significant in the regression models. Thus, in Italy, the high degree of coordination across collective contracts seems to limit the responsiveness of minimum wage dynamics to sector-specific productivity trends, which is consistent with real wage rigidity. Minimum wages also do not appear to be particularly responsive to labor market tightness, even if a small negative association between pay floors and unemployment was significant in some of the most saturated regression specifications.

We then focus on the relationship between minimum wages and pay inequality. As documented by the literature, the 1990s have been the period of most significant growth of daily wage inequality in Italy, even when accounting for employment composition trends (e.g., Depalo et al. 2025). In this study, we document the direct role of collective contracts in shaping the evolution of pay dispersion. For this purpose, we match the contractual minimum wage data with Italian administrative records covering the population of employees in the Veneto region (VWH dataset). We show that the matched

sample of analysis has a quite similar trend of wage inequality with respect to the underlying population of Italian private sector workers.

Using these data, we provide new evidence for a hypothesis originally formulated by Manacorda (2005). According to this study, the growth of Italian wage inequality during the 1990s could at least in part be linked to the dynamics set within the system of collective bargaining. Due to the presence of an automatic indexation mechanism that was very favorable for low-paid workers (the so-called *scala mobile*), Italy was coming out of a period of strong wage compression in the 1980s. In this context, trade unions came under pressure to allow skilled workers to be paid relatively more, and this could have been reflected in negotiated wage floors. Evidence consistent with this hypothesis has been documented by Devicienti et al. (2019), who show that the dispersion in AKM firm wage premia did not play a relevant role in the growth of Italian pay inequality, while pay dispersion between job titles defined by collective contracts increased.

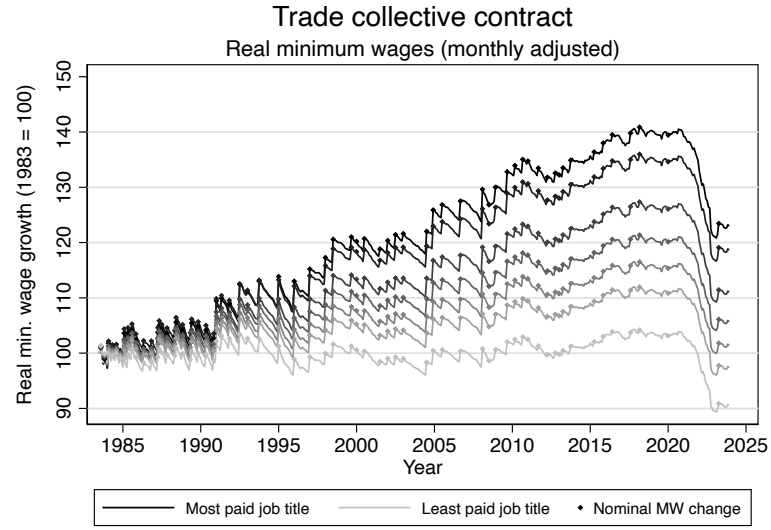
To quantify the incidence of bargained minimum wages on the evolution of pay inequality, we propose a specific variance decomposition exercise. We divide the total variance of full-time equivalent daily wages into a component determined by base wages, which are set at the centralized level by collective bargaining, a component representing wage cushions (the difference between actual pay and the base wage), which are individual-specific, and a component representing the sorting between base wage levels and wage cushions.

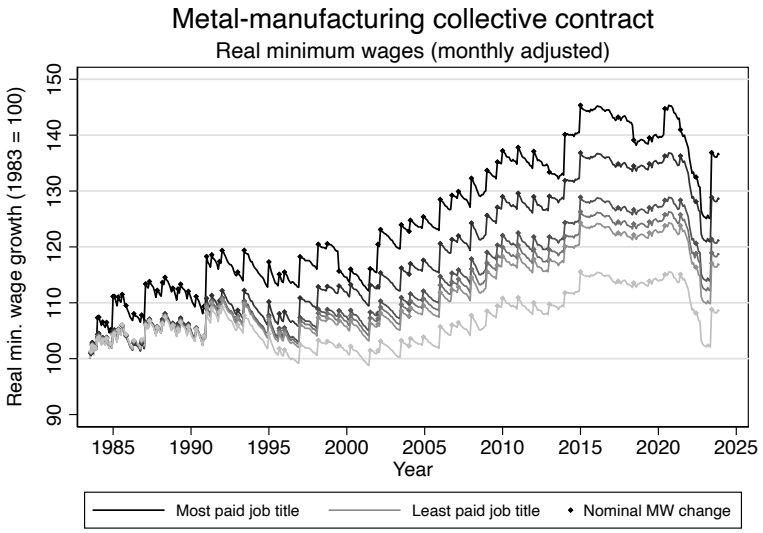
The results show that about 30% of the growth in wage inequality that occurred during the 1990s can be attributed to a greater dispersion of contractual minimum wages. Moreover, employment composition trends, such as the potential underrepresentation of mid-paid occupations across time, do not seem to play a major role. Overall, this evidence is consistent with the hypothesis set forth by Manacorda (2005) and shows that in the Italian system of industrial relations market forces are largely mediated and channeled through the centralized system of wage setting.

## 2. THE EVOLUTION OF CONTRACTUAL WAGES OVER FOUR DECADES

Figure 1 provides evidence on the evolution of real minimum wages set within each collective contract for several occupations (also called job titles) consistently defined over time. In the graph, the nominal minimum wages set by collective bargaining are adjusted for inflation with a monthly frequency. Each dot represents a nominal minimum wage change, which could be due to a contract renewal or to a planned increase in pay floors that was bargained at the time of a contract renewal.

**FIGURE 1**: *Evolution of Real Contractual Minimum Wages by Collective Agreement and Occupation over the Period 1983-2023*



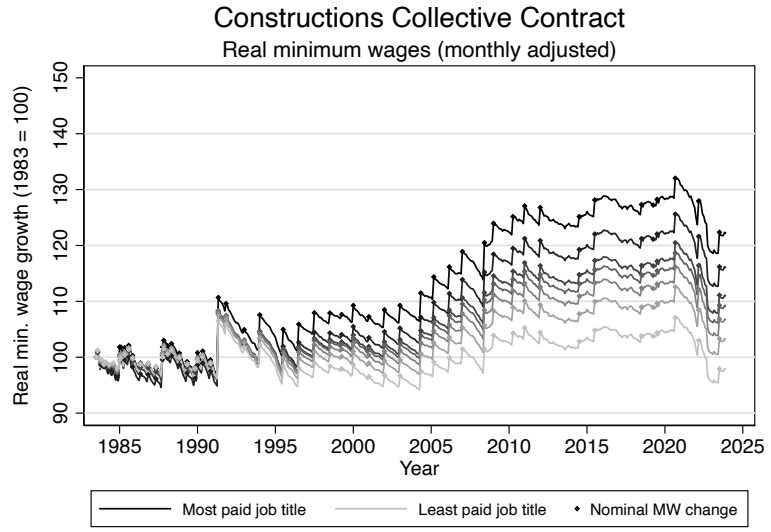
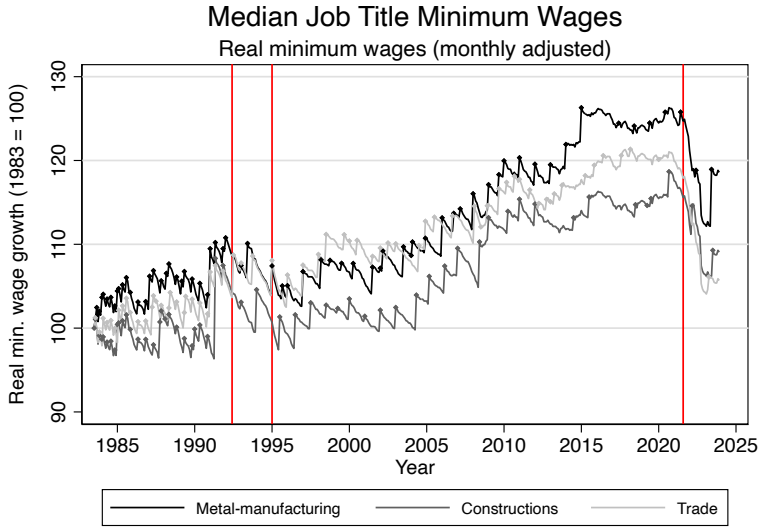



