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Abstract

We show that the Italian wage curve, inexistent in the eighties and early nineties, has re-emerged after the 1993 Income Policy Agreements, owing to the greater role granted to flexible and locally bargained top-up wage components.

Keywords: wage curve, top-up components, panel data, institutional reforms, Italy
JEL classification: J30, J60

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1 Introduction

The existence of an inverse relation between wage levels and local unemployment (the so called "wage curve") has been confirmed empirically in many countries. Nijkamp and Poot's (2005) survey reports an average wage-unemployment elasticity (ϵ_{wU}) equal to -0.07 based on over 1000 estimates from most OECD countries. More recently, Sanz-de-Galdeano and Turunen (2006) estimated ϵ_{wU} at -0.14 for the euro area as a whole. However, Montuenga et al. (2003) show that national wage curves exhibit more variability than originally indicated by Blanchflower and Oswald (1994). As European labour markets continue to be regulated at the national level, it remains crucial to study country specific wage curves and to understand how they are shaped by national reforms.

For Italy previous estimates have denied the existence of a wage curve up to the early '90s (Lucifora and Origo, 1999). They ascribed it to the national wage bargaining setup, unable to fully incorporate local labour market conditions. In fact, until 1993 wages were set within a centralized wage setting process, accompanied by automatic price indexation. Aimed at curbing inflation and increasing wage responsiveness to local conditions, the July 1993 Income Policy Agreement (IPA) abolished the indexation clause and introduced a new bargaining system, featuring two coordinated and specialized levels. The industry-wide national level is specifically devoted to defend the purchasing power of wages, now set according to the Government's targeted rate of inflation. The regional or firm level is devoted to distribute additional (top-up) wage components, according to firms' performance and local conditions. The resulting decentralization changed substantially the nature of the top-up components. Moreover, as unions agreed on setting low inflation targets, wages set at the national level saw a new phase of moderation, which granted additional room to the more market driven top-up components. Accordingly, one may expect that both features of the new bargaining system have led to a resurrection of wage curve after 1993.

This paper assesses whether IPA has been effective in making the Italian wage structure more responsive to local unemployment. Indeed, we find that ϵ_{wU} increases in absolute value and becomes statistically significant after 1993. The paper also investigates the source of wage flexibility in an environment where collective contracts are still very influential. The answer is relevant for Italy as well as for other European countries, where these features are widespread. The role of decentralized top-up components, which became responsive to local unemployment after 1993, clearly emerges.

2 Data and first evidence

We use administrative data from social security archives processed in a public-use file (Worker History Italian Panel, WHIP) by LABORatorio Revelli[1], and randomly select an unbalanced panel of employees of private firms observed at least twice between 1985 and 1999 (150,000 workers;

[1] Detailed documentation can be found at *www.laboratoriorevelli.it/whip*

1,300,000 observations). The available wage variable is the worker's average weekly wage. To minimize (unobserved) variability in the number of hours worked, the sample has been restricted to full-time employees with at least three months in continuous employment.

Individual top-up wage components have been reconstructed as employee's total wage in excess to her base wage. The base wage, as stipulated by the national contract the worker belongs to, is a minimum wage specific to each occupation within the contract, including any automatic price indexation. Top-up components refer therefore to both locally bargained wage components (second-level contracts and productivity premia; they account for half top-ups) and individual premia. Base wages are available and matched to WHIP for 22 main national contracts. The resulting "*contracts' sample*" covers about 60% of our "full sample", slightly under-representing high wages. Note that, to investigate the role of second-level top up components, which cannot be negative by definition, the contracts' sample (but not the full sample) excludes workers whose total wage is below their base wage.[2] Section 4 compares the wage curve estimates with the two samples.

Figure 1.A shows that the average share of top-up components over total wage is about 22% and pro-cyclical. It can be contrasted to the unemployment rate by the same geographical areas (figure 2.A): high/increasing unemployment matches low/decreasing average top-up components. Figures 1.B and 2.B illustrate the effect of IPA at the aggregate level. Before 1993, while unemployment dynamics was quite heterogeneous by area, top-up components moved uniformly all over the country. After IPA, top-up components' dynamics diverged markedly by area, clearly mirroring local unemployment's dynamics.

3 Econometric strategy

The economic theory behind the wage curve has been widely debated (e.g., Card (1995) and Bell et al. (2003)). Independently of the theoretical model, the specification of the wage curve has become quite standard, aiming at controlling as much as possible for observed and unobserved heterogeneity. In this respect, the use of individual longitudinal data allows us to control for the changing composition of the workforce over the business cycle, and hence to minimize the downward bias on wage procyclicality that affects aggregate data (Solon et al., 1994).

