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ABSENTEEISM, UNEMPLOYMENT AND EMPLOYMENT PROTECTION LEGISLATION: EVIDENCE FROM ITALY

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Absenteeism, Unemployment and Employment Protection Legislation: Evidence from Italy*

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Abstract

Efficiency wages theories argue that the threat of firing, coupled with a high unemployment rate, is a mechanism that discourages employee shirking in asymmetric information contexts. Our empirical analysis aims to verify the role of unemployment as a worker discipline device, considering the different degree of job security offered by the Italian Employment Protection Legislation to workers employed in small and large firms. We use a panel of administrative data (WHIP) and consider sickness absences as an empirical proxy for employee shirking. Controlling for a number of individual and firm characteristics, we investigate the relationship between worker's absences and local unemployment rate (at the provincial level). We find a strong negative impact of unemployment on absenteeism rate, which is considerable larger in small firms due to a significantly lower protection from dismissals in these firms. We also find that workers who are absent more frequently face higher risks of dismissal. As an indirect test of the role of unemployment as worker's discipline device we show that public sector employees, almost impossible to fire, do not react to the local unemployment.

Keywords: Shirking; Absenteeism; Employment Protection Legislation; Unemployment.

JEL classification: J41; M51; J45.

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1 Introduction

In their seminal paper, Shapiro and Stiglitz (1984) showed that unemployment can represent a "worker's discipline device" in moral hazard contexts. Because of the threat of unemployment, the incentives to shirk for employees decrease in high unemployment states in which it would be hard to find a new job in case of dismissal, while shirking increases, for the opposite reason, when labor markets are tight.

Due to the difficulty in observing shirking behavior, the empirical evidence of this relationship has been rather scant. Cappelli and Chauvin (1991) showed an inverse relationship between local unemployment and disciplinary sanctions for employees working in different plants of a large US firm. Similarly, Campbell (1994) found out that when local and industry unemployment rates are lower, worker dismissals are higher because presumably shirking is more frequent.

More recently, worker's shirking has been proxyed by the absenteeism rate: since the worker is typically fully covered by the national insurance system (or by the employer) when sick and her effective state of health cannot be observed by the employer, the worker has an incentive to take days off while preserving the whole wage, causing pecuniary and non-pecuniary costs to the firm. Along these lines, a few papers have shown an inverse relationship between industry or regional unemployment and absenteeism at individual level (Leigh, 1985; Askildsen et al., 2005). A much larger literature shows that employees' sickness absences are positively related to the degree of job security (Ichino and Riphahn, 2005, among others).

The main aim of this paper is to provide evidence on the impact of unemployment on worker's absenteeism at the individual level. We exploit a large Italian dataset of individual work histories based on Social Security administrative records (WHIP) in which, in addition to standard information on individuals and firms, we observe employees' absence rates that we relate to the local unemployment rate. Differently from the existing literature, we refer to the unemployment rate at provincial level (NUTS3 level). This turns out to be particularly important in Italy where individuals' mobility is extremely low (see Faini et al., 1997) and workers mainly look at their local labor market. We exploit cross-sectional (103 provinces) and time (10 years) variations of unemployment and take into account possible heterogeneity in social capital and work ethics controlling for workers' region of birth (or, alternatively, for individual fixed effects).

A neglected aspect in the literature relating absenteeism and unemployment is the role played by the degree of job security enjoyed by employees. The effectiveness of the unemployment threat for shirking employees heavily depends on firing restrictions: when the Employment Protection

Legislation (EPL) makes extremely costly for firms to dismiss workers, the level of unemployment should have little impact on employees' decisions to work hard; on the other hand, the threat of unemployment is more effective if job security is low. The structure of the Italian labor market characterized by different degrees of job security offered by the EPL to workers employed in small firms (with 15 or less employees) and large firms (more than 15 employees) gives us the unique opportunity to investigate if unemployment has a different influence on workers' behavior employed in the two types of firms.

Controlling for a number of individual and firm characteristics, we firstly find that the individual absenteeism rate is negatively and strongly related to the provincial unemployment rate. In particular, we find that in high unemployment Southern areas shirking is dramatically lower than in Northern areas, notwithstanding South Italy is characterized by lower levels of social capital and more widespread opportunistic behavior (Ichino and Maggi, 2000; Guiso, Sapienza and Zingales, 2004). Secondly, we find that the impact of unemployment on shirking behavior is significantly stronger in small firms than in large firms, arguably because of the significantly lower protection from dismissal in the former. These results hold true when we use individual fixed effects models and are consistent through different robustness checks.