**FIGURE 2***: Evolution of Real Contractual Minimum Wages in the Median-Paying Occupation of each Collective Agreement*




*Note*: *The vertical lines broadly highlight different phases of wage setting dynamics.*

In describing the dynamics of real minimum wage levels, there are at least four phases that can be broadly identified. These phases also tend to be similar across collective contracts, suggesting a considerable amount of coordination. They are highlighted by the vertical lines in Figure 2, which reports the minimum wages set in the median-paying occupations within each collective contract.

The first phase, from 1983 to around 1992 was characterized by a gradual, although nonmonotonic, real minimum wage growth. This growth tended to be particularly positive in the first years of the 1990s. Moreover, there was only a limited differentiation in the size of minimum wage growth across job titles, with more skilled occupations being rewarded gradually more than low-skilled ones mostly only in the metal-manufacturing contract. The early 1990s broadly corresponded to a local peak in real minimum wages for most job titles.

From 1993 to around 1995 there is a second phase of decline or flat trends in real minimum wages. These years correspond to a transition phase of collective bargaining in Italy. A severe economic recession that hit Italy in the early 1990s prompted the government to completely abolish the *scala mobile*, a system of automatic partial adjustment of minimum wages to past inflation. This system was replaced by an agreement signed in the summer of 1992, in which the bargaining parties decided to anchor wage growth to future inflation targets, rather than past realized inflation (Banca d'Italia, 1992). The transition phase from the old to the new system was characterized by more limited

adjustments of pay floors to inflation, which led to a rather flat or negative dynamic in minimum wages, particularly for the constructions collective contract.

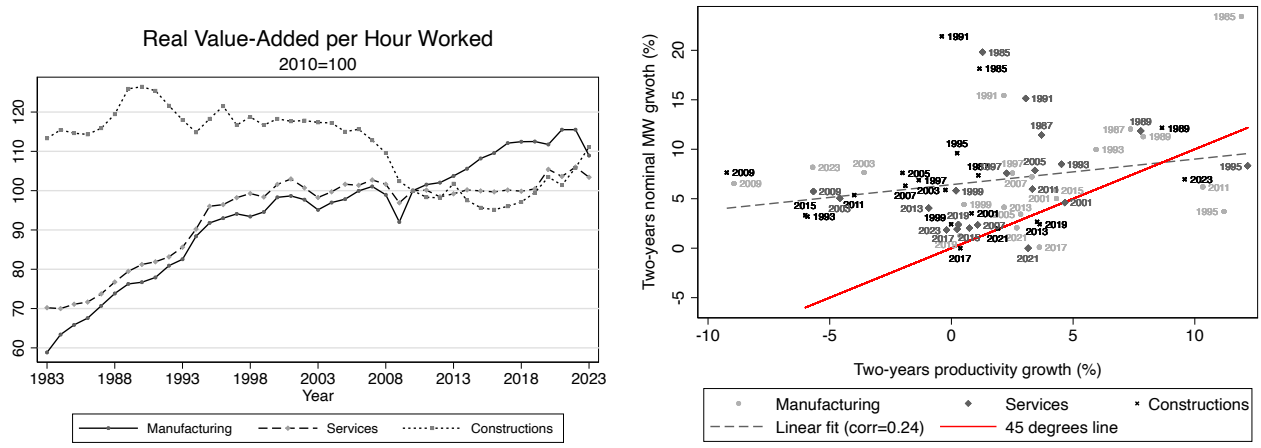
From 1995 to 2021 there is a third phase of recovery and growth in real minimum wage levels. It is also a period of strong increase in the differences between the minimum wages of low-skilled occupations (characterized by a slower pay growth) and high-skilled ones. The growth in pay differences across low- and high-skilled occupations was particularly strong in the second half of the 1990s, while the growth in real minimum wage levels became broadly more similar across job titles since the early 2000s. Moreover, for almost all occupations, real pay increases were particularly strong from the early 2000s to the mid-2010s, a period characterized by low inflation.

The year 2021 represented an historical peak in the level of real minimum wages for almost all the collective contracts and job titles considered, particularly among relatively high-skilled occupations. After this year, due to the recent and dramatic growth in inflation rates, there has been a sharp decline in real minimum wages for all collective contracts and job titles. The decline was stronger in the trade sector, with real losses of an order of magnitude of approximately 20%, while these losses were around 15% in the construction sector and around 10% in the metal manufacturing sector. Consequently, the recent inflation shock has eroded almost all the real minimum wage growth that had been cumulated during the previous two-three decades. The last contract renewals observed in this time series determined only a partial recovery in real minimum wage levels, with the most positive adjustment occurring in the metal manufacturing sector.

In general, this evidence shows that collective bargaining had different characteristics in different institutional and economic phases of the Italian economic history. This suggests that the influence of this institution on several outcomes of workers and firms could be heterogeneous depending on the period considered and on the underlying characteristics and determinants of wage setting. From a policy perspective, it seems important to monitor the trends in negotiated wages to correctly identify potential limitations in the system of collective bargaining, since optimal interventions could be heterogeneous over time as well.

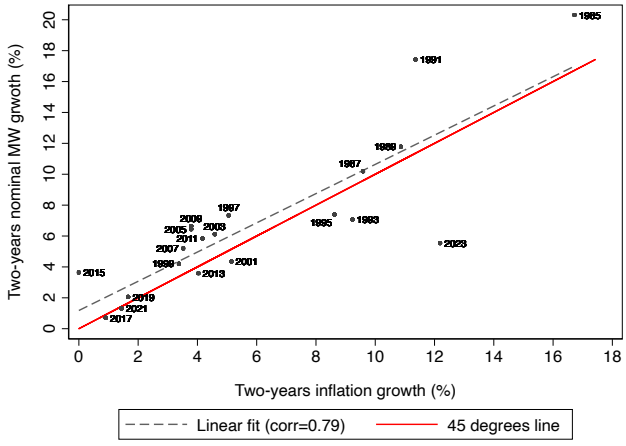
Finally, apart from quantitative differences in the timing and pace of minimum wage growth, the broad dynamics occurring in each collective contract have many similarities, particularly since the mid-1990s onward. As mentioned above, this evidence suggests that coordination in collective bargaining across contracts seems to be quite relevant in the Italian context.