We test the existence of a structural break after the 1993 IPA. This is a before-after estimator of the effect of a universal reform (no viable control group). In section 4 we discuss the eventual role of confounding factors. We estimate the wage curve using as dependent variables both total wages and top-up components. Our prior is that the wage curve re-emerges after 1993 thanks to the new nature of top-up components in the post-1993 bargaining setup; i.e. we expect $\beta_{break} < 0$

[2] About 10% of individuals have negative top-ups. All of them are located in the first quartile of the wage distribution and are likely to point to sub-standard employment relations. Undetectable reporting and coding errors is another possibility.

in both specifications and larger in the second. We estimate:

$$\ln w_{ijt} = \theta_i + \theta_j + \theta_t + \sum_j \left(\gamma_j' D_j\right) t + \beta \ln u_{jt} + \beta_{break} \ln u_{jt} D_{1993} + \sum_k \beta_k x_{ijt}^{(k)} + v_{ijt} \qquad (1)$$

where w_{ijt} is the wage level (total wage or top-up components) of individual i in region j and year t. u_{jt} is the local unemployment rate[3], also interacted to D_{1993} (a dummy signalling the period after 1993) to test $\beta_{break} < 0$. The θs are individual, region and time fixed effects, allowed to be correlated with one another and with the local unemployment rate (θ_j are dummies on 20 administrative regions and θ_t on 15 years). $\sum_j \left(\gamma_j' D_j\right) t$ are region specific linear time trends, included to capture region specific wage pressure or regional variation in working hours (Bell et al., 2002). $x_{ijt}^{(k)}$ includes time varying controls[4].

Equation (1) is estimated through the efficient fixed-effect transformation to remove the individual fixed effect θ_i. Estimated standard errors are robust to heteroschedasticity and are corrected for clustering on region.

Some studies using region-level data also control for the possible endogeneity of unemployment (Baltagi and Blien, 1998). We have conducted the C-test of exogeneity estimating an IV-fixed effects model on aggregate data at the regional level and using lagged average $x_{.jt}^{(k)}$ as excluded instruments, as in Baltagi and Blien (1998). We cannot reject the null hypothesis of exogeneity of u_{jt} both for the total wage and for the top-up wage component specification[5].

4 Empirical results

Our main results are reported in table 1. We obtain no significant elasticity (β) before the reform[6], negative and significant after 1993 ($\beta + \beta_{break}$). β_{break} is always strongly statistically significant. This result is not affected by the way we introduce the break in equation (1). If we allow the unemployment elasticity to be different across four sub-periods (table 2), β is not significant for the 1985-1988 and 1989-1993 subperiods; on the contrary, a wage curve reemerges for the 1994-1997 subperiod and even more so for the 1998-99 subperiod, partly owing to the graduality with which the new dispositions have been received in the actual bargaining process.

[3] Regional unemployment (standard ILO classification). This is the most disaggregate unemployment series that is consistent over the whole 1985-99 period.

[4] Age (quadratic), dummies for 4 occupations, 5 firm size classes, 8 industries, as well as for spells of health or maternity leave or temporary layoffs.

[5] Total wages: X^2 =1.366, p-value=.505. Top up components: X^2=2.675, p-value=.263. IV pass both relevance and overidentification tests.

[6] Exceptions are white collars and northern regions. This may be related to our inability to separate cadres from white collars: cadres (more concentrated in northern regions) have always enjoyed a very significant individual bargaining over wages.

Although statistically significant, an elasticity of -0.029 (s.e. 0.009) is low. In fact it is well below the -0.1 result reported by Blanchflower and Oswald (1994) for many countries (including Italy, although their result is not robust to the inclusion of regional fixed effects). However, it is comparable to the -0.025 elasticity estimated for the U.K. by Bell et al. (2002) with administrative data. To properly compare our results to theirs, we replicate their dynamic specification, including the lagged wage in equation (1) and restricting the sample to males appearing every year ($T = 15$) of the panel to minimize the small T bias on the fixed effects estimator.[7] In this case we expect a lower elasticity, as a balanced sample excludes frequent movers, entrants and less protected workers in general. In fact, the short run elasticity after 1993 decreases to -0.014 (s.e. 0.004)[8], lower than that estimated for the most deregulated labour market in Europe. Furthermore, that we obtain a significant elasticity also after excluding entrants, denies a leading role to a possible confounding factor, i.e. the 1997 liberalization of temporary contracts. Even though the elasticity increases again after 1997 (table 2), it is significant both in the 1994-1997 period and excluding entrants altogether.

Our second and most novel result relates to the source of recovered wage flexibility: the top-up components are providing room for flexibility in the wage structure after 1993. Their unemployment elasticity becomes significant after 1993 and is much higher, at -0.076, than the elasticity displayed by total wages (table 1 and table 2).

