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The Italian Wage Curve Reloaded. Does Occupation Matter?

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Abstract
This paper provides some evidence on the existence of the wage curve—the negative relationship between individual wages and the local unemployment rate—within a number of occupations. It exploits the Bank of Italy's Household Survey and draws data from 1977 to 2008. An occupation-level wage curve exists for all the employees, while it holds only for a sub-set of the self-employed. In particular, the wage curve has an elasticity of approximately –0.05 for the blue-collars, an elasticity of –0.1 for the employees and of approximately –0.2 for the executives. This suggests that professional labor markets may have different levels of flexibility, also within the same country. In particular, the professional categories with higher (lower) levels of negative elasticity belong to more (less) flexible labor markets.

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1 Introduction

The relationship between individual wages and the unemployment rate is one of the most discussed issues in the history of macroeconomics and labor economics. Indeed, it can be considered as one of the "stilyzed" facts that has caught the attention of many scholars in economics.
Among the several aspects that have been studied concerning the relationship between these two key economic variables, a large part of the economists has focused its attention on the econometric study of the relationship between them. In particular, especially during the last twenty years, some authors, starting from the analysis of Blanchflower and Oswald (1995), some scholars have estimated the precise elasticity of the relationship between wages and the unemployment rate, in order to "quantify" it. Blanchflower and Oswald found that the majority of the surveyed countries (Italy included) showed a -0.10 elasticity: in other terms, doubling the local unemployment rate, a 10% reduction of the individual income occurs. In this paper, the estimation of the elasticity between individual wages and the local unemployment rate is defined in this paper as the estimate of the "wage curve", as Blanchflower and Oswald first called it in 1995, although this term in the economic literature has also been used to indicate, in more general terms, an equation which determines the level of wages and contains the unemployment rate among the explanatory variables. Economists have carried out several analyses which had the goal to extend the basic wage curve model: through the inclusion of different control variables in the estimate equation; by estimating the wage curve for different countries; by testing the existence of a wage curve for the same countries in different historical periods.
In this work I extend the aalysis estimating different wage curves for different professional categories. Moreover, as this analysis focuses on the Italian case in the period from 1977 to 2008, some particular aspects and country's labor market features had to be taken into account, in order to correctly define the specific econometric model.
Therefore, the idea behind this work is to understand whether a wage curve for all professional groups in Italy exists and, consequently, which are the differences in elasticities among them. This last result allows to provide an insight on the flexibility and efficiency of the professional category's specific labor market. A larger negative elasticity between wages and the unemployment rate: on the one hand indicates a wider credible competition among the unemployed agents, who are out of the labor market and would be willing to accept a lower salary in order to work, and the employed agents, who feel the external competition and are willing to accept a reduction of their wages rather than lose their job; on the other hand, it corresponds to a greater chance for employers to dismiss some inefficient job positions (i.e. wages which are higher than the corresponding labor productivity)

and to recruit individuals who are willing to accept a lower wage for the same level of productivity, without any legal, economic (e.g. contractual issues) and social (e.g. negative opinion by consumers) cost.
The results of my analysis show that, in general for all the self-employed category and, in particular, for the entrepreneurs, it is not possible to identify a standard wage curve, due to the presence of an underlying bias: the difficulty of obtaining correct information about wages, because of the presence of widespread tax evasion and tax avoidance. On the contrary, for the employees a wage curve exists and it is negative, confirming the expected results. However, in a few cases the elasticity obtained is equal or close to the estimated value of -0.10. In general, I obtain that blue-collars and white collars have a lower elasticity, in absolute value, than the executives and the self-employed. In particular, the category which has the least flexible labor market is the blue-collars' one, while the most flexible is the executive's category. Nevertheless, a wage curve is not found when considering only the period from 1993 to 2008, the aftermath of the great reform of the Italian labor market in the early '90s, probably due to the small number of available observations. In the following sections, I will discuss in detail, in the following sections, the assumptions underlying the implemented econometric model and the implications of the obtained results.
This work is organized as follows. In the first section, I will describe the main sources and the structure of the datased used to implement the analysis. I will also give a short description of all the variables I will use in the empirical analysis. In particular, I will describe them from an historical and a geographical point of view. In the second section, a theoretical review on the wage curve model is given. In particular, I will discuss some economic frameworks which could justify the econometrical choice of the Blanchflower and Oswald (1995) wage curve and some empirical issues on the econometric tools to use in order to correctly implement my model. In the third section, descending from the previous parts, the econometric model for the wage curve estimation is presented. In the fourth section, I will discuss the results of the empirical analysis and I will test the goodness of the Blanchflower and Oswald's prediction on the wage curve. Iin the fifth section, I will present my conclusions and I will discuss some possible future extensions of the present analysis.

2 A brief review of the wage curve

In this section I propose a brief review of the main theoretical results related to the study of the economic relationship between wages and the unemployment rate. In particular, I will focus on the description of the reasons that justify the choice of the econometric model known as "the wage curve", among the other predictive

models in the same field.
This issue has always been of great interest to both macroeconomists and labor economists, who appreciate the possible general theoretical implications and seize the policy issues related to it, and econometricians, who focused their attention on the empirical analysis, in order to know and measure the elasticity between wages and the unemployment rate.
In this paper, I perform an empirical analysis which refers to one of the most relevant theoretical models in the literature of the relationship between wages and unemployment: the "wage curve" analysis. This approach mainly refers to Blanchflower and Oswald, who have written since 1995 several empirical studies in this field, at first about the USA and then on other European and non-European countries. They wanted to reinterpret the relationship between wages and unemployment, inspired by the spreading microeconomic foundation of macroeconomics of the 90's (e.g. Jowell and Witherspoon (1989)). The main goal of their study was to examine «the role that plays unemployment local pay determination - where causality is to be thought of as running from the amount of joblessness to the level of wages» (Blanchflower and Oswald (1995)) and the fundamental innovation was the use of micro-data. In particular, they have documented the existence of a logarithmic curve that relates the level of pays and the unemployment rate in the local area. The most peculiar aspect of this issue is that, since their first work which analyzes 12 countries, the results have shown that the estimated elasticity is about -0.1. This implies that if the unemployment rate decreases by half, real wages increase of about 10%.
These results have been supported by many subsequent analysis conducted by several scholars. At the same time a large empirical literature does not support this theory: several analysis were made on more than 40 countries and the existence of wage curves in some of them, including the U.S. and Italy, is still considered controversial (Montuenga et al. (2003)).
Having considered this remarkable empirical result, it is useful to describe, on the one hand, the economic intuition behind the theoretical model and, on the other hand, the possible empirical econometric description of the phenomenon. In particular, I will consider the following issues: the consistency of the econometric model wage curves with different theoretical models; the predictive ability of the econometric model with respect to the specific features of the analyzed country (or region).
These two issues cannot be considered as completely separarable, since the construction of the empirical analysis usually stems from the choice of a theoretical model's reference. Nevertheless, in this section I distinguish the two issues, a theoretical and an empirical one, in order to isolate the critical aspects of both of them. In particular, we will consider some empirical limits to the application of the wage curve model to the Italian case.

2.1 Theoretical issues

From a theoretical point of view the definition of wage curve is clear and relatively intuitive: «the substance of the wage curve revolves around a micro-econometric wage function of the kind routinely used by labor economists such issues as to study the returns to education or male-female wage gaps» (Card (1995)). One of the major Blanchflower and Oswald's introductions was to increase the list of individual-specific job features (gender, education, age) while measuring the unemployment rate.
However, the economic intuition behind the theory of the wage curve refers to some findings of non-competitive theories of the labor market (Blanchflower and Oswald (1995)). In particular, usually the presence of low wage levels together with a high rate of unemployment is explained by the lack of bargaining power held by workers, employed in "intensive-unemployment" labor markets. Indeed, these workers decide to accept low wages because they fear that, if they ask upward salary adjustments, they could probably be dismissed, since an unemployed agent would be willing to work at the minimum - very low - wage. Moreover, they prefer to remain occupied because, given the strong external competition in the labor market by the agents who search a job, they might not be hired back, even with a lower wage. Hence, according to this theory, the level of the wage is a negative function of the unemployment rate (Blanchflower et al. (1992)). However, the same empirical relationship found by Blanchflower and Oswald for the first time may be justified at least by two other theories that, for different reasons, would confirm the inverse relationship between unemployment and wages.
The first one is the Phillips curve (Phillips (1958)). In 1958, Phillips wrote an empirical article in which he identified a negative relationship between the growth rate of wages and the unemployment rate, for the historical period between the 1913 and 1948 in the UK. The analysis, started with an entirely empirical intent, was later often used in the standard theoretical macroeconomic literature. The underlying economic mechanism is intuitive and not a-theoretical: «it can be justified by appealing to the notion that excess supply of a commodity gradually pushes down the price of commodities» (Blanchflower and Oswald (2005)). However, this is very different from individuating a clear relationship between the two variables: actually Phillips never specified the existence of any predictable relation between the level wages and unemployment. Moreover, from the econometric modeling point of view, there is a marked difference in the construction of the Phillips curve and the wage curve. Phillips'model tests the existence of a negative relationship between the rate of exchange of wages and the contemporaneous unemployment rate (Lipsey (1960)), while the model of wage curves tests whether the unemployment rate determines the level of wages, in addition to determine the existence of the negative relationship between two variables (Card (1995)). From

an analytical point of view, this means that, in the Phillips curve equation, the level of the unemployment rate is the main regressor, while, in the wage equation, the main regressor is the first difference of the unemployment rate:

$logw_{rt} = a_1 logu_{rt} + e_{rt}$,
$logw_{rt-1} = a_1 logu_{rt-1} + e_{rt-1}$,
$\Delta logw_{rt} = a_1 logu_{rt} + a_2 logu_{rt-1} + \Delta e_{rt}$,

where w_{rt} is the wage in region r and time t, u_{rt} is the unemployment rate in region r and time t. With this equation I am able to test the hypothesis required by Phillips (fixing $a_2 = 0$), while we may test the wage curves hypothesis (fixing $a_2 = -a_1$). We obtain the following equations:

$\Delta logw_{rt} = a_1 logu_{rt} + \Delta e_{rt}$
and
$\Delta logw_{rt} = \Delta logu_{rt} + \Delta e_{rt}$
as just said in the above description.

As the Phillips curve, another basic theory describes the inverse relationship between unemployment and wages, even though with different economic motivations. This theory is known as the labor supply function model. According to Lucas and Rapping (1969) the change in the unemployment rate may depend on the behavior of labor supply. Indeed, in the short term the change from employment to unemployment could be be considered almost complementary: this means that wages' increases and simultaneous reductions of the unemployment rate may simply result from a *movement along the curve* with positive gradient which represents the labor supply function. However, Blanchflower and Oswald pointed out in their empirical findings that the local unemployment rate - and not the global employment rate - has a direct impact on wages.
In conclusion, some other theories are alternative to the wage curve, even in the main result: the negative relationship between them. Within this research stream, the most relevant theory was produced by Harris and Todaro (1970). It is based on the concept of *compensating differentials*: in order to accept a job in a high-density of unemployment area, workers receive an incentive to move, which takes the form of a higher wage (Blanchflower and Oswald (2005)). Consequently, high levels of unemployment should justify high levels of wage. Otherwise the workers would not accept a job for which there is a strong external competition, as it would be too risky. The main criticism of this approach is purely empirical: «depending on which years are used in the analysis, researchers have not always found statistically significant and positive association between wages and "long run" unemployment rates» (Card (1995)). The reason for this result is probably due to the fact that

«the compensating differentials theory pertains to the expected unemployment rate in a local market, while the wage curve relation that occupies Blanchflower and Oswald's attention concerns contemporaneous unemployment» (Card (1995)).