**FIGURE 3**: *Evolution of Productivity by Industry and Correlation with Nominal Minimum Wage Growth*



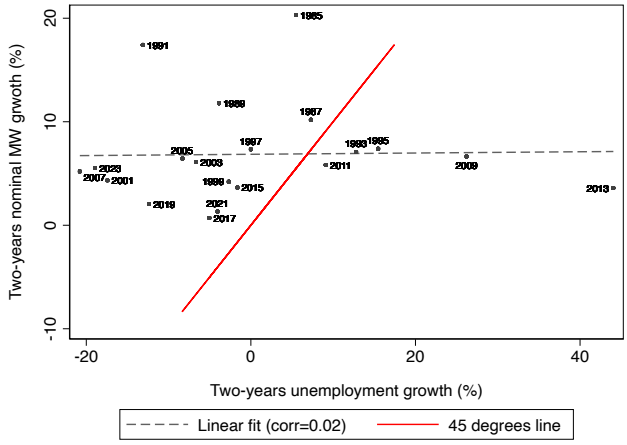

*Note*: *Evolution of real value added per hour worked by industry in the period 1996-2023 and its correlation with industry-specific log real contractual wage growth. Each bin in the scatterplot is the average nominal growth computed for each sample year*

**FIGURE 4**: *Correlation between Inflation and Nominal Minimum Wage Growth*




*Note*: *Correlation between the cumulative percentage growth in the consumer price index across minimum wage renewals and bargained log nominal wage growth for the period 1983-2023. Each bin in the scatterplot is the average nominal growth computed for each sample year*

**FIGURE 5**: *Correlation between Unemployment and Nominal Minimum Wage Growth*




*Note*: *Correlation between percentage growth in the unemployment rate and bargained log nominal wage growth for the period 1983-2023. Each bin in the scatterplot is the average nominal growth computed for each sample year*

## 3. CONTRACTUAL WAGE GROWTH RELATIONSHIP WITH PRODUCTIVITY, UNEMPLOYMENT AND INFLATION

We now study the relationship between bargained minimum wages and potential underlying determinants of their trends. In particular, we focus on productivity, unemployment, and inflation, which broadly reflect profitability, business cycle fluctuations, and cost of living dynamics.

For this purpose, we build a time series of sector-specific productivity growth, unemployment, and inflation. We rely on official statistics derived from the Italian Institute of Statistics (ISTAT) covering the period 1983-2023. As a measure of productivity, we consider the real value added per hour worked by sector. We match the 2-year cumulative real growth of nominal minimum wages in the metal-manufacturing, constructions, and trade collective contracts to the corresponding cumulative real growth in productivity in the manufacturing, constructions and services sectors, respectively. We also match to this series the growth in nation-wide unemployment and inflation, as measured by the CPI.

Figure 3 reports the observed relationship between nominal minimum wage growth and real productivity growth. The left panel shows that the sector that experienced the most significant growth in productivity over the last four decades was manufacturing. The trade industry has had a fairly stagnating productivity dynamic since the mid-1990s. Instead, the growth of value added per hour worked was generally flat or negative in the case of the construction sector, except for the most recent years, which were characterized by very generous government subsidies for this sector. At first

glance, these dynamics are not particularly similar to the observed growth of real wages within each industry-specific collective contract.

To further explore this relationship, the right panel of Figure 3 shows the correlation between the cumulated growth of productivity over two-year periods and the corresponding growth in nominal minimum wages set by each industry-specific collective contract. This analysis shows that the correlation between productivity and the growth of bargained pay floors was positive, but not particularly strong. Most observations lie above the 45 degree line, suggesting that the percentage growth in productivity was generally lower than the percentage growth in nominal pay floors.

Figure 4 instead shows the relationship between cumulated inflation growth over two-year periods, as measured by the consumer price index, and the corresponding nominal growth of pay floors. Here, a positive correlation is more evident, with a correlation coefficient close to 0.8. For moderate levels of inflation, nominal minimum wage growth is generally higher than or close to the observed growth in prices. Instead, observations are more evenly distributed below and above the 45-degree line during high-inflation periods. Finally, Figure 5 shows a very limited level of correlation between unemployment dynamics and nominal minimum wage growth.

### *3.1 Regression Analysis*

To shed more light on the significance of the association of inflation, productivity, and unemployment with contractual wage growth, we rely on a first-differences regression model. This approach is best suited to address nonstationarity in the context of time series data. We rely on the same data plotted in Figures 2-4, measuring each variable of interest over two-year time windows covering the entire period from 1983 to 2023. We estimate the following specification

$$\Delta_{t-2}^{t} lnMW_{jt} = \beta_1 \%\Delta_{t-2}^{t} infl_t + \beta_2 \%\Delta_{t-2}^{t} prod_{ct} + \beta_3 \%\Delta_{t-2}^{t} unempl_t + \alpha_j + \tau_t + \varepsilon_{jt} \quad (1)$$

where $lnMW_{jt}$ is the natural logarithm of the nominal minimum wage in occupation *j* and $\Delta_{t-2}^{t}$ is the first difference operator from year *t* to year *t-2*. Notice that *t* includes only odd years from 1985 to 2023, so that first-differenced periods never overlap. Moreover, $infl_t$, $prod_{ct}$ and $unempl_t$ are, respectively, year-specific inflation, year-contract specific productivity and year-specific unemployment. $\%\Delta_{t-2}^{t}$ is the first difference operator providing the percentage growth from year *t-2* to year *t*. Finally, $\alpha_j$ is an occupation fixed effect and $\tau_t$ is a linear time trend, which we interact with collective contract and decade fixed effects in the most saturated specifications.

**TABLE 1**: *Descriptive Statistics on the Estimation Sample*

| Variable | Mean | Standard deviation |
|---|---|---|
| Ln nominal MW growth | 0,07 | 0,05 |
| % inflation growth | 6,00 | 4,31 |
| % productivity growth | 1,69 | 4,64 |
| % unemployment growth | 0,27 | 15,51 |
| Observations | 400 | |

*Note: Nominal minimum wage growth is measured as a first difference in the natural logarithm over a two-years period for each occupation defined by the collective contracts. The other variables provide the percentage growth over a two-years period. The sample includes all odds years between 1985 and 2023*

The dependent variable in equation (1) is a policy outcome, as the nominal minimum wage growth is decided in negotiations between trade unions and employer associations. This outcome is measured over fixed two-year windows. Thus, it can also be influenced by delays in contract renewals, which would slow down the observed nominal minimum wage growth. Although several considerations could affect the negotiation process between trade unions and employer associations, the chosen explanatory variables are derived from official statistics that were likely available and observed by bargaining parties.