To investigate this point further, we move to quantile regression versions of equation (1), for both the total wage and the top-up components. We also discuss the effect of estimating the elasticities over our full sample versus the more selected contracts' sample[9].

Estimated $\beta + \beta_{break}$ are plotted in figure 3.A against percentiles, using the "contracts' sample"[10]. Both total wage and top-up's elasticities are significant at 95% confidence level from percentile 50 onward[11]. The elasticity of wages is increasingly higher (in absolute value) the higher the percentile. This is because the elasticity of their top-up components is increasingly higher the higher the percentile. It is worth noticing that when top-up components are low they (and total wages) are not able to respond to changes in local labour market conditions.

The contracts' sample excludes fringe workers and some high wage workers, so providing a lower bound of flexibility. In fact, total wage elasticity estimated with the contracts' sample decreases to -0.023 (s.e. 0.004). Figure 3.B plots $\beta + \beta_{break}$ of quantile regressions estimated over the whole sample, which can be done for total wages only. The estimated elasticities, all significant at 95%

[7] Kiviet (1995) provides an alternative method, not used here for comparability reasons.

[8] Unemployment elasticity in the long run is -0.053 in the U.K. and -0.033 (s.e. 0.008) in Italy.

[9] Results for the full sample are also needed for comparability with earlier empirical work.

[10] The correlation coefficient between the percentiles of the total wage and of the top-up components is 94%. The two series of quantile regression estimates can therefore be safely compared

[11] Pre-1993 elasticities are statistically insignificant at each quantile, and are not shown.

confidence level[12], illustrate the effect of re-introducing in the sample the excluded high wage workers and fringe workers (with sub-standard employment contracts). In this case, both high and low wages (in the first two deciles) display more post-1993 responsiveness to local unemployment than wages in the middle of the distribution. As low wage workers do not have significant top-ups, their increased wage flexibility cannot be imputed to IPA; instead, it may point to a decreased protection of marginal workers in the new labor market environment.

The 1993 break is found in many different groups of workers, and no particular group drives the result (Table 1). However, as expected, elasticity is higher in industries facing more international competition, and for women. Top-up components are more sensitive to local labour market conditions for white collars (vs blue collars), large firms (vs small/medium firms), northern (vs southern) regions, consistently with the larger top-up components received by these groups.[13] At the same time, the total wage elasticity for blue-collars, small and southern regions is slightly higher, consistently with the larger proportion found in these groups of low-wage / high-elasticity (fringe) workers.

Our final comments concern the role of potential confounding factors. One may argue that the wage curve would have resurrected even in the absence of IPA, as a result of general trends towards stronger international competition and closer European integration[14]. However, the sharp break in table 2 suggests that this is unlikely to be the case. Moreover, as shown in table 1, the wage curve resurrected also among firms not facing international competition. Hence we are confident in stating that the Italian wage curve resurrected after the 1993 Income Policy Agreement, as it created a new institutional setting that allowed firms to better adjust their wage structure to the local pressures of a changing economic environment.

5 Conclusions

We have shown the existence of a significant structural break after the 1993 IPA, which allowed wages to become more responsive to local unemployment. The result is related to the increased elasticity of decentralized top-up wage components, at -0.076 after 1993. That top-up components only take up 22% of total wages on average explains why the resurrected wage curve still looks a bit anaemic, with a -0.029 wage-unemployment elasticity.

[12] The higher precision of these estimates may be related to the larger sample size.

[13] The elasticity of top-ups is larger for women (vs men); however women's elasticity is not very precisely estimated.

[14] In effect, the IPA itself may have been triggered by the pressure of the new competing environment.

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Table 1: Unemployment Elasticity.

	Before 1993			After 1993		
	β	s.e.		$\beta+\beta_{break}$	s.e.	
All						
(a)	-0.005	0.006		**-0.029**	0.009	***
(b)	-0.002	0.018		**-0.076**	0.018	***
Males						
(a)	-0.008	0.007		**-0.029**	0.008	***
(b)	-0.007	0.019		**-0.073**	0.020	***
Females						
(a)	-0.002	0.007		**-0.041**	0.015	**
(b)	-0.001	0.032		**-0.101**	0.052	*
International competition: yes (+)						
(a)	-0.005	0.009		**-0.040**	0.013	***
(b)	0.003	0.035		**-0.107**	0.035	***
International competition: no (++)						
(a)	-0.002	0.005		**-0.016**	0.006	**
(b)	-0.024	0.020		**-0.042**	0.021	*
Blue collars						
(a)	-0.005	0.007		**-0.031**	0.009	***
(b)	-0.005	0.032		**-0.076**	0.028	**
White collars						
(a)	**-0.010**	0.003	***	**-0.024**	0.004	***
(b)	-0.014	0.015		**-0.085**	0.029	***
North and centre						
(a)	**-0.011**	0.004	**	**-0.033**	0.006	***
(b)	-0.012	0.021		**-0.090**	0.023	***
South						
(a)	-0.015	0.011		**-0.035**	0.012	**
(b)	0.008	0.031		-0.063	0.036	
Firms above 200 employees						
(a)	-0.005	0.007		**-0.025**	0.008	***
(b)	-0.050	0.031		**-0.162**	0.031	***
Firms below 200 employees						
(a)	-0.004	0.006		**-0.031**	0.011	**
(b)	0.014	0.023		-0.034	0.021	