To corroborate our findings, using the Bank of Italy's Survey on Household Income and Wealth which includes both public and private employees, we show that public employees, who are almost not dismissable, do not react at all in terms of sickness absences to the unemployment rate in their local labor market.

A crucial hypothesis in the mechanism relating sickness absences to the local unemployment is that firms effectively adopt the strategy of firing employees who are more frequently absent. To test this aspect we estimate a model for the employee's probability of becoming unemployed and verify whether a worker's sickness absence behavior influences her risk of becoming unemployed in the future. The results clearly indicate that an increase in the frequency of sick spells are associated with a higher risk of being dismissed in the near future, confirming a key underpinning of the role of unemployment as worker's discipline device.

The remainder of the paper is organized as follows. Section 2 provides a brief review of the existing literature. Section 3 describes the institutional background. Section 4 presents the data and the sample selection procedure. Estimates of the effect of unemployment on absenteeism and its differential impact in small and large firms are presented in Section 5. A number of robustness checks are carried out in Section 6. Section 7 investigates the influence of sickness absence behavior

on the risk of subsequent unemployment. Finally, Section 8 concludes.

2 Literature Review

A wide literature has analyzed worker absenteeism in relation to individual characteristics and to contractual and institutional aspects (see, among others, Barmby et al., 1994; Johansson and Palme, 1996, 2002; Ichino and Riphahn, 2005). In particular, a number of papers has studied the impact of labor market conditions and employment protection systems on worker's sickness absences.

Unemployment has been found to have a negative impact on workers' decision to take sick leaves. This inverse relationship has been explained by two different mechanisms. First, it has been argued that during periods of low unemployment individuals have a better chance of finding a job and, as a consequence, they have higher incentives to shirk due to lower expected costs deriving from losing the job. In other words, a high level of unemployment acts as a worker discipline device, curbing opportunism. In the second place, the inverse relationship may be the result of a changing composition of the labor force. It is likely that workers with low absence rates are retained during economic recessions while more absence-prone workers are laid off, giving rise to a pro-cyclical pattern of the aggregate absence rate ("selection effect").

A few studies have investigated the cyclicality of workplace absenteeism. Leigh (1985) has been the first study to suggest that a pro-cyclical absence rate can be due both to a fear of being fired during periods of high unemployment and to a selection effect. Using individual data from the Panel Study of Income Dynamics merged with industry unemployment rates, he finds support for both hypotheses. Askildsen et al. (2005) try to distinguish between the two alternative explanations for the cyclicality in absence behavior. They find that county-specific unemployment rates in Norway are negatively related to both the probability of having a sickness spell in a given year and to the duration of absence. Since this also holds for a subsample of high tenured workers, they conclude that the selection effect is not driving the cyclical behavior and the incentive effect dominates the composition effect for explaining cyclical fluctuations in absenteeism. A limitation of their study is that they only observe absences longer than 15 days while opportunistic behavior could manifest especially in short term absences.

The same result has been found by Fahr and Frick (2007) who evaluate the relative importance of the incentive and the selection effects examining the impact on monthly absence rates of changes in the unemployment benefit entitlement system in Germany for the years 1991-2004. They find

clear evidence in favor of an incentive effect.

Arai and Thoursie (2005), aiming to analyze if pro-cyclical absenteeism is due to higher sick-rates of marginal workers or it is a consequence of pro-cyclical sick report incentives, focus on temporary workers. Using Swedish aggregate data at industry-region level (14 industries in 4 regions) they investigate the correlation between sick rates and the share of temporary contracts. They find that temporary workers have lower sick-rates (generating a negative correlation between the absenteeism rate and the fraction of temporary contracts), implying that an employee incentive effect is at work, rather than a selection effect, which would have generated a positive correlation between absenteeism and temporary contracts.

Complementary to these works, Hesselius (2007) shows that an increase in current or previous sickness absences has a negative effect on the probability of retaining the job: the absence behavior of the worker can be seen as a signal to the employer of the worker's health status and/or her shirking tendency.