In this context, the main threat to the correct identification of the parameters of interest in equation (1) is represented by reverse causality. A given rate of growth in nominal minimum wages could itself have an influence on inflation, productivity, or unemployment. To account for this issue, we estimate a second model with lagged regressors. In particular, we estimate the following specification

$$\Delta_{t-1}^{t} lnMW_{jt} = \beta_1 \%\Delta_{t-2}^{t-1} infl_t + \beta_2 \%\Delta_{t-2}^{t-1} prod_{ct} + \beta_3 \%\Delta_{t-2}^{t} unempl_t + \alpha_j + \tau_t + \varepsilon_{jt} \quad (2)$$

where $\Delta_{t-1}^{t}$ is the first-difference operator from year *t* to year *t-1*, and $\%\Delta_{t-2}^{t-1}$ provides the percentage growth from year *t-2* to year *t-1*. In equation (2), past inflation, productivity and unemployment growth are predetermined and regressed on current nominal minimum wage growth. Thus, the estimated parameters should not be affected by reverse causality.

Table 1 reports descriptive statistics for the analysis sample. Throughout the study period, nominal wage growth was on average close to 7% over a two-year period (3,5% annually). The average growth in price levels was around 6%, real productivity growth was around 1,7%, and unemployment growth was around 0,3%.

Using this sample, we estimated the regression models of equation (1) and (2). Table 2 provides the results of these regressions when using different specifications of the controls. Columns 1 to 4 show results related to the model of equation (1), where both the outcome and the independent variables are measured using two-years first differences. Columns 5 to 8 show the results of the model of equation (2), where the outcome is in first difference from *t* to *t-1* and the independent variables are specified as first differences from *t-1* to *t-2*.

In the most saturated specification (columns 4 and 8) the model includes occupation by collective contract fixed effects and a linear time trend interacted by collective contract and decade fixed effects. Thus, in this specification the identifying variation is given only by deviations in nominal minimum wage growth from non-linear time trends separately estimated for each collective contract, and by deviations from the average growth rate within each job title estimated over the entire period.

The results show that there is a positive and significant association between inflation and nominal wage growth. A 1% inflation growth induces a nominal wage growth estimated between 0,9 and 0,5%, depending on the specification. The relationship between sectoral productivity and nominal pay growth is always close to zero and is negative and significant only in some of the specifications. Finally, there is some evidence of slower nominal minimum wage growth in periods of positive unemployment growth, but this association is significant only in the most restrictive specifications and it is quantitatively close to zero.

Given the very weak unconditional correlation between nominal wage growth and unemployment (see Figure 5), it is possible that part of the effect of unemployment on minimum wages, which emerges only in saturated regression specifications, could be induced by non-linearities in the relationship between inflation and contractual pay floors. This source of estimation bias could be mediated by the residual correlation between inflation and unemployment. However, given the low statistical power of the current exercise, it is difficult to test for non-linearities in this setting.

Among the limited evidence on the association between minimum wages and unemployment in Italy, Adamopoulou et al. (2022) found no significant association between minimum wages and current unemployment levels in the metal-manufacturing sector, but the association was significant with lagged measures of unemployment. Due to a higher flexibility in wage cushions, actual wages are likely more cyclical than minimum wages. For example, Devicienti et al. (2008) show an elasticity of Italian wage cushions to regional unemployment of up to -0,09. However, direct and indirect estimates of wage rigidity in Italy suggest that it could be quite relevant with respect to other countries (e.g., Devicienti et al. 2007; Boeri et al. 2022; Belloc et al. 2023). Our findings suggest that minimum wage dynamics could be a relevant component of real rigidity.

**TABLE 2**: *First-Differences Regression Estimates of the Determinants of Contractual Minimum Wage Growth*

| | **Outcome: Ln nominal MW difference (T-2)** | | | | **Outcome: Ln nominal MW difference (T-1)** | | | |
|---|---|---|---|---|---|---|---|---|
| **Indep. Variable** | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** |
| % inflation growth | 0,009*** | 0,007*** | 0,008*** | 0,008** | 0,009*** | 0,006*** | 0,005*** | 0,005** |
| | (0,000) | (0,001) | (0,001) | (0,001) | (0,000) | (0,001) | (0,001) | (0,001) |
| % productivity growth | -0.002 | -0,001*** | -0,001*** | -0,001** | 0,001 | 0,000** | 0,000 | 0,000 |
| | (0,001) | (0,000) | (0,000) | (0,000) | (0,001) | (0,000) | (0,001) | (0,001) |
| % unemployment growth | 0,000 | -0,000 | -0,001* | -0,001 | -0,000 | -0,000** | -0,002*** | -0,002** |
| | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) | (0,000) |
| **Controls** | | | | | | | | |
| Linear time trend | | YES | | | | YES | | |
| Linear time trend by CCNL by decade FE | | | YES | YES | | | YES | YES |
| CCNL by job title FE | | | | YES | | | | YES |
| R2 | 0.636 | 0.707 | 0.809 | 0.814 | 0.497 | 0.575 | 0.705 | 0.708 |
| Observations | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |

*Note: Regression results obtained from the first difference models of equation (1) (columns 1 to 4) and of equation (2) (columns 5 to 8). Each column uses a different specification of the controls. Standard errors are clustered at the collective contract level.*

The evidence of a null or weak association between minimum wages and productivity is consistent with the findings of Fanfani et al. (2024), which use Italian firm-level survey data matched with contractual pay floors. Instead, Card et al. (2022) find a quite robust association between pay floors and productivity in Portugal. There are relevant differences in the specification adopted by Card et al. (2022) with respect to our setting, as they weight the regression by employment size and exploit a substantially larger cross-sectional variation in wage floors and productivity measures. However, a higher sensitivity of Portuguese contractual wages to the business cycle could also be the result of institutional differences, which could be quite relevant.

In general, the evidence in this section suggests that the negotiations that occur between trade unions and employers' associations at the national industry level are not particularly influenced by the productivity dynamics occurring within each sector. Coordination seems to be a relevant element that could partly explain this result. Despite the sharp differences in the performance of each sector, real minimum wages in the three collective contracts considered in Figure 1 followed a surprisingly similar path. The main differences in real wage growth between sectors were mostly related to its timing, while there was only limited heterogeneity in its size and direction.