(a)Total wage
(b)Top-up components

Regional unemployment, ILO definition.
Within Group estimator, robust s.e., clustering on regions.
*, ** and *** significant at the 90pct, 95pct and 99pct level, respectively.
(+) Manufacturing (ATECO81 branches 2-3-4)
(++) Utilities, constructions, services (ATECO81 branches 1-5-6-7-8)
Coefficients of controls not reported

Table 2: Unemployment Elasticity, subperiods.

	1985-1988	**1989-1993**	**1994-1996**	**1997-1999**
Total wage	-0.005	-0.006	**-0.027**	**-0.039**
s.e.	*0.0088*	*0.0048*	*0.006*	*0.0073*
Top up components	-0.007	-0.006	**-0.078**	**-0.090**
s.e.	*0.026*	*0.015*	*0.016*	*0.016*

Notes: as table 1. All individuals. Bold: significant at 99pct level

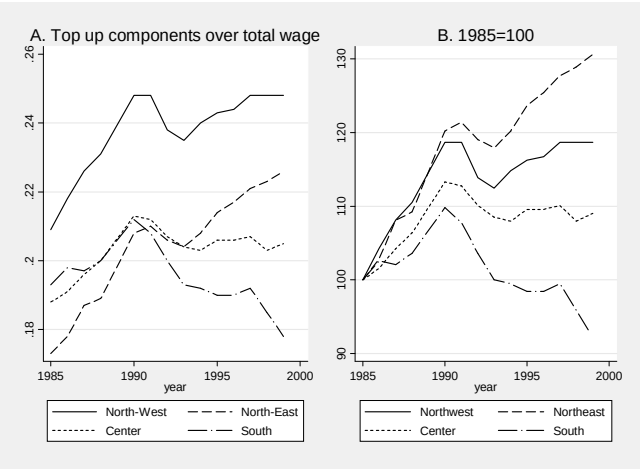

Figure 1: Share of top-up components by area

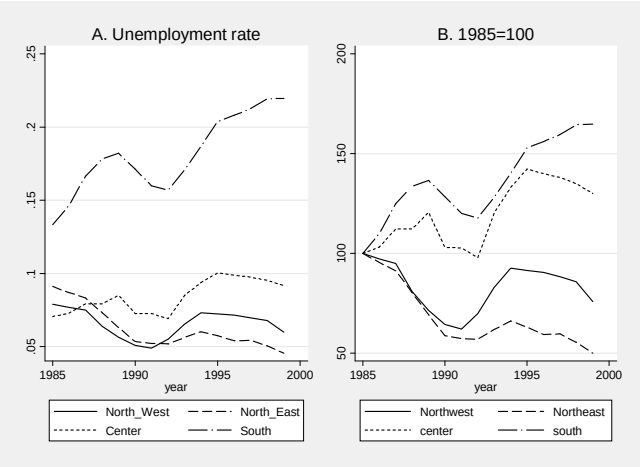

Figure 2: Unemployment rate by area

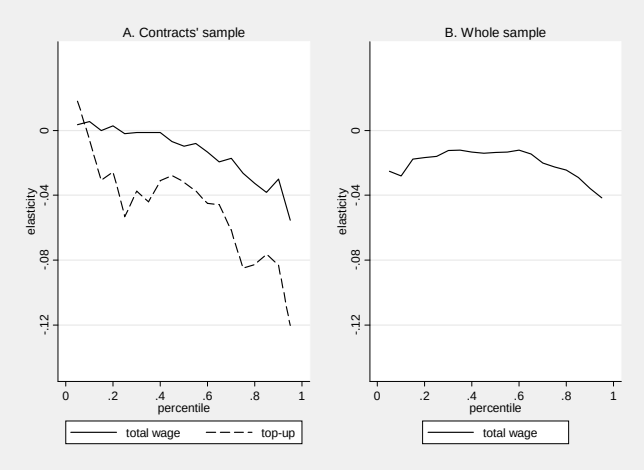

Figure 3: Unemployment elasticity after 1993, by centiles. Quantile regressions.