2.2 Empirical issues

The wage curve analysis cannot be uniquely considered a theoretical issue. In order to complete the analysis, I will also consider which are the features that an empirical model describing the wage curve should have.
One of the main issues to take into consideration simultaneity. The wage curve estimates the effect of unemployment rates on individual earnings, but, conversely, wages could also affect labor demand and supply, and therefore unemployment (Nijkamp and Poot (2005)). However, in micro-level data sets, even though the wage is negotiated between a specific worker and an individual firm, so that it could be influenced by the local unemployment rate, it is very difficult to prove that the micro-outcome could directly have a feedback effect on the unemployment rate itself (which is a macro-variable). For this reason, only a few wage curve estimation models adopts instrumental variables to control for possible endogeneity of the unemployment rate, and standard OLS are the most used estimation technique.
Another relevant issue to consider is the functional form of the relationship. Blanchflower and Oswald (1995) came to the conclusion that, empirically, the most supported relationship is the constant elasticity one: synthetically, $ln(w) = a + bln(u)$ plus other possible control variables. This formulation has been widely used in the economics literature and it could be considered as the standard model for describing a wage curve.
Concerning the type of OLS regression to use, the majority of studies adopted a pooled cross-section time-series approach. Hence, it is important to understand the role of regional and time-fixed effects. According to Nijkamp and Poot (2005), such dummy variables are often significant. However, there could be an interpretation problem: there are often several different independent influences leading to such fixed effects. Moreover, even though the wage curve is a relationship between the real wage and local unemployment, only a few studies consider spatial cost of living variation in the model (e.g. Buettner (1999)). Certainly, this depends on the difficulties that one may have in finding such a specific cost-living index for all the considered regions.
Furthermore, I discuss the use of micro-data instead of grouped data. Using micro-data allows estimating the wage curve with a greater precision. However the simultaneous use of grouped labor market (and non-market) features as control variables in the estimation equation leads to the standard error on the unemployment rate being significantly underestimated (Moulton (1990); Card (1995)). Hence, sometimes the precision of the estimation could be overvalued. This could lead

to large t-statistics which may deceive the researcher about the significance of the estimated coefficient.
To conclude, the most appropriate econometric model should be calibrated on the characteristics of the country that is analyzed. There have been several attempts to test the hypothesis for an Italian wage curve. Nevertheless, the results in some cases did not show an inverse relationship between unemployment and wages (e.g. in Ammermuller et al. (2010)); in other cases, although the basic relationship was identified, it was found a significantly different from -0.1 elasticity, which is the value found by Blanchflower and Oswald in the U.S. and many other countries (e.g. Destefanis and Pica (2010)). The main reason for this particularity is generally identified in the strong centralization of wage bargaining that has been present in Italy at least until 1992. The centralized bargaining system, accompanied by a semi-automatic indexing of wages to inflation, did not let wages be freely determined by the specific conditions of the local labor market (Devicienti et al. (2008)). This is probably one of the reasons why Lucifora and Origo (1999) did not find any wage curve, before the early '90s.
In 1993 the Income Policy Agreement (IPA) abolished the indexation clause and introduced the new bargaining system, composed of two different stages. The national level was dedicated to the defense of the purchasing power of wages, which effectively was set according to the targeted rate of inflation. «The firm level was implemented in order to distribute additional (top-up) wage components, according to firms' performances and local conditions. Accordingly, one may expect the wage curve to resurrect after 1993» (Devicienti et al. (2008)).
I will now proceeed to the analysis of the data, taking into account these relevant theoretical, empirical and Italian-specific critical aspects that may occur.

3 The Data

The analysis I implement uses together micro- and macro-data. Indeed, the two main considered variables, wages and the unemployment rate, were obtained from different sources, using diverse techniques. The Italian Institute for Statistics (ISTAT) provides an aggregate (regional) version of the unemployment rate. Moreover, ISTAT provides data on regional unemployment only since 1993 (and data from 1993 to 2003 are recreated by extrapolation). However, I build an extended dataset to consider the effect of the Italian labor market reforms in 1993. Hence, I decided to choose the unemployment rate by geographical area: indeed, ISTAT usually divides Italy into five macro-regions (North-West, North-East, Centre, South and Islands) and for each of them it provides the unemployment rate from 1977 to 2012. However, in this work we circumscribe the analysis to the period before 2009, in order to provide an estimation which is not influenced by the economic

crisis started in 2009 whose effect on unemployment would confound the whole analysis.

Bank of Italy provides individual wage variable's source: I obtained the micro-data from the Survey on Household by Income and Wealth (SHIW, the *Italian Indagine sui Bilanci delle Famiglie Italiane*). This study always considers net wages, as the Bank of Italy always provides data relative to net individual wages. The survey refers to interviews conducted from 1977 to 2008 (basic information are not available prior to 1977), even though for a total of 20 years, since questionnaires were not administered every year. The involved years are 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1986, 1987, 1989, 1991, 1993, 1995, 1998, 2000, 2002, 2004, 2006 and 2008. More than 122,000 interviews were carried out during the two decades and about 8,000 households or 24,000 individuals actually filled in the questionnaire. The dataset contains information on personal features and employment status of individuals, level of income earned by family members, consumption, the real property owned or inhabited by members of the family and the financial assets and liabilities held by the family. Overall, I decided to use a sample survey, although aggregate data on wages and incomes were available, for two main reasons: on one hand, this choice allows to integrate the income data with further information on workers, which I will use as controls in the estimation of the wage curves (e.g. geographical information, gender, education level and age); on the other hand, I was able to distinguish the individual income levels based on five professional categories (blue collars, employees and teachers, executives, self-employed workers and entrepreneurs).

Since the main purpose of this work is to study the relationship between wages and unemployment rates to test the existence of a wage curve, let me describe the series of variables available in the dataset. In particular, as my analysis' goal is to identify a precise relationship between individual wages by professional category and unemployment rates, through this descriptive data analysis it is possible to observe the differences among the professional categories and the five geographic Italian areas, looking at the evolution of the individual wages. The earnings in the SHIW dataset were expressed in thousands of Lire until 2000 and in Euro since 2002. For homogeneity I decided to convert also the values from 1977 to 2000 in Euro.

First, let me describe wages. I calculate the average income earned over the entire period (Tab. 1), in order to have an indication of the differences among the professional categories, in terms of wage. Higher average incomes belong to the executives (nearly 19,000 Euros), followed by the self-employed workers (about 15,000 Euros). Entrepreneurs earn about 9,800 Euros and employees earn just over 8,800 Euros. The blue collars' revenues are quite lower (about 6,200 Euros). Those categories which had a higher average income also show a greater variability of results, signaled by a higher standard deviation of earnings.

In the appendix section it is possible to analyze the wage time series, through some graphs: in Fig. 1, the median earning is indicated by a triangle and the maximum and the minimum earnings are signaled by a vertical line, in the corresponding year. Not considering the division by geographical areas and just evaluating the national average, there is a growth of the level of earnings over time, for all the professional categories. In particular, executives have a greater absolute and percentage increase than other categories from the late 80's to the 90's. On the other hand, the self-employed workers' earnings were stable during the same period.
However, in order to pursue the object of this analysis, it could be more useful to understand how the earnings grew on the basis of the geographical distribution. According to Fig. 2, in most of the cases the earnings of the Northern Italy workers are higher than those of the Southern Italy ones, for all the geographical areas and almost every year. Nevertheless, while for blue collars and employees there are not substantial geographical differences in the time series, for the other three groups, the difference between the medians of the areas is significantly higher. Furthermore, this absolute difference increases with time: in particular, since 1993 the gap of earnings between North and South has increased. For instance, while in 1977 the absolute difference of the median wages of a Northern over a Southern entrepreneur was about 750 Euros, in 2008 the same difference was approximately 5,800 Euros. However, the relative difference, calculated as the ratio between the two wages belonging to workers of the same categories and different areas, is non-increasing: in our example, the ratio for 1977 is 1.5 and for 2008 is 1.43.
Let me now look at the unemployment rate, our second key variable. As already mentioned, due to the lack of micro data on unemployment, I looked for the unemployment rate by geographical area at an aggregate level. This solution did not allow me to consider a professional level of unemployment, an unemployment rate that refers to a specific job category, which could be considered as the horizontal distance from full employment in their profession. The calculation of a proxy of the unemployment rate could not be a forcing operation and the results would have been difficult to interpret; therefore, their use in subsequent econometric analysis would have been impaired. For this reason, I opt for a unique unemployment rate: this means that I consider unemployment as independent from the professional labor market. Indeed, whatever the professional category is, the unemployment rate would be the same, in the same geographical area, during the same year. Overall, this is a simplification which has often being adopted in this stream of economic literature (Destefanis and Pica (2010); Devicienti et al. (2008)). Hence, considering the time series of the unemployment rate for geographical area, the evolution of the variable was similar in all of them (Fig. 3). After having had a significant increase between '80s and '90s, the unemployment rate was slowly returning to the levels of the late 70's, before the large increase of the most recent years (excluded in this analysis). Moreover, since the mid 80's the unemployment rate of the South and of

the Islands has been at least twice the rate in the Centre-Northern regions. I will take into account the impact of the geographical differences on the labor market variables in the following sections.
To conclude, I deal with the descriptive analysis of those variables that we use as controls in the following section. Tab. 2 and Fig. 4 report the absolute and percent frequencies of the following variables: gender, age, area, education and economic sector. The interviewed men are on average more than women, for all the professional categories (Fig. 4.1). For the executives the disproportion is quite evident (86% men, 14% women); on the contrary for employees and teachers the distribution is much more balanced. The analysis by age reveals that the professional categories of respondents are strongly different among the age group considered (Fig. 4.2). Blue collars are more common especially in the age group under 30 years, with a progressive decrease in the successive groups. On the other hand, there are more executives and entrepreneurs, for the age groups after 40 years. There is a relatively stable behavior of employees and self-employed, among the age groups. The geographical analysis does not show relevant differences, among professional categories (Fig. 4.3). Indeed, there is not a relevant disproportion among workers of different categories within the same area. There is just one significant piece of information to notice: in the North-West the presence of executives prevails (while, in the South, they are very few in proportion); moreover, the percentage of entrepreneurs is proportionally lower in the North-West and proportionally higher in the South Italy. The education level of Italian workers seems to show a relationship with the professional category (Fig. 4.5). The only categories which have a discrete number of workers without any education qualification are the blue collars and the entrepreneurs. On the other hand, employees and teachers have a high school diploma (approximately 58%), although a good percentage is graduated (18%). The category with the highest percentage of graduates is composed by the executives (approximately 58% of the total), in addition to whom we should consider those workers who have a higher university degree. A similar phenomenon can be observed for the category of self-employed workers. Otherwise, the entrepreneurs are a very particular category: only the 3% of them has a degree and more than one third of them has only a primary school diploma.
In conclusion, I consider the distribution of workers among the economic sectors (Fig. 4.5). Blue collars mainly work in the industrial sector (52%) and Public Administration (21%). Employees and teachers mostly work in the PA (60%) and in the industry (17%), as well as managers (61% and 26%, respectively) and self-employed workers (61% and 25%, respectively). Otherwise, entrepreneurs work mainly in trade (38%) and industry (25%), although there are also some positions in the agriculture and in the PA (16% and 15%).