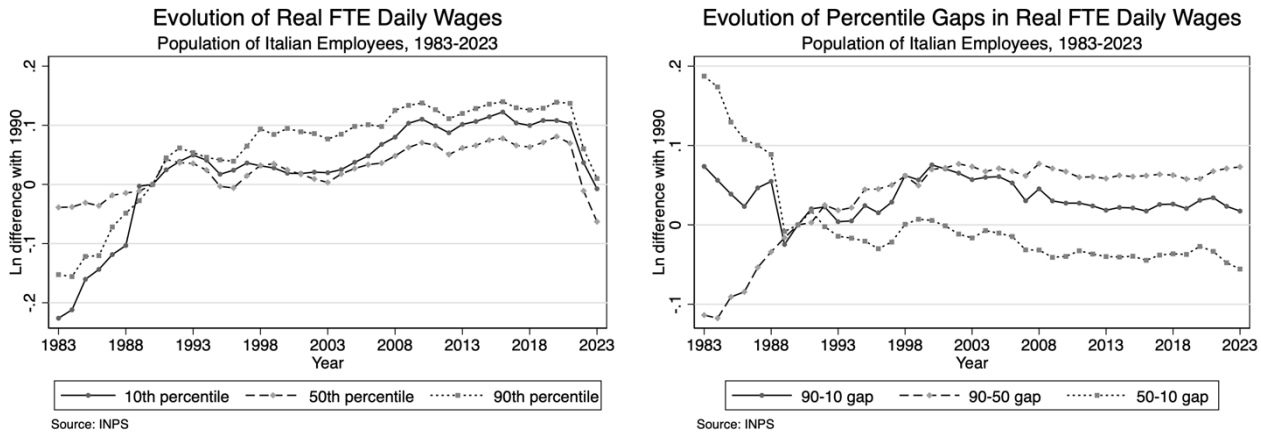
The robust positive relationship between bargained wage growth and inflation suggests that price and cost-of-living dynamics are a very relevant determinant of pay setting in the Italian system of industrial relations. This is consistent with common perceptions about collective bargaining in Italy, where the adjustment of wages to the cost of living has always been considered one of the main objectives of this institution.

## 4. THE ROLE OF CONTRACTUAL WAGES IN THE GROWTH OF WAGE INEQUALITY

Italian wage inequalities have followed a peculiar trend during the last four decades. The left panel of Figure 6 shows the evolution of full-time equivalent real daily wages during the last four decades for the 10th, 50th, and 90th percentiles. The right panel shows the evolution of the percentile gaps. These statistics are derived from social security records on the population of private sector employees, which represents more than two-thirds of the Italian workforce, and it is exactly the group of workers to which the rules set by collective bargaining apply.[1]

[1] The descriptive statistics related to the population of private-sector employees in Figures 3 and 4 have been computed by Lorenzo Cappellari and Bernardo Fanfani on INPS administrative data as part of their VisitInps project "Bargained Minimum Wages, Wage Inequality and Workers' Reallocation".

**FIGURE 6**: *Evolution of Real Daily Wage Levels and Inequality in Italy*




*Note: Evolution of real full-time equivalent ln daily wages at various percentiles of their distribution during the period 1983-2023 (left panel), and evolution of the 90-10, 90-50 and 50-10 percentile wage gaps during the same period (right panel).*

The trend in wages is generally positive for all percentiles up to 1990. Then, real wage levels follow a relatively flat trend up until 2021. However, there are relevant differences in the pace of wage growth between percentiles. The 1980s were characterized by an increase in the 90-50 gap and by a decrease in the 90-10 and 50-10 gaps. The 1990s were instead characterized by an increase in the 90-50 and the 90-10 gap, while the 50-10 gap became relatively flat. After around 2000 the evolution of inequality became relatively flat, with only a very gradual and small reduction in the 90-10 and 90-50 wage gaps.

The last two years of the series are characterized by real wage losses above 10%. These losses correspond to the surge in inflation that took place in 2022 and 2023. However, wage losses are broadly similar across the pay distribution and provide limited effects on inequality.

The dynamics reported in Figure 6 are influenced by several factors, such as, for example, the employment composition. In particular, trends in composition could be particularly relevant due to the secular increase in female labor force participation and the gradual convergence of the female pay distribution to the male one during the period considered. Even when accounting for these trends, the 1990s are characterized by the most relevant growth in daily wage inequality in recent Italian history (e.g., Depalo et al. 2025).

Figure 6 shows indeed that the 1990s were characterized by increased differences between the top and both the mid- and bottom of the pay distribution, a trend that was not observed in other decades. The evidence in Figure 6 is consistent with existing results on the dynamics of Italian pay inequality among private sector employees documented in the literature (Depalo et al. 2025). Devicienti et al. 2019 show that male wage inequality started to increase already during the 1980s. Indeed, among

men, the 1980s were characterized by an increase in differences also for what concerns 90-10 and 50-10 wage gaps. However, the overall trend in male pay dispersion from the 1990s onward is relatively similar to the one documented in Figure 6 for the entire population.

An influential hypothesis on the evolution of pay inequality, originally proposed by Manacorda (2004), is that the growth in dispersion during the 1990s could have been the result of a greater differentiation in the floors set by collective bargaining for relatively more and less skilled occupations. Consistently with this hypothesis, Devicienti et al. 2019 show that the growth in male pay inequality during the 1980s and 1990s was not driven by a higher dispersion in AKM firm pay premia and that it was mostly driven by a higher variance between the occupations (job titles) defined by collective contracts.[2]

The Italian trends contrast with evidence for Germany, where inequality kept increasing in the first decade of the 2000s (Dustmann et al. 2014). Card et al. (2013) show that the German trend was significantly affected by higher dispersion in AKM firm wage policies across time, and they link this result to opting-out clauses introduced by German collective contracts since the 1990s. Other countries characterized by more centralized collective bargaining systems, such as Portugal, show instead trends that are more similar to the Italian one, with AKM firm wage policies sometimes playing an even equalizing effect across time (e.g., Leitao et al. 2022).

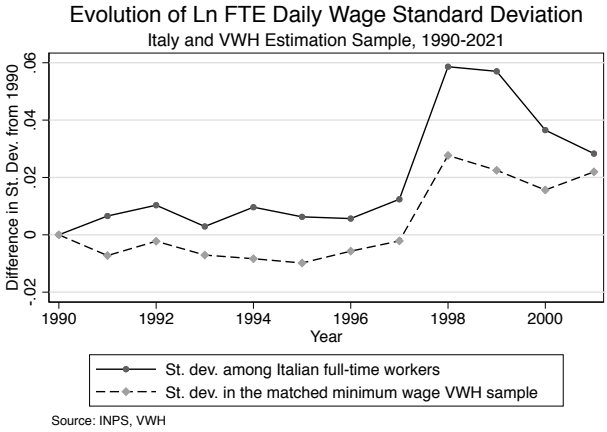
In general, the hypothesis that greater differentiation in the floors set by collective contracts could have played a role in the Italian growth of inequality appears consistent with the dynamics in minimum wages documented in Figure 1. This section provides further evidence on this hypothesis by analyzing the relationship between the occupation-specific pay floors set by collective contracts and actual wages.

### *4.1 Data Sources and First Evidence*

To study the relationship between occupation-specific pay floors set by collective contracts and actual wages, we rely on the Veneto Working Histories (VWH) data for the period 1990-2001. This is an extract of INPS administrative archives covering the population of employees in the Veneto region of Italy, which is one of the largest and more manufacturing-oriented in the country. This dataset has been used in several studies on the Italian wage distribution, including Card et al. (2014), Devicienti et al. (2019), Leonardi et al. (2019) and Kline et al. (2020).

[2] A limited role of AKM firm wage premia in the growth of Italian wage inequality has also been documented by Kline et al. (2022), and, for what concerns earnings inequality, Briskar et al. (2023).