A parallel literature has investigated the role of EPL in the workers' decisions to take sickness absences. Ichino and Riphahn (2005) show that employees of a large Italian bank are less absent during their probationary period (the initial 3 months of employment, in which they can be fired at will) than when they become permanent employees, when firings become extremely costly. Similarly, Riphahn and Thalmaier (2001) find that German employees show a higher probability to be absent after their probationary period of 6 months. Along the same lines, Riphahn (2004) shows that German public sector employees with long tenure (virtually impossible to fire) are absent more often than their younger colleagues. Leombruni (2011) and Origo et al. (2012) look at the effect of having a temporary contract (introduced in Italy at the end of the 1990s), not covered by the employment protection, on worker's absenteeism. They find that workers with temporary contracts take less absences than workers with permanent contracts. Scoppa (2010) shows that a reform introducing a more stringent employment protection legislation for small firms in Italy determines a significant increase in employee absenteeism in these firms compared to large firm employees who are unaffected by the reform. Olsson (2009) analyzes how sickness absence behavior changes after a reduction of employment protection enacted in Sweden in 2001. He finds that short-term sickness absences are reduced as employees in small firms perceive job insecurity due to the new legislation. Exploring the same reform of job security, Lindbeck et al. (2006) find an overall reduction in the average work absence rate. They also show that persons with high absenteeism rate tend to leave the firms affected by the reform and that in turn the firms become less reluctant to hire workers

with a history of high sickness absences, presumably because the reform reduces the hiring and firing costs for firms.

3 The Institutional Background: the Sickness Benefit System and EPL in Italy

Employees in Italy are almost fully-insured against earnings losses due to illness. The Italian Institute of Social Security (INPS) pays for sick leave benefits after the third day of absence and collective employment contracts establish that employers pay for the first three days: a worker usually ends up obtaining almost 100 percent of her wage for absences due to health problems. Since the worker's effective state of health is typically costly to observe for the employer or for public authorities, sickness absences, beyond true health problems, may hide opportunistic behaviors, that is, the full-coverage insurance creates a moral hazard problem for employees, who are induced to take days off, preserving the whole wage without providing any effort.

In addition to the possibility of being absent from work without suffering significant wage reductions, employees are highly protected against dismissal by the Italian legislation. As it is well-known, Italy has one of the strictest EPL among OECD countries (see OECD, 1999; Boeri and Jimeno, 2005), but with significant differences for employees of small and large firms. Since The Charter of Workers Rights (Law 300/1970), individual dismissals are allowed in large firms only if there exists a "just cause" (for productive reasons or for severe misconduct of the employee). More precisely, a worker can be fired for "justified objective motive" that is, "for justified reasons concerning the production activity or the organization of labor in the firm"; or for "justified subjective motive" that is, "in case of a significantly inadequate fulfillment of the employee's tasks specified by the contract". Moreover, large firms are required to give to the employee a term of notice in order to proceed with an individual dismissal, whose length depends on the tenure of the worker, with detailed indications of the reasons for the dismissal. The worker can easily appeal to a Court against the dismissal. If the judge rules that the dismissal is "unfair" the worker has the right to receive as severance payments: 1) all the foregone earnings after the dismissal until the sentence; 2) either an extra financial compensation of 15 months earnings or she has to be reinstated in the firm (the choice is up to the worker). In addition, the firm has to pay the legal costs and a penalty for the delayed payment of social security contributions of up to 200% of the original sum due.

Since judges ultimately decide on the validity of the motives given by the firm, the latter faces the risk of a costly trial with uncertain outcomes whenever firing a worker becomes necessary

(Ichino and Riphahn, 2004). It implies that it is not so much the law *per se* as it is the uncertainty surrounding the court's ruling that makes it harder to dismiss workers.

Firms with less than 16 employees ("Small Firms") were not mentioned by the Charter and were exempted from the EPL regime until 1990. The EPL reform of 1990 imposed that dismissals must have a "just cause" also in small firms (applying the same criteria of large firms). However, for small firms the Law establishes a different regime of sanctioning if the dismissal is judged "unfair": the employer may choose between the re-employment of the worker or the payment of a financial compensation ranging between 2.5 and 6 months pay. Although the 1990 reform has increased the dismissal costs for small firms, they remained significantly lower compared to the costs faced by large firms.

4 The Data and Descriptive Statistics

We use administrative data from the full version of the *Work Histories Italian Panel* (WHIP), provided by LABORatorio Revelli (Turin) and drawn from the National Institute of Social Security (INPS). This dataset covers a 1:90 random sample of all employees working in the private sector in Italy followed for the years from 1985 to 2004. Agricultural workers, public employees and self-employed workers are excluded from the sample. The dataset is an employer- employee unbalanced panel with observations at year level, or at employment spell level if a spell is shorter than a year,[1] that contains information on both individual and firm characteristics.

On the worker's side the WHIP includes information on gender, age, region of birth, province of work, the initial and the final date of each employment spell, the gross wage, the total number of weeks worked, an indicator for part-time status, maternity leave, redundancy payments, an occupational qualification code and, most importantly, it records sickness episodes. In particular, for each year it is recorded the number of weeks that a worker has benefited of the so-called *indennità di malattia*, a payment for sick leave made by INPS after the third day of absence.[2] Therefore, we observe the total number of weeks of absence the worker has made in a given year.