4 The empirical strategy

In this section, I proceed to the estimation of the wage curve. The main issues that should be taken into account in the construction of the model are: the econometric research strategy which could better describe the relationship between wages and unemployment; the choice of control variables which could provide the most plausible model specification; the test of the hypothesis of a structural break in 1993 (the year of the Italian labor market reform). «Independently of the theoretical models, the wage curve model has become quite standard aiming at controlling as much as possible for observed and unobserved heterogeneity» (Devicienti et al. (2008)). We will estimate the wage curve using the total wages as dependent variables. I estimate through OLS the equation that describes the chosen wage curve model, for individual i, in region r, at time t:

$$lnw_{irt} = \alpha + \beta lnu_{rt} + \beta_{break} lnu_{rt} D_{1993} + \gamma X_{irt} + \phi_r + \phi_t + \varepsilon_{irt}, \quad (1)$$

where lnw_{irt} is the natural logarithm of wages. The main regressor, lnu_{rt}, is the natural logarithm of the regional unemployment rate. $lnu_{rt} D_{1993}$ is a dummy variable which isolates the regression on the period from 1993 to 2008. X_{irt} is a set of control variables for individual i, in region r, at time t. ϕ_r and ϕ_t are respectively the spatial (regional area) and time (year) fixed-effects of the panel-data model. Finally, ε_{irt} is an error term. I am going to estimate β and test Blanchard and Oswald hypothesis on the negative relation between wages and the unemployment rate.

I decided to use logarithms for two reasons: several authors estimated a logarithmic equation (e.g. Blanchflower and Oswald (1995); Devicienti et al. (2008); Destefanis and Pica (2010)); using logarithms, β would represent the elasticity coefficient between the individual wage and the unemployment rate, which provides us deeper information about the intensity of their relation. In particular, we are going to test Blanchflower and Oswald's hypothesis of a -0.1 elasticity ratio.

The OLS regression that I conduct is established within a panel data structure. The individual *id* considered in the panel is the geographical area indicated by ISTAT and the time variable is a subset of 20 years within the period from 1977 to 2008. However, within the same regional area a different number of individuals, based on the results of the Bank of Italy interviews, were considered for each year. This means that the panel is unbalanced on the side of the interviewed individuals, while it is balanced by the side of the regional area. Nevertheless, the use of an OLS regression in a panel allows to control for the heterogeneity of individuals (in the case of geographical areas), avoiding distortions in the estimates due to aggregation of individual data. In addition, a panel data structure gives more information about variables and, with it, a greater variability. This implies a lower probability of collinearity between variables, a higher number of degrees of freedom and,

therefore, more efficient estimates.
The panel structure allows to include spatial and regional fixed effects (ϕ_r and ϕ_t). Spatial fixed-effects are included in the analysis model in order to consider the "individuality" of each cross-sectional unit (regional area). The time fixed effects are included in the model so that they take into account the fact that the unemployment rate can vary over time within the same geographical area.
In order to test the structural break following the reform of the Italian labor market, I include a dummy that signals only the period after 1993 (Destefanis and Pica (2010)). In this way I isolate the period when the Italian labor market has not been directly influenced by the government, in order to test my equation only for the period 1977-2008 and to be able to compare my result with other results for European and non-European countries.
Finally, X_t is a set of control variables related to personal features, cultural and economic conditions of the considered individuals. In particular, I include the "gender" variable that controls for the individuals' gender. As part of the personal information, I consider the "individual age" variable which controls for five different age groups. Concerning the economic controls, I include in the model the "sector" variable, which monitors the agent's participation to one of the six considered economic sectors. With regard to the cultural sphere, I consider the "education" variable that controls the different level of education of respondents.
All control variables that I include in the model are exogenous: they do not depend on either the independent variable (salary), or on the main regressor (unemployment rate). This allows to be certain that there should not be endogeneity problems within the model. The only variable that could be endogenous is "education", since the education level of an individual could depend on the local unemployment rate: in those areas of the country where the unemployment rate is high, the level of education tends to be higher, given that young people prefer to delay the access into the labor market (considered the high probability of unemployment). Therefore they prefer to continue studying and achieve higher qualifications. Hence, I will check the correlation between unemployment and education level to avoid including an endogenous variable in the econometric model.
As one of the main goals of this work is to try to understand the differences among the different professional categories in terms of elasticity between wages and unemployment rate, I will estimate the equation (1) several times:

- For the different generic type of profession: all employed workers versus all self-employed workers;
- For the four main professional categories: blue-collars, white collars, self-employed and entrepreneurs;
- Within the white collars category: employees versus executives.

Hence, I will refer to eight different datasets to implement our final analysis and I will produce different tables to clearly compare the final results.

5 Empirical results

This section is dedicated to the description of the results obtained by the estimation of the wage curve equation for the different occupational categories identified by the Bank of Italy in the Survey on Household by Income and Wealth. Professional groups are organized in order to compare first all the employees with all the self-employed. Second, it follows a comparison between some more specific categories: in particular I will compare blue-collars with white-collars, self-employed and entrepreneurs. Finally, within the category of white collar, employees (and teachers) and managers will be distinguished. The final goal is to understand how different is the elasticity of wages with respect to the rate of unemployment among those professional (group of) categories. Preliminarily, the correlation matrix of the variables used in the model is analyzed. I obtain eight correlation matrices, as many as the considered professional groups. Each matrix is composed of the Pearson index expressing the ratio of the covariance of the corresponding variables and the product of their standard deviations.
The correlation matrix (Tab. 3) is useful to provide a first insight on the empirical relationship between the main variables of the model (wages and unemployment rate). First, let me analyze the correlation coefficient between the ln of wages and the ln of the unemployment rate. The correlation coefficient is negative for all occupational categories analyzed. Hence, according to this first analysis the direction of the relation seems unique (and negative). In particular, the correlation coefficient is ranged from -0.005445 of the employees to -0.12 of the executives. However, most of the results is around -0.08: all employed workers (-0.074), entrepreneurs (-0.086), and blue-collar workers (-0.089). Moreover, for all the employees, on average, the relationship between wages and unemployment rate appears to be less strong (-0.074) compared to that of all the self-employed (-0.103).
Let me consider the OLS panel regression results. For each professional (group of) category, we estimated several equations. The equation (A) is the full version of the model:

$$lnw_{irt} = \alpha + \beta lnu_{rt} + \gamma lnw_{irt-1} + \delta X_{irt} + \phi_r + \varepsilon_{irt}. \qquad \text{(A)}$$

In (A) the individual wage is dependent on the unemployment rate over the same period, on the lagged wage variable, on the set of control variables and on the regional fixed-effects. The equations (B), (C), (D) are shorter versions of equation (A). In each of them only a single control variable is not considered. The reason

of this choice is to understand the effect of the different control variables on the elasticity of each estimated coefficient β. In particular, in (B) we control for the age of individuals, in (C) we control for the economic sector, in (D) we control for the level of education attained and, eventually, in (E) we control for individual gender. Finally, we consider the basic version of the equation of the model, noted as (F): in (F) the natural logarithm of individual wages is directly dependent on the unemployment rate over the same period and on the lagged wage variable. All the following results are reported in Tab. 4.

In order to describe the results, I first compare the elasticities of all the employees and all the self-employed. The obtained elasticities are all negative and statistically significant. This implies that an increase in the local unemployment rate is correlated with an individual local wage decrease, both in the case of all the employees and all the self-employed. However, the intensity of the relationships is different. Indeed, in the case of all the employees the value of β is always close to - 10%: however, with an (F)-type equation the elasticity is equal to -0.02427, while including in the model all the socio-economic controls, the elasticity is equal to -0.0880. In addition, all estimates of the elasticity with individual controls oscillate between -12% and -9%, with the exception of the gender control. Therefore, the -8.8% result is sufficiently robust for all the employees. Conversely, the case of all the self-employed workers is quite different. Considering equation (F) and (E) the elasticity is positive (about +24%). This result is not robust with respect to the inclusion of the age (-23%), sector (-17%) and education (-11%) as control variables.

However, the elasticity obtained by the complete equation (A) - as well as that obtained with the remaining control variables - is much smaller. In particular, in the case of (A) it is equal to -0.0616. If this result is the most relevant for comparison between professional categories, as I sustain in this work, then the difference of elasticity between wages and the unemployment rate among the category of all the self-employed and all the employees is quite relevant. In particular, all the employee workers have (in absolute value) a larger elasticity between wages and the unemployment rate, with respect to all the self-employed workers. However, the incomplete robustness results for both categories may leave some doubts about this final interpretation.

I now include in the estimate a dummy variable that allows to isolate the period after the reform of the labor market, which occurred in 1993 (D_{1993}). In this case, with regard to all the employees, the elasticity is not significant for the complete (A) model, while for the other formulations of the equation, it is quite low (never exceeding 3%, with the exception of the (F)-type equation when it is approximately equal to -1%). With respect to all the self-employed, the elasticities are all significant, again with the exception of the (A) and (D) models. In the other cases, the elasticity, although high, is lower than that obtained for the whole period

(1977-2008). Since the overall results are not significant, I cannot draw any conclusion on the post-reform wage curve in comparison between all the employees and all the self-employees. Nevertheless, I may conclude that, for both employed and self-employed, since 1993 and onwards, the elasticity between wages and unemployment was relatively low: the flexibility of the labor market that I expected actually did not seem to be occurred for none of professional categories.

Let me now turn to a more analytical comparison among the different professional categories. First of all, the majority of the results are negative and statistically significant, confirming the hypothesis of the existence of a wage curve for the principal labor markets. However, there is great variability in the intensity of the elasticity and in the strength and significance of the results. Blue-collar workers, for example, show a relatively robust elasticity, as it oscillates around the 10%, with exception of the (F) and (E) versions of the model, which are over the 20%. In any case, when I include the whole set of control variables the β of equation of the full model (A) is lower, as it is equal to -5.1%. The behavior of the β coefficient for white-collars is not dissimilar to blue-collars' one: if the equation of (F)-type of the model provides an elasticity equal to -21%, the elasticity of the complete model (A) is relatively higher in absolute terms (-10%). This value is also the first to be perfectly in line with the results obtained by Blanchflower and Oswald in 1994. Moreover, this result is quite robust, since white-collars' β coefficient ranges only between -9% and -12%, with the exception of the simplified (F) and gender controlled (E) versions of the model. By contrast, the results for the self-employed and free-lancers are quite different. In this case, the intensity of the elasticity is much greater: although there is a considerable variance of the β values in the partially constrained equations, the value of elasticity is ranged between -19% and -28%. The elasticity obtained in the equation of (F)-type (-13.8%) is not statistically significant. The last analyzed category is the one of the entrepreneurs. In this case, due to a relatively small number of respondents and the higher probability of an incorrect compilation of surveys for fiscal reasons, some β are not significant. Moreover, the coefficients are not easily interpretable, because of the inconsistence of the arithmetic sign among the different models. In particular the coefficient of the full version of the model is not only non-robust with respect to the elasticity of the partially constrained models, but is statistically significant just at a 10% level and it is equal to -2.7%. To sum up, among the white-collars and, especially, the blue-collars labor markets, there is a low flexibility between wages and unemployment rate, compared to the self-employed and freelancers market situation, even though in these last cases, the empirical results show some problems of consistency, robustness and significance of the estimation.