**FIGURE 7**: *Comparison of Inequality Trends in the Sample of Analysis and the Population*



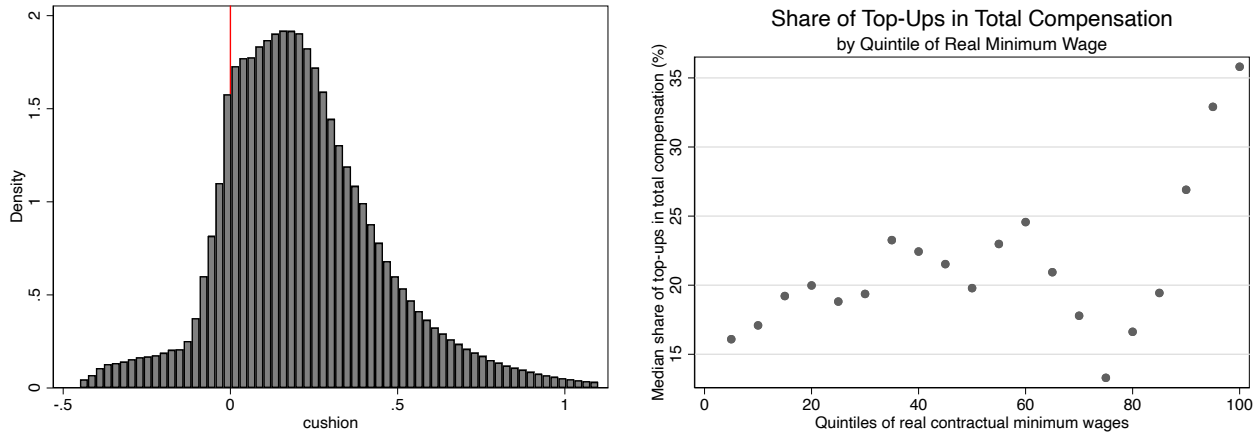

*Note: Evolution of the standard deviation of real full-time equivalent ln daily wages among full-time workers in Italy and in the Veneto Working Histories (VWH) data matched to contractual minimum wages set by the trade, metal-manufacturing, and constructions collective contracts (1990-2001)*

This dataset contains precise information on earnings and full-time equivalent days worked, along with several individual and firm characteristics. Importantly, for each worker the employer must state the collective contract and job title that is applied, which allows to match employees with their relevant minimum wage level.

To increase the precision in the measurement of wages, we restrict the sample to full-time workers only. Part-time contracts were not very common in Italy during the 1990s, and employers had to approximate the information on days worked for these workers, which could potentially induce a higher measurement error in the definition of wages. Moreover, we restrict the sample to workers covered in one of the job titles of the trade, metal-manufacturing, and constructions collective contracts, deleting cases with potential recording errors in the name of the job title.

In general, the sample restriction choices adopted in this study do not strongly bias the overall dynamics of pay inequality, if the estimation sample is compared to the underlying population of private sector workers. In this regard, Figure 7 shows that the evolution of the standard deviation of wages in the Veneto sample of full-time workers matched with the contractual wages set by the collective contracts of trade, metal manufacturing, and construction is broadly similar to the Italian trend. Indeed, inequality tends to increase from around 1998 onward in both the sample of analysis and the underlying population of private sector full-time workers, even if the size of this growth is partly attenuated in the estimation sample.

**FIGURE 8**: *Wage Cushions Distribution and Size*




*Note: The left panel shows the distribution of wage cushions expressed as a log difference from the minimum wage (1990-2001, VWH matched data). The vertical red line corresponds to the MW level. The right panel shows wage cushion expressed as a percentage of total compensation by quantile of the occupation-specific minimum wage (1990-2001, VWH matched data).*

### *4.2 Wage Cushions Estimation*

Using the VWH estimation sample, we decompose total wages into the contract and occupation-specific minimum wage and the wage cushion (difference between actual pay and bargained minimum floor). A peculiar feature of Italian administrative data covering the 1990s is that social security records include explicit information on the collective contract and the job title to which a worker belongs. For this reason, it was possible to deterministically match each contractual wage in Figure 1 to the workers employed under the corresponding occupation and collective contract. This allowed us to construct a measure of pay floors and wage cushions without relying on imputation procedures, such as using the mode of actual wages of the job title to approximate the contractual minimum (Cardoso et al. 2005).

The component of the salary defined as the wage cushion can be made up of several elements. First, there could be an optional top-up component, that is, a compensation on top of the base wage that employers may decide to give to all or selected employees (e.g. a performance premium). Second, there could be mandatory top-up components, such as seniority premiums or premiums related to the exposure to given risks and responsibilities (e.g., the handling of cash, travel allowances, etc.), which are often compulsory and of an amount set by the collective contract. Finally, part of the wage cushion may be given by overtime pay, which cannot be distinguished from the pay received for the standard schedule in the INPS administrative data.

The left panel of Figure 8 shows the distribution of estimated wage cushions for the period 1990-2001, jointly considering all occupations in the three collective contracts included in this study. Almost 75% of the workers are paid between 0% and 50% more than the minimum. The average wage cushion is around 21% and is lower in the service sector (11,5%) with respect to manufacturing (28%) and constructions (29%).

The left panel of Figure 8 also shows that there is a relevant proportion of non-compliance, which is estimated at around 15%. This could be the result of both miss-classification of workers into wrong job titles and of elusion behavior by firms. Non-compliance is significantly higher in the service sector (28%) with respect to the manufacturing and construction sectors (7%).

The high non-compliance in the service sector could be partly related to the system of classification of job titles in this collective contract. Indeed, while in most Italian contracts the first job title is used to denote the least paid occupation, the opposite is true for the trade collective agreement, where the first job title refers to the most paid occupation. This specificity of the service sector could partly justify a higher incidence of non-compliance related to recording errors in this collective contract. When considering non-compliance with respect to the least paid occupation, which should not be affected by problems of classification of workers into job titles, this statistic is still higher in the service sector (9%) with respect to the construction (5,6%) and manufacturing sector (3%). However, the size of the differences between collective contracts is proportionally lower.[3]

The right panel of Figure 8 shows that wage cushions, which are 21% on average, range between 15% and 35%, depending on the job title considered. Moreover, there is a positive (although nonmonotonic) association between the size of cushions and the minimum wage level of the job title.

The size of wage cushions is quite large with respect to available evidence on decentralized wage setting systems, such as the US labor market. Recent estimates of top-up wage components for the US, which were derived using payroll data, suggest that they generally constitute only 2,5% of total compensation (Grigsby et al. 2021). This is not surprising, considering that in a decentralized system of wage setting contractual base wages can be considerably more differentiated across workers.

The wage cushions estimated in this study are, instead, more similar to the evidence in other collective bargaining systems. Depending on the industry, Cardoso et al. (2005) estimate an average wage cushion between 20% and 49% in Portugal, while this average has been estimated at 20% for the same country with more recent data on actual pay floors (Card et al. 2022). Adamopoulou et al. (2022)

[3] Past studies on non-compliance with the lowest minimum wage of collective contracts, which were based on labor force survey data, have estimated an average level around 10%-13% for Italy (Garnero, 2018; Garnero et al. 2022).

estimate a wage cushion of 46% in the Spanish metal-manufacturing sector. Buller et al. (2022) estimate a wage cushion of around 15% for Norway.

Compared with other estimates available in the literature for Italy, the level of wage cushions estimated in this study is in line with Devicienti et al. (2008), which cover a similar period of analysis. Our estimates are instead lower than the average wage cushion of 39% documented by Adamopoulou et al. (2022) for metal-manufacturing workers in the years 2005-2013. This could be partly attributable to the fact that since 2005 the information on job titles is missing from Italian administrative data, which implies that occupation-specific minimum wages have to be imputed within each collective contract.

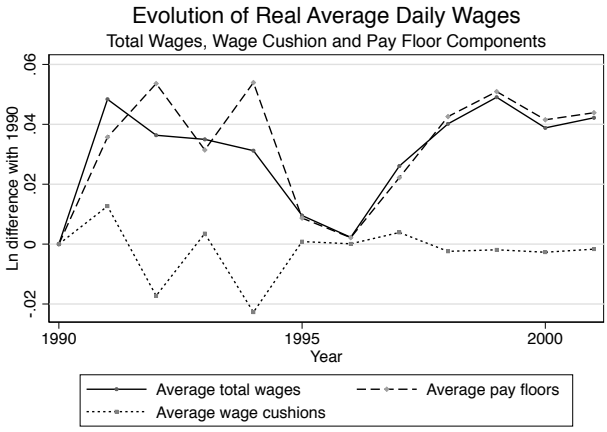
### *4.3 The Role of Minimum Wages in the Growth of Pay Inequality During the 1990s*

Figure 9 shows the evolution of average wages divided into two components: the growth in average pay floors and the growth in average wage cushions. Interestingly, wage cushions played a limited role in wage dynamics, and they were relatively more relevant in the early 1990s. From around 1995 onward, wage cushions start to follow a remarkably flat trend, and average wage growth even more closely follows the dynamics of pay floors.

A relevant feature of collective bargaining in the second part of the 1990s was the transition to a new phase of negotiations between trade unions and employers' associations, which was given the name of *concertazione*. The aim of this new phase was to increase the degree of coordination across collective contracts and to anchor bargained wage growth to future inflation targets, rather than to past realized inflation, as was the case with the *scala mobile* system. Figure 9 suggests that this new phase of collective negotiations probably increased overall centralization and coordination of pay standards, reducing the influence of wage cushions on average pay growth.

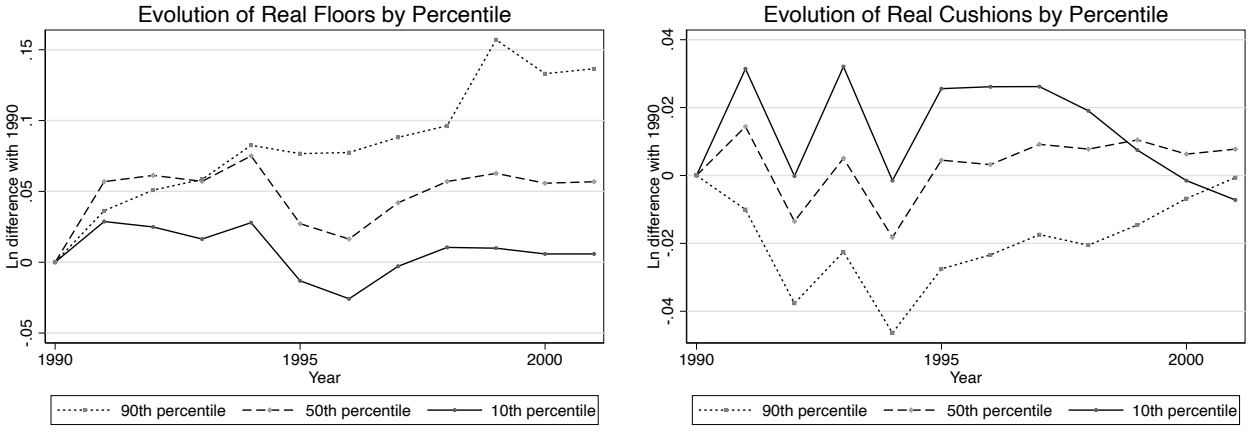
The evidence in Figure 9 is consistent with the institutional characteristics of Italian collective bargaining. This is a system where a growth in bargained pay floor implies also a mandatory growth of the same amount for the base wage of virtually all covered workers, including those paid more than the minimum. Thus, wage growth tends to be quite sensitive to the dynamics set by collective contracts. The elasticity of actual average wages to minimum wage growth has been estimated at around 0,3-0,5 when using counterfactual estimation methods on a large set of collective contracts (Fanfani 2023; Devicienti et al. 2025).

**FIGURE 9***: Evolution of Average Real Ln Daily Wages, Wage Cushions, and Pay Floors*




*Note: The series refer to VWH data matched to contractual minimum wages set by the trade, metal-manufacturing, and constructions collective contracts (1990-2001)*

**FIGURE 10***: Evolution of Real Ln Wage Cushions and Pay Floors by Percentile of their Distribution*




*Note: The series refer to VWH data matched to contractual minimum wages set by the trade, metal-manufacturing, and constructions collective contracts (1990-2001)*

Figure 10 shows the evolution of pay floors (left panel) and wage cushions (right panel) by percentile of their distribution. Since the mid-1990s, the dynamics of pay floors became increasingly differentiated across the distribution, with top percentiles growing increasingly more than median and low minimum wages. Considering the entire decade, real minimum wages were almost 15% higher in 2001 than in 1990 at the 90th percentile. The same growth was only around 5% at the median, and almost zero at the 10th percentile.

The right panel of Figure 10 shows that wage cushions instead had a more favorable dynamic at the bottom and mid of their distribution up until 1997. Since then, the growth in wage cushions became positive at the 90th and flat or negative at the median and 10th percentiles. By the end of the decade, real wage cushions were at a level similar to those observed in 1990 for all percentiles of the pay distribution.

This preliminary evidence suggests that the growth of pay inequality documented in Figure 7 was likely driven, at least in part, by a higher dispersion of base wages. Indeed, the 90-10 minimum wage gap increased by almost 15%, and the 50-10 minimum wage gap by almost 10%, while the same gaps in wage cushions, while having differentiated dynamics throughout the period, remained relatively similar when comparing the early 1990s to the end of the decade.