I check now the same results for the period after 1993. Blue-collars show an elasticity which is comparable to the one obtained for the whole period: it oscillates around the -11% and, in the full (A) version of the model it is slightly lower than

the -5% that we obtained for the whole period. In the case of white-collars, the obtained coefficients, although statistically significant, are all positive, meaning that we are not able to find a post-reform wage curve for this professional category. Concerning the self-employed and freelancers, elasticity, where statistically significant, is negative and has a lower value than the corresponding elasticity for the total period. Hence, I am not able to get a meaningful comparison between the post-1993 and total results, with respect to the entrepreneurs' category.
The final comparison is provided within the broader category of white-collars. In order to avoid that some differences in behavior, within the white-collars labor market, would not be clear from the previous analysis, we compare employees and teachers with executives. Both categories show statistically significant, negative and robust β coefficients. In particular, in the case of employees and teachers, we found an elasticity ranged between -7% and -11%, with the exception of the simplified version (F) and the gender controlled version (E) of the model. Precisely, the value obtained in the full (A) version of the model is equal to -10% and is consistent both with the other controlled versions of the model and with Blanchflower and Oswald's hypothesis on elasticity. Instead, executives have a higher β coefficient. The result of the elasticity is even more robust in this case: the value obtained from the (F)-type equation and the one obtained from the (A)-type equation are very similar (approximately -20%). Concerning the analysis on the post-reform period, it is clear that employees and teachers show a positive and statistically significant elasticity between wages and unemployment rate: this result would give a hint against the resurrection of the wage curves after 1993, because of the reforms on the Italian labor market. Anyhow, nothing can be concluded about executives because, due to an insufficient number of observations, the results are not statistically significant.
The analysis so far has not taken into account the presence of spatial and individual fixed effects. In fact, in the original analysis of the wage curves (Blanchflower and Oswald (1995)), not significant results were found, including fixed effects in the panel model. I will now discuss the differences in terms of elasticity between two models, including and not-including fixed effects. Hence, repeating the analysis, the results obtained in some cases do not differ from those obtained without the presence of fixed effects in the model, while in others the significance of the results, or even their arithmetic sign, changes. In the case of blue-collars the value of the elasticity, in the (A) version of the model, increases in absolute value (from -5% to -7%), while the value in the version (F) is almost unchanged. The case of the employees and teachers is different: the β coefficient of the (F)-type equation increases in absolute value (from -21% to -24%) and the value in the (A)-version increases from -10% to-14%. The executives' situation is similar to the employees' one: both considered values (F and A) increase in absolute terms (respectively, from -20% to -33% and from -10% to -14%). Finally, concerning the categories

of self-employed and entrepreneurs, the results are often not significant or such that, by including fixed-effects, the arithmetic sign of the coefficient turns from negative to positive. I explain this unexpected result with the presence of a low number of observations for these professional categories. As argued in the previous section, in fact, there is the risk that given the high number of control variables, standard errors would be underestimated and, therefore, I could be led to reject a null hypothesis that, otherwise, I would have been accepted.

6 Conclusive remarks

This work was started with the goal of understanding whether a wage curve, a negative structural relationship between the local unemployment rate and the level of individual wages, exists for different professional categories in Italy. In particular, the analysis was realized on the longer period over which a consistent dataset was available (from 1977 to 2008), on five geographic areas (North-West, North-East, Centre, South and Islands). If an aggregate wage curve for Italy has been found by several authors, especially for the period after 1993, we did not have specific information on the different professional category labor markets. Hence, we did not know if, for different professional categories, there was a different response on wages to the change in the unemployment rate. A second goal of this analysis, which follows directly from the first, is to understand, once we have shown the existence and the consistency of professional wage curves, what is the intensity of the relationship between the local unemployment rate and the individual wages; in other words, since the model is built as logarithmic equation, which professional labor market has an elasticity coefficient greater than the others.

Through the construction of an econometric model, in line with the original realized by Blanchflower and Oswald (1995), but corrected on the basis of country specific characteristics, the obtained results are various and not always concordant. First of all, a wage curve was not found for all the profession categories. In particular, for the entrepreneurs' category it does not seem to exist a significant negative relationship between unemployment and wages. However, this result is not surprising: entrepreneurs and, more generally, all the self-employed workers have to declare "spontaneously" their own level of pay, while the employees are "obliged" to do that by the National authorities through their employers. Therefore, the possibility of obtaining false results because of tax evasion is higher for this kind of categories. In addition, the lowest number of observations made the result not statistically significant.

Nevertheless, concerning all the employees' category, more significant results were obtained. First, for both blue-collars and white collars a consistent and significant wage curve exists. Despite the differences in elasticity between the results of the

different estimation models I used (with and without controls), the relationship is always negative. The inclusion of regional fixed-effects in the estimation actually had an effect on the values of the estimated coefficients, but usually not in the ratios between the coefficients of the different professional categories. Moreover, nothing can be said about a possible "resurrection" of the wage curves after 1993: as the observations were considered up to 2008 and only for 10 years, the coefficients are often not significant results. A wage curve exists for both the white collars sub-categories: employees and executives. If we turn to analyze the intensity of the relationship among the professional categories for which there a wage curve exists, we obtain some interesting results. The blue-collars category shows the least elasticity in absolute value (-5%). For employees, conversely, the Blanchflower and Oswald's hypothesis is confirmed, with a -10% elasticity, while for executives the elasticity is even larger (-20%). These results, in addition to providing an accurate report of the response of the individual wage of each of the categories with respect to changes in the local rate of unemployment, gives a strong indication of the level of efficiency and flexibility of the labor markets of reference. Indeed, the existence of a market similar to that of the executives, where there is a strong relationship between the level of unemployment and wages, implies the possibility for the unemployed agents to implement a competitive pressure on the workers, who will have to accept a lower wage to avoid losing their jobs and being replaced. The wage "equilibrium" should be as low as possible; it should be equal to the marginal productivity. Therefore, the "internal-external" competition could significantly reduce market imperfections. Conversely, in a market which is similar to that of the blue-collars, this phenomenon does not occur: there may be an external pressure of the unemployed agents, but the individual wages of the workers are not responsive and blue-collars may, within the limits of their contract, not suffer wage cuts, even though the excess of labor supply would naturally lead to a substantial reduction of wages "in equilibrium".

However, these results should be evaluated also considering the different contract of the professional categories. Indeed, it is likely that in many cases the executives sign short-term contracts with their employers: therefore, in this case the employers have a greater chance to ask, in any circumstance, similar work performance to those unemployed agents who are willing to work at a lower salary and equal productivity. For blue-collars and employees (especially in PA), since there is a collective bargaining system, this type of contractual relationship is not possible in many cases. In this sense, a future study should take into account and control for the different categories of contract in the estimation of the wage curves. In case of future analysis, another precaution that should be taken is the use of regional or provincial unemployment rates which are currently not available for Italy. This will allow to obtain highly statistically significant results, because of the increase in the number of available observations, and to realize some geographical analyses,

taking into account the area specific macro-economic characteristics of the Italian regions.

Tab. 1 - Descriptive statistics by professional category.

Descriptive statistics - Blue collars					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
wage	51347	12282.46	7415.695	20	90000
unemployment rate	51347	9.314906	4.708334	3	22.7

Descriptive statistics -Employees and Teachers					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
wage	46007	17168.19	9267.357	33	300000
unemployment rate	46007	9.707166	5.070505	3	22.7

Descriptive statistics -Executives					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
wage	2581	36830.27	23635.04	192	200000
unemployment rate	2581	9.109764	5.070505	3	22.7

Descriptive statistics -Self-employed and Freelancers					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
wage	5267	28841.94	29210.12	60	550000
unemployment rate	5267	9.595652	5.1132	3	22.7

Descriptive statistics -Entrepreneurs					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
wage	17183	18882.85	25404.98	1	1000000
unemployment rate	17183	10.28479	5.171535	3	22.7

Source: our elaboration on Bank of Italy and ISTAT data. [1]

[1] The professional categories' unemployment rates have to be considered as macro variables: they are built as the ration of the total unemployment rate and the number of interviewed people belonging to each professional category.

Tab. 2 - Absolute and percent frequency of control variables, by professional category.

2.1 - Blue collars

Group	Blue collars		
Variable		Absolute Freq	Percent Freq
Gender	F	35633	30.6
	M	15714	69.4
	Total	51347	100
Education	None	2234	4.35
	Primary school	15878	30.92
	Lower secondary school	24735	48.17
	High secondary school	8190	15.95
	University	302	0.59
	Post-lauream	8	0.02
	Total	51347	100
Sector	Agriculture	3728	7.26
	Industy and constructions	26894	52.38
	Trade, hotels and restaurants	6989	13.61
	Transports and comunications	2795	5.44
	Financial intermediation	93	0.18
	Public Administration	10848	21.13
	Total	51347	100
Age	Up to 30	16722	32.57
	31-40	12365	24.08
	41-50	13064	25.44
	51-65	9021	17.57
	Over 65	175	0.34
	Total	51347	100
Area	North-West	13365	23.03
	North-East	11199	21.81
	Centre	11323	22.05
	South	10928	21.28
	Islands	4532	8.83
	Total	51347	100

Source: our elaboration on Bank of Italy data.

2.2 - Employees and Teachers

Group	Employees and Teachers		
	Variable	Absolute Freq	Percent Freq
Gender	F	21930	47.67
	M	24077	52.33
	Total	45992	100
Education	None	94	0.2
	Primary school	1336	2.9
	Lower secondary school	8816	19.16
	High secondary school	27219	59.16
	University	8394	18.25
	Post-lauream	148	0.32
	Total	45992	100
Sector	Agriculture	355	0.77
	Industy and constructions	8154	17.73
	Trade, hotels and restaurants	4030	8.76
	Transports and comunications	2895	6.29
	Financial intermediation	2943	6.4
	Public Administration	27615	60.04
	Total	45992	100
Age	Up to 30	11578	25.17
	31-40	14059	30.56
	41-50	12473	27.11
	51-65	7773	16.9
	Over 65	124	0.27
	Total	46007	100
Area	North-West	12530	27.23
	North-East	9115	19.81
	Centre	9955	21.64
	South	9714	21.11
	Islands	4693	10.2
	Total	46007	100

Source: our elaboration on Bank of Italy data.

2.3 - Executives

Group	Executives		
Variable		Absolute Freq	Percent Freq
Gender	F	357	13.83
	M	2224	86.17
	Total	2581	100
Education	None	6	0.23
	Primary school	20	0.77
	Lower secondary school	86	3.33
	High secondary school	880	34.1
	University	1513	58.62
	Post-lauream	76	2.94
	Total	2581	100
Sector	Agriculture	31	1.2
	Industy and constructions	679	26.33
	Trade, hotels and restaurants	140	5.43
	Transports and comunications	135	5.23
	Financial intermediation	239	9.27
	Public Administration	1355	52.54
	Total	2581	100
Age	Up to 30	109	4.22
	31-40	498	19.29
	41-50	954	36.96
	51-65	987	38.24
	Over 65	33	1.28
	Total	2581	100
Area	North-West	836	33.4
	North-East	483	18.71
	Centre	589	22.82
	South	408	15.81
	Islands	238	9.22
	Total	2581	100

Source: our elaboration on Bank of Italy data.

2.4 - Self-employed workers and freelancers

Group	Self-employed and freelancers		
Variable		Absolute Freq	Percent Freq
Gender	F	1176	22.33
	M	4091	77.67
	Total	5267	100
Education	None	25	0.47
	Primary school	162	3.08
	Lower secondary school	466	8.85
	High secondary school	2104	39.95
	University	2369	44.98
	Post-lauream	141	2.68
	Total	5267	100
Sector	Agriculture	62	1.18
	Industy and constructions	880	16.73
	Trade, hotels and restaurants	695	13.21
	Transports and comunications	63	1.2
	Financial intermediation	355	6.75
	Public Administration	3206	60.94
	Total	5261	100
Age	Up to 30	964	18.3
	31-40	1655	31.42
	41-50	1297	24.63
	51-65	1201	22.8
	Over 65	150	2.85
	Total	5267	100
Area	North-West	1439	27.32
	North-East	1021	19.38
	Centre	1266	24.04
	South	1065	20.22
	Islands	476	9.04
	Total	5267	100

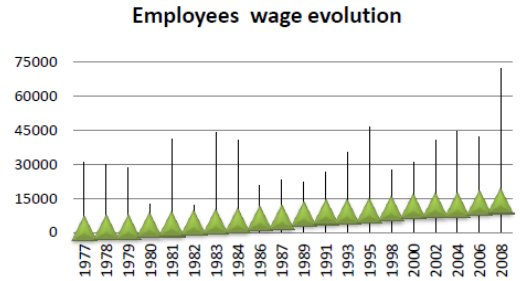
Source: our elaboration on Bank of Italy data.

2.5 - Entrepreneurs

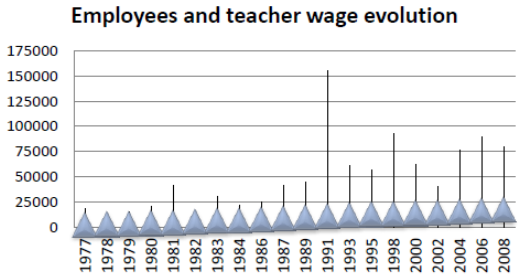
Group	Entrepreneurs		
Variable		Absolute Freq	Percent Freq
Gender	F	13140	76.47
	M	4043	23.53
	Total	17183	100
Education	None	919	5.35
	Primary school	5850	34.05
	Lower secondary school	5854	34.07
	High secondary school	4.005	23.31
	University	538	3.13
	Post-lauream	17	0.1
	Total	17183	100
Sector	Agriculture	2726	15.87
	Industy and constructions	4394	25.29
	Trade, hotels and restaurants	6582	38.33
	Transports and comunications	715	4.16
	Financial intermediation	145	0.84
	Public Administration	2612	15.21
	Total	17174	100
Age	Up to 30	2342	13.63
	31-40	4007	23.32
	41-50	4910	28.57
	51-65	5207	30.3
	Over 65	717	4.17
	Total	17183	100
Area	North-West	3613	21.03
	North-East	3373	19.63
	Centre	3635	21.15
	South	4458	25.94
	Islands	2104	1224
	Total	17183	100

Source: our elaboration on Bank of Italy data.

Fig. 1 - Wage evolution, by professional categories [2]



1.A.



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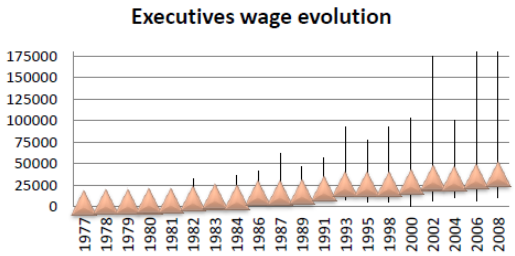

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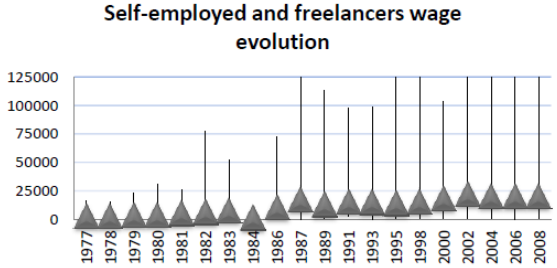

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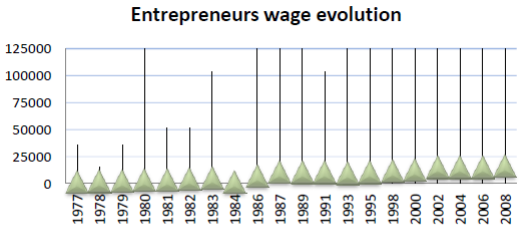
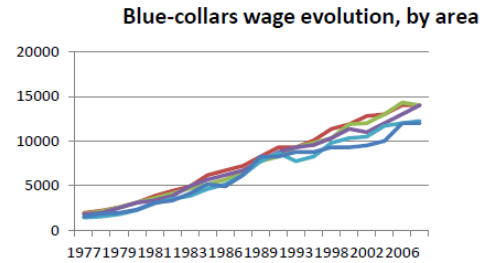


1.E

[2] Fig. 1 describes the evolution of wages of five professional categories: blue-collars (1.A.), employees (1.B.), executives (1.C.), self-employed (1.D.) and entrepreneurs (1.E.). The vertical axis indicates the level of wages expressed in Euros, the horizontal axis indicates the involved years. The triangles indicate the median of individual wages and the vertical line connects the maximum and minimum value of wages. Source: Bank of Italy

Fig. 2 - Wage evolution, by professional category and by area. [3]



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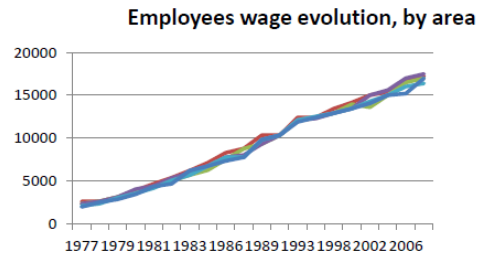
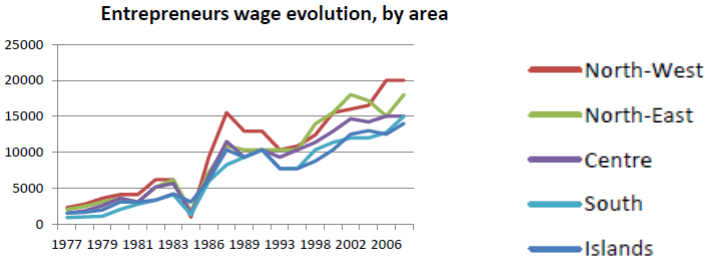


2.B

2.C

2.D



2.E

[3] Fig. 2 describes the evolution of wages of five professional categories: blue-collars (2.A.), employees (2.B.), executives (2.C.), self-employed (2.D.) and entrepreneurs (2.E.). The vertical axis indicates the level of wages expressed in Euros, the horizontal axis indicates the involved years. The different colors indicate the five different Italian macro-areas. Source: Bank of Italy

Fig. 3 - Wage evolution, by professional category and by area. [4]

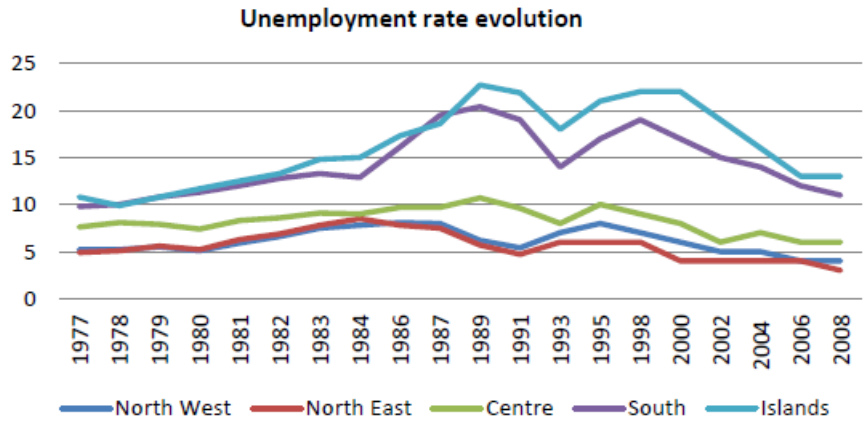
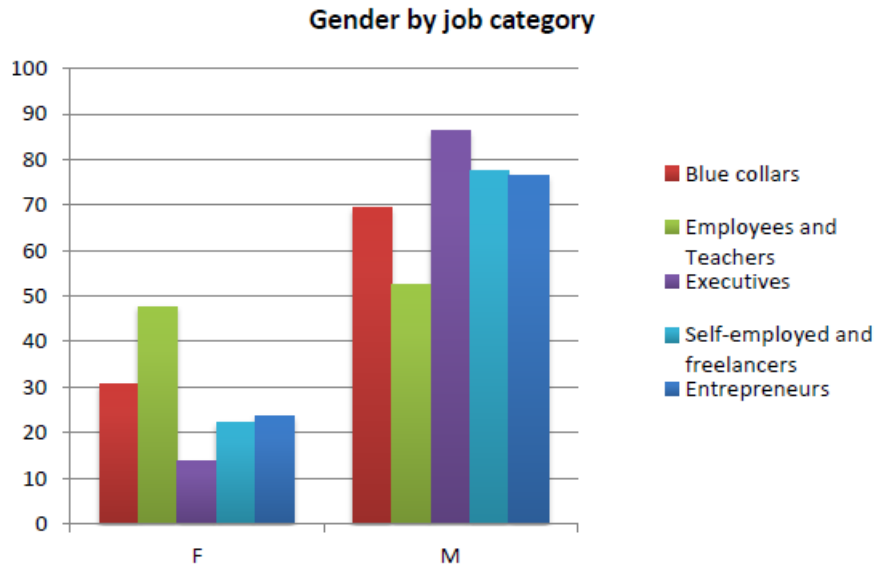


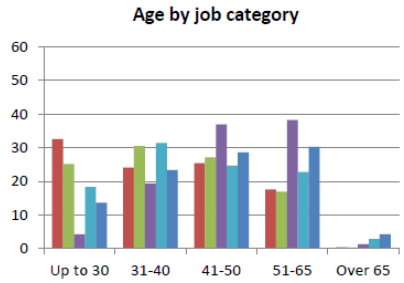
Fig. 4 -Control variables, by job category. [5]



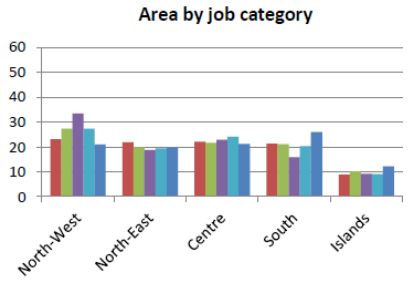
4.A

[4] Source: ISTAT

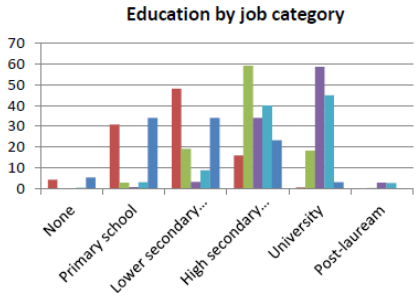
[5] Fig. 4 describes the distribution of professional categories by gender (4.A.), age (4.B.), geographical are (4.C.), education (4.D.) and economic sector (4.E.). The vertical axis indicates the shares of professional categories belonging to a variable modality, the horizontal axis indicates the modalities.