To provide more direct evidence of the role of contractual wages in driving the upward trend of inequality during the 1990s, we divide the sample into two four-year panels, 1990-1993 and 1998-2001. Within each panel, we compute the following variance decomposition of total daily wages

$$Var(W_{ijt}) = Var(MW_{jt}) + Var(C_{it}) + 2Cov(MW_{jt}, C_{it}) \quad (3)$$

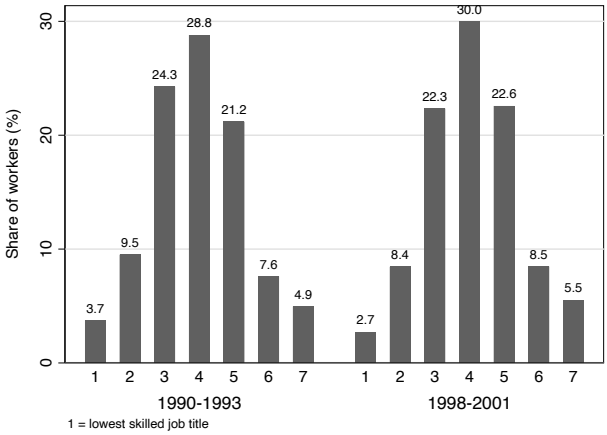
In equation (3), $W_{ijt}$ is the actual wage of worker *i* in job title *j* at time *t*. $MW_{jt}$ is the contractual base wage of the worker, which is specific to the job title. $C_{it}$ is the wage cushion, which is individual-specific. This decomposition is straightforward and can be implemented whenever information on individual base wages is available. It allows dividing total pay variation into a wage floor variance component, driven by the dynamics set by centralized bargaining, a wage cushion variance component, driven by firm- and worker-specific deviations from base wages, and a component related to the sorting between pay floors and wage cushions. When comparing the same wage variance decomposition across time, it is possible to link inequalities either to dynamics set within the system of collective bargaining through minimum wages or to residual factors that could affect actual pay levels.

**TABLE 3**: *Decomposition and Evolution of Ln Daily Wage Variance Over Time*

| Period | Var(Cushion) | Var(MW) | 2*Cov(Cushion, MW) | Total Variance |
|---|---|---|---|---|
| **1990-1993** | **0.083** | **0.006** | **0.009** | **0.099** |
| % of total | 84.3% | 6.4% | 9.3% | 100% |
| **1998-2001** | **0.094** | **0.012** | **0.010** | **0.116** |
| % of total | 81.4% | 10.2% | 8.5% | 100% |
| Difference | 0.011 | 0.005 | 0.001 | 0.017 |
| % Change | 12.03% | 59.44% | 6.10% | 15.51% |
| **% Diff./Total diff.** | **64.13%** | **32.40%** | **3.48%** | **100%** |

*Note: Decomposition of the growth in the total variance of log daily wages into a wage cushion component, a pay floor component, and a sorting component. Analysis performed in the VWH data matched with the trade, metal-manufacturing and constructions collective contracts*

**FIGURE 11**: *Distribution of Workers Across Occupations within Each Collective Contract over Time*




*Note: Category 1 refers to the job title associated to the lowest base wage of the collective contract, 7 refers to the job title with the highest base wage.*

Table 3 reports the results of this variance decomposition exercise. Overall inequalities, measured by wage variance, increased by 15.5% between 1990-1993 and 1998-2001. In 1990-1993, base wages represented only 6,4% of the total variance, while the same percentage increased to 10,2% in 1998-2001. Instead, the influence of wage cushions on the total variance reduced from 84,3% to 81,4% throughout the same period. The sorting component only marginally decreased as well.

Of the total 15% wage variance growth between 1990-1993 and 1998-2001, around 64% can be linked to a higher dispersion in wage cushions, 3.5% to a higher sorting of high cushions into high pay floors, and around one third (32,4%) can be attributed to a larger dispersion in bargained minimum wages. Furthermore, the bargained pay floor was the component of wages with the largest growth of inequality, given that their variance increased by almost 60%, with respect to 12% in the case of cushions and 6,1% in the case of sorting.

Part of the variance of contractual minimum wages could be influenced by composition effects. If the relative size of low- mid- and high-paying occupations changed across time, this would be reflected in the variance of occupation-specific minimum wages, which depends on the employment weight of each job title. To shed more light on the relevance of this mechanism, Figure 11 shows the distribution of workers across job titles, where category 1 refers to the lowest base wage occupation of each collective contract, and category 7 reflects the highest base wage occupation.

Figure 11 shows that there was no major change in the relative size of the job titles over time. From the first to the last period, the two lowest paid occupations reduced in size from 13,2% to 11,1%. The three occupations in the middle of the distribution remained relatively stable at around 74%, while the two highest paid occupations increased from 12,5% to 14% of the total population. Thus, there is no indirect evidence that job polarization played an important role in the fairly strong growth of minimum wage inequality documented by Table 3.

In summary, the evidence in Table 3 shows that the relatively less egalitarian attitude adopted in centralized negotiations from the early 1990s onward has played a relevant role in the growth of Italian wage inequalities. Considering the 1990s alone, which is the period of the most significant growth of wage inequality in Italy, the higher dispersion in occupation-specific minimum wages bargained by trade unions and employers' associations can account for around 30% of the observed trend. Overall, this evidence aligns with the hypothesis of Manacorda (2005), who linked at least part of the growth of Italian pay inequality in the 1990s to the dynamics determined within the system of collective wage bargaining.

## 5. CONCLUSIONS

This study has analyzed the evolution of contractual minimum wages set by collective bargaining in Italy over a forty-year period. The evidence shows that various phases of pay setting took place over time. The 1980s were characterized by slow real minimum wage growth and by a low differentiation of this growth between high- and low-skilled occupations. From the mid-1990s up to 2021 real minimum wage growth was generally positive, and differences in pay floors between low- and high-skilled occupations increased over time, particularly in the first decade of this period. Finally, the inflation crisis of 2022-2023 determined a fast and significant decrease in real minimum wage levels, which was quite similar between low- and high-skilled occupations within the same contract.

Minimum wage growth seems fairly coordinated across industries, as its association with sectoral productivity is weak and not significant. The pay floors set by collective bargaining have instead a strong association with past inflation, suggesting that price dynamics are an important determinant of pay negotiations between trade unions and employer associations. The unemployment dynamics had an unconditional correlation with minimum wage growth that was very close to zero. A significant negative relationship between unemployment and minimum wage growth emerged only in the most saturated regression specifications. In general, minimum wage dynamics seem to be quite rigid with respect to business cycle fluctuations, with inflation being the only macroeconomic variable providing a robust and consistent effect on bargained pay floors.

Minimum wage dynamics also have a strong influence on actual wages and pay dispersion. Even if wage cushions, which are largely determined at the individual or firm level, account for about 20% of total compensation, the average growth in actual wages tends to follow the dynamics set by collective contracts. Our evidence shows that the higher differences between occupation-specific minimum wages over time accounted for about 30% of the total growth in inequality observed during the 1990s, which was the decade of the most significant growth of daily wage dispersion in Italy. Thus, during this period wage negotiations have at least partly reacted to market pressures, such as the demand for relatively higher premiums by high-skilled workers, which likely emerged after the wage compression tendencies of the 1980s.

The results of this study have provided new insights on the functioning of a collective bargaining system characterized by one of the highest coverage rates among OECD countries and by a fairly centralized level of wage bargaining. Institutional differences should be considered before generalizing our findings to other countries. Nonetheless, our results show the importance of correctly identifying and monitoring policies implemented through collective bargaining, as they could have a considerable influence on firms, workers, and aggregate economic outcomes.

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