Age by job category
60
50
40
30
20
10
0
Up to 30
31-40
41-50
51-65
Over 65

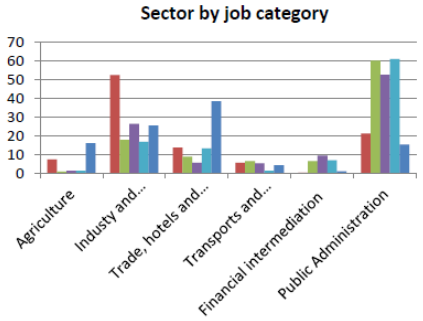
4.B


Area by job category
60
50
40
30
20
10
0
North-West
North-East
Centre
South
Islands

4.C


Education by job category
70
60
50
40
30
20
10
0
None
Primary school
Lower secondary...
High secondary...
University
Post-lauream

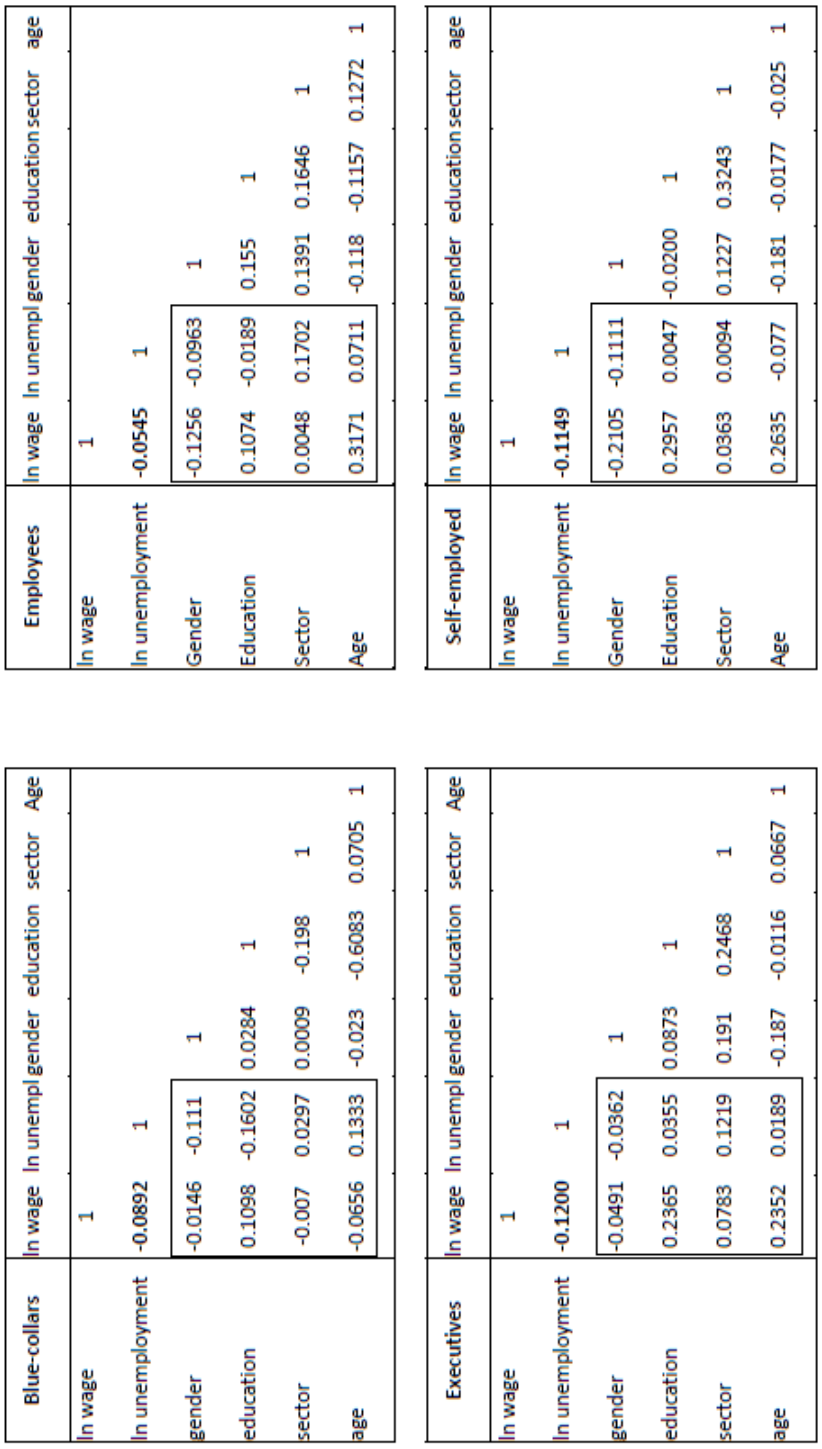
4.D


Sector by job category
70
60
50
40
30
20
10
0
Agriculture
Industy and...
Trade, hotels and...
Transports and...
Financial intermediation
Public Administration

4.E


Blue collars
Employees and Teachers
Executives
Self-employed and freelancers
Entrepreneurs

Tab. 3 - Correlation matrix by professional category. (1/2) [6]



Employees	ln wage	ln unempl	gender	education	sector	age
ln wage	1					
ln unemployment	-0.0545	1				
Gender	-0.1256	-0.0963	1			
Education	0.1074	-0.0189	0.155	1		
Sector	0.0048	0.1702	0.1391	0.1646	1	
Age	0.3171	0.0711	-0.118	-0.1157	0.1272	1

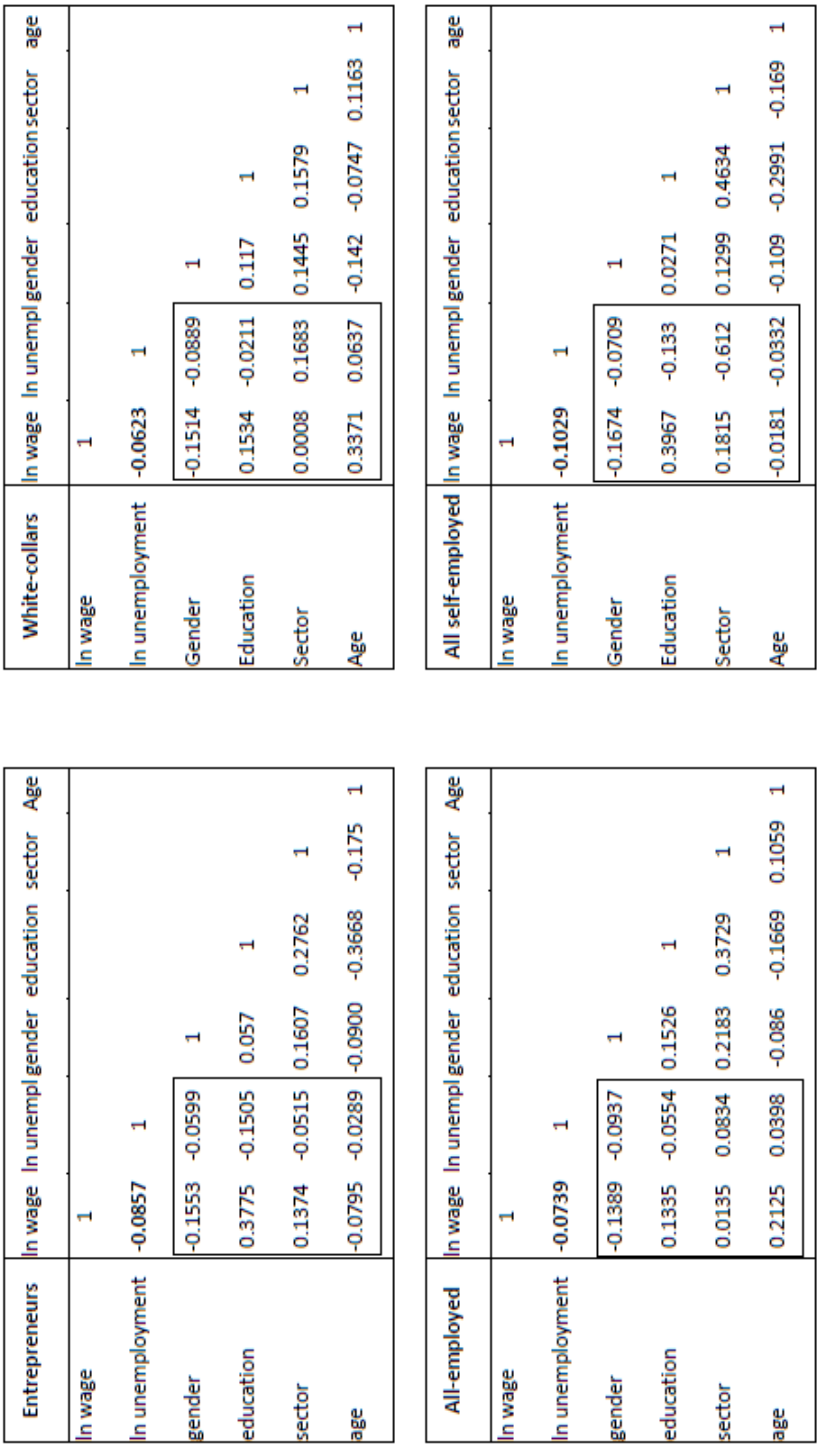
Self-employed	ln wage	ln unempl	gender	education	sector	age
ln wage	1					
ln unemployment	-0.1149	1				
Gender	-0.2105	-0.1111	1			
Education	0.2957	0.0047	-0.0200	1		
Sector	0.0363	0.0094	0.1227	0.3243	1	
Age	0.2635	-0.077	-0.181	-0.0177	-0.025	1

Blue-collars	ln wage	ln unempl	gender	education	sector	Age
ln wage	1					
ln unemployment	-0.0892	1				
gender	-0.0146	-0.111	1			
education	0.1098	-0.1602	0.0284	1		
sector	-0.007	0.0297	0.0009	-0.198	1	
age	-0.0656	0.1333	-0.023	-0.6083	0.0705	1

Executives	ln wage	ln unempl	gender	education	sector	Age
ln wage	1					
ln unemployment	-0.1200	1				
gender	-0.0491	-0.0362	1			
education	0.2365	0.0355	0.0873	1		
sector	0.0783	0.1219	0.191	0.2468	1	
age	0.2352	0.0189	-0.187	-0.0116	0.0667	1

[6] The elements of the matrix are Pearson correlation indexes, ranging from -1 to+ 1.

Tab. 3 - Correlation matrix by professional category. (2/2) [7]



Entrepreneurs	ln wage	ln unempl	gender	education	sector	Age
ln wage	1					
ln unemployment	-0.0857	1				
gender	-0.1553	-0.0599	1			
education	0.3775	-0.1505	0.057	1		
sector	0.1374	-0.0515	0.1607	0.2762	1	
age	-0.0795	-0.0289	-0.0900	-0.3668	-0.175	1

All-employed	ln wage	ln unempl	gender	education	sector	Age
ln wage	1					
ln unemployment	-0.0739	1				
gender	-0.1389	-0.0937	1			
education	0.1335	-0.0554	0.1526	1		
sector	0.0135	0.0834	0.2183	0.3729	1	
age	0.2125	0.0398	-0.086	-0.1669	0.1059	1

White-collars	ln wage	ln unempl	gender	education	sector	age
ln wage	1					
ln unemployment	-0.0623	1				
Gender	-0.1514	-0.0889	1			
Education	0.1534	-0.0211	0.117	1		
Sector	0.0008	0.1683	0.1445	0.1579	1	
Age	0.3371	0.0637	-0.142	-0.0747	0.1163	1

All self-employed	ln wage	ln unempl	gender	education	sector	age
ln wage	1					
ln unemployment	-0.1029	1				
Gender	-0.1674	-0.0709	1			
Education	0.3967	-0.133	0.0271	1		
Sector	0.1815	-0.612	0.1299	0.4634	1	
Age	-0.0181	-0.0332	-0.109	-0.2991	-0.169	1

[7] The elements of the matrix are Pearson correlation indexes, ranging from -1 to+ 1.

Tab. 4 - OLS panel regression, by professional category.

The following tables report the results of an OLS estimate on a panel of annual observations for the 5 macro-Italian areas (North-West, North-East, Centre, South and Islands) during the period 1977-2008. The dependent variable is the natural logarithm of individual net wages at time t. The ln unemployment rate variable is the natural logarithm of regional unemployment rate at time t. Data sources are the ISTAT for the rate of unemployment and the Bank of Italy for the individual wages. The standard error is included, beneath the estimate coefficients. $*$, $**$ and $***$ describe the rejection of the null that the coefficient is equal to zero at a significance level of 10%, 5% and 1%.

4.1 - All employed workers

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.2427** ***	**0.1769** ***	**-0.12069** ***	**-0.0279** ***	**-0.0998** ***	0.0010
S.E.	0.00973	0.009714	0.004540	0.004337	0.00471	0.00446
Costant	9.6109 ***	4.974881 ***	9.46435 ***	9.04778 ***	9.3095 ***	8.8943 ***
S.E.	0.05989	0.026786	0.01045	0.010454	0.01038	0.01024
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.1065** ***	**-0.0152** ***	**-0.2581** ***	**-0.0331** ***	**-0.0880** ***	-0.0052
S.E.	0.00465	0.004427	0.0096	0.0044	0.0045	0.0043
Costant	9.2738 ***	8.8837 ***	9.7252 ***	9.0217 ***	9.4916 ***	9.0885 ***
S.E.	0.01050	0.01037	0.0716	0.0102	0.0107	.01077
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.2 - All employed workers (Fixed-Effects)

Equation	(F)			(B)			(C)		
Variable	Total		After 1993	Total		After 1993	Total		After 1993
ln unemployment t	-0.2438	***	0.1793 ***	-0.2121	***	0.1843 ***	-0.2480	***	0.1778 ***
S.E.	0.00976		0.00976	0.00950		0.00953	0.0097		0.0097
Costant	9.58831	***	8.4717 ***	9.6613	***	8.5900 ***	9.6288	***	8.5094 ***
S.E.	0.02091		0.022158	0.02052		0.02129	0.02095		0.0215
Post-1993 dummy	No		Yes	No		Yes	No		Yes
Age dummies	No		No	Yes		Yes	No		No
Sector dummies	No		No	No		No	Yes		Yes
Education dummies	No		No	No		No	No		No
Gender dummy (Female)	No		No	No		No	No		No

Equation	(D)			(E)			(A)		
Variable	Total		After 1993	Total		After 1993	Total		After 1993
ln unemployment t	-0.2434	***	0.11645 ***	-0.2588	***	0.1742 ***	-0.1910	***	0.1694 ***
S.E.	0.0976		0.0097	0.0097		0.0096	0.0094		0.0094
Costant	9.5701	***	8.4954 ***	9.7028	***	8.5713 ***	9.7200	***	8.7154 ***
S.E.	0.0211		0.0218	0.0208		0.0213	0.0205		0.0214
Post-1993 dummy	No		Yes	No		Yes	No		Yes
Age dummies	No		No	No		No	Yes		Yes
Sector dummies	No		No	No		No	Yes		Yes
Education dummies	Yes		Yes	No		No	Yes		Yes
Gender dummy (Female)	No		No	Yes		Yes	No		No

4.3 - All self-employed workers

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	**0.4323** ***	**0.2330** ***	**-0.2337** ***	**-0.0796** ***	**-0.1658** ***	**-0.0347** **
S.E.	0.0311	0.01966	0.0146	0.0139	0.0144	0.0138
Costant	8.0058 ***	8.1346 ***	9.6433 ***	8.9891 ***	9.4408 ***	8.8399 ***
S.E.	0.0949	0.0463	0.0347	0.0345	0.0339	0.0338
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	**-0.1059** ***	-0.0107	**0.4092** ***	**0.2621** ***	**-0.0616** ***	0.0162
S.E.	0.0138	0.0134	0.03082	0.0201	0.0133	0.0130
Costant	9.2807 ***	8.8171 ***	8.1620 ***	8.1760 ***	9.4603 ***	9.0080 ***
S.E.	0.0327	0.0329	0.1031	0.0477	0.0334	0.0344
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.4 - All self-employed workers (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**0.4730** ***	**1.1168** ***	**0.4695** ***	**1.0980** ***	**0.4403** ***	**1.0305** ***
S.E.	0.0318	0.0304	0.0311	0.02986	0.0307	0.0297
Costant	7.9319 ***	6.1582 ***	8.1085 ***	6.3560 ***	8.2639 ***	6.4787 ***
S.E.	0.0701	0.06876	0.0693	0.0682	0.0678	0.0674
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**0.4908** ***	**0.9952** ***	**0.4377** ***	**1.0906** ***	**0.5485** ***	**0.9943** ***
S.E.	0.0293	0.0289	0.0314	0.0297	0.0281	0.02786
Costant	7.9638 ***	6.5398 ***	8.1161 ***	6.3262 ***	8.1433 ***	6.8272 ***
S.E.	0.0655	0.0667	0.0693	0.0674	0.0631	0.0647
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.5 - Blue-collars

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	-0.2850 ***	-0.2755 ***	-0.1314 ***	-0.1254 ***	-0.0809 ***	-0.0803 ***
S.E.	0.0126	0.0126	0.0064	0.0064	0.0064	0.0063
Costant	9.9032 ***	9.6333 ***	9.3802 ***	9.3509 ***	9.4012 ***	9.3950 ***
S.E.	0.1206	0.0789	0.0148	0.0148	0.0793	0.0792
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	-0.1116 ***	-0.1025 ***	-0.2331 ***	-0.2337 ***	-0.0511 ***	-0.04870 ***
S.E.	0.0065	0.0065	0.0063	0.0063	0.0064	0.0064
Costant	9.3710 ***	9.3357 ***	9.1043 ***	9.0900 ***	9.0303 ***	8.9955 ***
S.E.	.0151	0.0152	0.1178	0.0659	0.3809	0.3807
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.6 - Blue-collars (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	-0.2854 ***	-0.2765 ***	-0.2725 ***	-0.2578 ***	-0.0778 ***	-0.0781 ***
S.E.	0.0126	0.0126	0.0125	0.0125	0.0130	0.0130
Costant	9.6382 ***	9.6066 ***	9.6888 ***	9.6457 ***	8.9136 ***	8.9031 ***
S.E.	.0269	0.0270	0.0270	0.0271	0.0295	0.0296
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	-0.2851 ***	-0.2744 ***	-0.2308 ***	-0.2338 ***	-0.0756 ***	-0.0748 ***
S.E.	0.0125	0.0126	0.0063	0.0063	0.0129	0.0129
Costant	9.7393 ***	9.7071 ***	9.1057 ***	9.091 ***	8.5876 ***	8.5681 ***
S.E.	0.0469	0.0273	0.0035	0.0366	0.3531	0.3530
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.7 - White-collars

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.2117** ***	**0.3974** ***	**-0.1275** ***	**0.0157** ***	**-0.0917** ***	**0.0689** ***
S.E.	0.0135	0.0128	0.0063	0.0056	0.0068	0.0060
Costant	9.5740 ***	7.8841 ***	9.6390 ***	8.9775 ***	9.3414 ***	8.7155 ***
S.E.	0.0342	0.0343	0.0147	0.0139	0.0157	0.0144
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.0914** ***	**0.0542** ***	**-0.2458** ***	**0.2610** ***	**-0.1007** ***	**0.0402** ***
S.E.	0.0067	0.0059	0.0137	0.0106	0.0062	0.0056
Costant	9.1800 ***	8.6225 ***	9.7570 ***	8.3237 ***	9.4898 ***	8.9371 ***
S.E.	0.0163	0.0148	0.0367	0.0258	0.0165	0.0152
Post-1993 dummy	No	Yes	No	355495	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.8 - White-collars (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment$_t$	-0.2413 ***	0.4547 ***	-0.1741 ***	0.4519 ***	-0.2422 ***	0.4544 ***
S.E.	0.0146	0.0136	0.0136	0.0127	0.0146	0.0135
Costant	9.6235 ***	7.7961 ***	9.7091 ***	8.0678 ***	9.6681 ***	7.8468 ***
S.E.	0.0315	0.0304	0.0297	0.0289	0.0322	0.0307
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment$_t$	-0.2230 ***	0.4554 ***	-0.2667 ***	0.4436 ***	-0.1430 ***	0.4574 ***
S.E.	0.0145	0.0135	0.0145	0.0133	0.0133	0.0125
Costant	9.4621 ***	7.732 ***	9.7859 ***	7.946 ***	9.5783 ***	7.9961 ***
S.E.	0.0321	0.0306	0.0315	0.0297	0.0306	0.0292
Post-1993 dummy	No	Yes	No	355495	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.9 - Employees and teachers

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.2037** ***	**0.3920** ***	**-0.1144** ***	**0.0294** ***	**-0.0792** ***	**0.0784** ***
S.E.	0.0135	0.0126	0.0063	0.0056	0.0068	0.0060
Costant	9.5190 ***	7.8637 ***	9.5373 ***	8.8978 ***	9.2679 ***	8.6442 ***
S.E.	0.0344	0.0332	0.0148	0.0140	0.0157	0.0143
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.0768** ***	**0.0685** ***	**-0.2323** ***	**0.2580** ***	**-0.1053** ***	**0.0330** ***
S.E.	0.0067	0.0059	0.0137	0.0104	0.0062	0.0056
Costant	9.1468 ***	8.5889 ***	9.6726 ***	8.2829 ***	9.3893 ***	8.8173 ***
S.E.	0.0163	0.0148	0.0368	0.0253	0.0162	0.01149
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.10 - Employees and teachers (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	**Total**	**After 1993**	**Total**	**After 1993**	**Total**	**After 1993**
ln unemployment $_t$	**-0.2332** ***	**0.4549** ***	**-0.1736** ***	**0.4486** ***	**-0.2350** ***	**0.4537** ***
S.E.	0.0146	0.0135	0.0137	0.0128	0.0146	0.0134
Costant	9.5682 ***	7.7600 ***	9.6631 ***	7.9687 ***	9.6068 ***	7.7984 ***
S.E.	0.0316	0.0302	0.0299	0.0289	0.0322	0.0306
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	**Total**	**After 1993**	**Total**	**After 1993**	**Total**	**After 1993**
ln unemployment $_t$	**-0.2197** ***	**0.4555** ***	**-0.2537** ***	**0.4457** ***	**-0.1472** ***	**0.4510** ***
S.E.	0.0146	0.0135	0.0145	0.0132	0.0136	0.0126
Costant	9.4541 ***	7.7293 ***	9.7029 ***	7.8905 ***	9.4772 ***	7.8898 ***
S.E.	0.0324	0.0306	0.0317	0.0297	0.0305	0.0292
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.11 - Executives

Equation	(F)				(B)				(C)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment $_t$	**-0.2059**	***	**-0.0710**	**	**-0.1955**	***	-0.0241		**-0.2014**	***	0.0025	
S.E.	0.0384		0.0337		0.0303		0.0258		0.0314		0.0267	
Costant	10.2282	***	9.2654	***	10.2450	***	9.5533	***	10.1413	***	9.4775	***
S.E.	0.0851		0.0782		0.0667		0.0594		0.0687		0.0603	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		Yes		Yes		No		No	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	No		No		No		No		No		No	
Gender dummy (Female)	No		No		No		No		No		No	

Equation	(D)				(E)				(A)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment $_t$	**-0.2011**	***	-0.0295		**-0.2283**	***	-0.0319		**-0.2031**	***	0.0110	
S.E.	0.0302		0.0258		0.0431		0.0303		0.0294		0.0253	
Costant	9.5701	***	9.0432	***	10.2954	***	9.3852	***	9.6127	***	9.1291	***
S.E.	0.0986		0.084		0.0980		0.0697		0.097		0.0827	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		No		No		Yes		Yes	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	Yes		Yes		No		No		Yes		Yes	
Gender dummy (Female)	No		No		Yes		Yes		No		No	

4.12 - Executives (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.3309** **	**0.4674** ***	**-0.2690** ***	**0.4854** ***	**-0.2798** ***	**0.4775** ***
S.E.	0.0647	0.0574	0.0628	0.0557	0.0650	0.0572
Costant	10.4868 ***	8.4233 ***	10.3974 ***	8.4472 ***	10.3040 ***	8.4258 ***
S.E.	0.1361	0.1252	0.1334	0.1224	0.1411	0.1268
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment $_t$	**-0.3064** ***	**0.4579** ***	**-0.3490** ***	**0.4500** ***	**-0.2250** ***	**0.4734** ***
S.E.	0.0627	0.0559	0.0649	0.0566	0.047505	0.0539
Costant	9.7913 ***	8.0091 ***	10.5423 ***	8.4890 ***	9.6541 ***	8.0810 ***
S.E.	0.1513	0.1343	0.1371	0.1237	0.1505	0.1313
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.13 - Self-employed

Equation	(F)		(B)		(C)	
Variable	**Total**	**After 1993**	**Total**	**After 1993**	**Total**	**After 1993**
ln unemployment t	-0.0597	0.4123	**-0.2120** ***	-0.0427	**-0.2418** ***	**-0.0666** **
S.E.	0.0617	0.0539	0.0286	0.0279	0.0300	0.027037
Costant	9.4699 ***	8.0635 ***	10.0577 ***	9.3623 ***	9.9626 ***	9.1973 ***
S.E.	0.1602	0.1315	0.0667	0.0689	0.0732	0.0757
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	**Total**	**After 1993**	**Total**	**After 1993**	**Total**	**After 1993**
ln unemployment t	**-0.2567** ***	**-0.0856** ***	**-0.2824** ***	**0.1118** ***	**-0.1936** ***	-0.0530
S.E.	0.0290	0.0282	0.0340	0.0414	0.0271	0.02666
Costant	9.3880 ***	8.8050 ***	10.0818 ***	8.8754 ***	9.6661 ***	9.0767 ***
S.E.	0.0781	0.0774	0.0767	0.0988	0.0817	0.0824
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.14 - Self-employed (Fixed-Effects)

Equation	(F)		(B)		(C)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	-0.0304	0.7657 ***	0.0555	0.7854 ***	0.0319	0.7721 ***
S.E.	0.0663	0.0671	0.0626	0.0636	0.0660	0.0668
Costant	9.4092 ***	7.3242 ***	9.4825 ***	7.5620 ***	9.3840 ***	7.367 ***
S.E.	0.1422	0.1495	0.1359	0.1437	0.1433	0.1513
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	Yes	Yes	No	No
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	No	No	No	No	No	No
Gender dummy (Female)	No	No	No	No	No	No

Equation	(D)		(E)		(A)	
Variable	Total	After 1993	Total	After 1993	Total	After 1993
ln unemployment t	-0.0319	0.7079 ***	-0.1210 *	0.6940 ***	0.1088 *	0.7353 ***
S.E.	0.0634	0.0646	0.0649	0.0649	0.0595	0.0609
Costant	8.9174 ***	7.0798 ***	9.7325 ***	7.6060 ***	9.0319 ***	7.3650 ***
S.E.	0.1434	0.1487	0.1401	0.1451	0.1376	0.1443
Post-1993 dummy	No	Yes	No	Yes	No	Yes
Age dummies	No	No	No	No	Yes	Yes
Sector dummies	No	No	No	No	Yes	Yes
Education dummies	Yes	Yes	No	No	Yes	Yes
Gender dummy (Female)	No	No	Yes	Yes	No	No

4.15 - Entrepreneurs

Equation	(F)				(B)				(C)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment t	**0.5681**	***	**-0.0508**	***	**-0.1983**	***	**-0.0634**	***	**-0.1350**	***	-0.0202	
S.E.	0.0346		0.0160		0.0164		0.0156		0.0162		0.0154	
Costant	7.5968	***	8.6760	***	9.4436	***	8.8521	***	9.3026	***	8.7545	***
S.E.	0.1020		0.03752		0.0393		0.0387		0.0378		0.0373	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		Yes		Yes		No		No	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	No		No		No		No		No		No	
Gender dummy (Female)	No		No		No		No		No		No	

Equation	(D)				(E)				(A)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment t	**-0.0626**	***	0.0107		**0.5649**	***	**-0.0715**	***	**-0.0270**	*	**0.0314**	**
S.E.	0.0157		0.0152		0.0344		0.0157		0.0151		0.0147	
Costant	9.2032	***	8.7927	***	7.7012	***	8.8225	***	9.3639	***	8.9635	***
S.E.	0.0366		0.0369		0.1123		0.0373		0.0379		0.0383	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		No		No		Yes		Yes	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	Yes		Yes		No		No		Yes		Yes	
Gender dummy (Female)	No		No		Yes		Yes		No		No	

4.16 - Entrepreneurs (Fixed-Effects)

Equation	(F)				(B)				(C)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment$_t$	**0.6219**	***	**1.1901**	***	**0.5966**	***	**1.1524**	***	**0.5728**	***	**1.1077**	***
S.E.	0.0355		0.0336		0.0347		0.0329		0.0342		0.0327	
Costant	7.4792	***	5.8854	***	7.6954	***	6.1251	***	7.7582	***	6.2381	***
S.E.	0.0789		0.0763		0.0778		0.0756		0.0758		0.0743	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		Yes		Yes		No		No	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	No		No		No		No		No		No	
Gender dummy (Female)	No		No		No		No		No		No	

Equation	(D)				(E)				(A)			
Variable	Total		After 1993		Total		After 1993		Total		After 1993	
ln unemployment$_t$	**0.6451**	***	**1.0741**	***	**0.6007**	***	**1.1762**	***	**0.6747**	***	**1.0626**	***
S.E.	0.0329		0.0323		0.0350		0.0329		0.0318		0.0313	
Costant	7.6259	***	6.3640	***	7.6249	***	6.0188	***	7.8377	***	6.6506	***
S.E.	0.0740		0.0748		0.0781		0.0749		0.0714		0.0724	
Post-1993 dummy	No		Yes		No		Yes		No		Yes	
Age dummies	No		No		No		No		Yes		Yes	
Sector dummies	No		No		No		No		Yes		Yes	
Education dummies	Yes		Yes		No		No		Yes		Yes	
Gender dummy (Female)	No		No		Yes		Yes		No		No	

References

Ammermuller, A., Lucifora, C., Origo, F., and Zwick, T. (2010). Wage Flexibility in Regional Labour Markets: Evidence from Italy and Germany. *Regional Studies*, 44(4: 401-421). URL http://www.tandfonline.com/doi/abs/10.1080/00343400903002705.

Blanchflower, D. G., and Oswald, A. J. (1995). An introduction to the wage curve. *The Journal of Economic Perspectives*, 9(3). URL http://www.jstor.org/discover/10.2307/2138431?uid=3738296&uid=2&uid=4&sid=21104584945917.

Blanchflower, D. G., and Oswald, A. J. (2005). The wage curve reloaded. *National Bureau of Economic Research*, (w11338). URL http://www.nber.org/papers/w11338.

Blanchflower, D. G., Oswald, A. J., and Sanfey, P. (1992). Wages, profits and rent-sharing. Discussion paper, National Bureau of Economic Research.

Buettner, T. (1999). The effect of unemployment, aggregate wages, and spatial contiguity on local wages: An investigation with German district level data. *Papers in Regional Science*, 78(1): 47–67.

Card, D. (1995). The wage curve: a review. *Journal of Economic Literature*, 33(2). URL http://www.jstor.org/discover/10.2307/2729028?uid=3738296&uid=2&uid=4&sid=21104584945917.

Destefanis, S., and Pica, G. (2010). It's wages, it's hours, it's the Italian wage curve. *Centre for Studies in Economics and Finance (CSEF), University of Naples*, (247). URL http://www.csef.it/wp/wp247.pdf.

Devicienti, F., Maida, A., and Pacelli, L. (2008). The resurrection of the Italian wage curve. *Economics Letters*, 98(3: 335-341). URL http://www.sciencedirect.com/science/article/pii/S0165176507001747.

Harris, J. R., and Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, (126-142). URL http://www.jstor.org/discover/10.2307/1807860?uid=3738296&uid=2&uid=4&sid=21104584945917.

Jowell, R., and Witherspoon, S. (1989). *British Social Attitudes: Special International Report:[6th Report]*, volume 6. Gower Publishing Company, Limited.

Lipsey, R. G. (1960). The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1862-1957: a further analysis. *Economica*, (1-31). URL http://www.jstor.org/discover/10.2307/2551424?uid=3738296&uid=2&uid=4&sid=21104584945917.

Lucas, R. E., and Rapping, L. A. (1969). Real wages, employment, and inflation. *The Journal of Political Economy*, (721-754). URL http://www.jstor.org/discover/10.2307/1829964?uid=3738296&uid=2&uid=4&sid=21104585193207.

Lucifora, C., and Origo, F. (1999). Alla ricerca della flessibilita: un'analisi della curva dei salari in Italia. *Rivista italiana degli economisti*, 4(1: 3-36). URL http://www.rivisteweb.it/doi/10.1427/3649.

Montuenga, V., Garcia, I., and Fernandez, M. (2003). Wage flexibility: evidence from five EU countries based on the wage curve. *Economics Letters*, 78(2): 169–174.

Moulton, B. R. (1990). An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *The review of Economics and Statistics*, (334-338). URL http://www.jstor.org/discover/10.2307/2109724?uid=3738296&uid=2&uid=4&sid=21104650900743.

Nijkamp, P., and Poot, J. (2005). The last word on the wage curve? *Journal of Economic Surveys*, 19(3): 421–450.

Phillips, A. W. (1958). The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957. *Economica*, 25(100): 283–299.