The payment of sick leave is made by INPS for the blue-collars of all sectors and only for white collars of the sectors "Wholesale and Retail Trade" and "Hotels and Restaurants". We consider only these categories and exclude also workers with the qualification of apprentices, cadres and

[1] For brevity, we will simply refer to the year throughout the paper.

[2] In the full version of WHIP it is only reported whether or not the employee has benefited of sickness benefits in a given year. The information on weeks of absence is not included but it has been kindly provided by the Laboratorio Revelli on our request.

managers.

Because of its administrative nature, the main drawback of the dataset is that there is little demographic information on individual characteristics; in particular we do not know the level of education, the marital status and the number of children. We build additional variables such as the length of tenure and total experience. Tenure is calculated as the number of weeks an individual is observed working for the same employer and then transformed into years. Total experience is computed as the length of the period in which an individual has been employed (from the first period observed). The earning variable is the real daily (gross) wage, obtained by dividing the total amount earned during a year or during an employment spell (if within the year) by the number of days worked over that period, and deflating it by the Consumer Price Index (base year 2000).

On the firm's side the WHIP includes the sector in which it operates (9 sectors), the geographic location (at provincial or NUTS3 level) and the yearly average number of employees.

Our main dependent variable, *Absenteeism*, is the fraction of weeks the individual is absent from work over the total number of weeks actually worked.[3] As robustness check we also consider as dependent variable the dichotomous variable, "*Being Absent*", which takes on the value of one if the employee has benefited of at least one INPS sickness benefit over the year, and zero otherwise (as in Engelland and Riphahn, 2005, and Chaudhury et al. 2006).

We augment the data base with the unemployment rate at the provincial level (103 provinces) drawn from the National Institute of Statistics (ISTAT). Unfortunately, the unemployment rate series is available only from 1993 since the computational method has changed in 1992 and again in 2003, generating two breaks in the time series.[4] In addition, since after 2002 many of the firm variables contain a large number of missing values and in particular we do not observe firm size, we are forced to focus on the ten-year window 1993-2002 in our analysis.

Our sample is made of individuals aged between 15 and 65. In order to deal with a more homogeneous sample, we exclude individuals who experienced a maternity leave episode, received redundancy payments, work on a temporary contract or had a part time job during the year.

Table 1 reports summary statistics of the variables used in the empirical analysis. The number of observations in the sample is 691,849, at worker-year level. The average rate of absenteeism is 2.1 on the whole sample, that is, about one week for an employee working the whole year. However,

[3]Since a worker is not insured for sickness absences for more than 180 days, we set the ratio to 50% in case it is above this threshold, which involves however only 0.6% of the observations. However, our findings are unchanged if we drop these observations.

[4]Since the series of provincial unemployment 1993-2002 are not available digitally, we made these data available at $http://www.ecostat.unical.it/Scoppa/Appendix\_Absenteeism\_Unemployment.htm$.

about 80 percent of employees is never absent in a year. The average rate of absenteeism is 10.8 for workers experiencing at least one episode of absence. Workers employed in small firms (with 15 employees or less) are 42.4% of the sample. Average age is 35.4 years. The fraction of women in our sample is particularly low (25.2%) but it depends on our sample selection which includes mainly blue collars. Most of the workers in our sample work in the Manufacturing sector (47%) and in the Northern regions of Italy (59%). The unemployment rate is on average 9.3%, with wide variability, ranging from 1.7% (Mantova, in Lombardy) to 35% (Enna, in Sicily). On the whole, Southern regions show considerable higher unemployment rates (19.8) than Center-North regions (6.2).

Columns 3 to 6 of Table 1 presents descriptive statistics on individuals' and firms' characteristics by firms size. The difference in the absenteeism rate between small and large firms is striking (respectively 1.66 vs 2.44) as well as the fraction of workers absent at least once over the year (14.4% in small firms vs 22.9% in large firms). These figures confirm that workers employed in small and large firms have different absence behaviors.

Figure 1 summarizes the main points of the paper. In panel (a) we show the relationship between the average absenteeism rate (at provincial level) for small firms and the provincial unemployment rate and we find a strong negative relationship (coefficient=-0.028; s.e.=0.0048). In panel (b) we show that the absenteeism rate for large firm employees is negatively related to the unemployment rate, but the slope is considerable lower in magnitude (coefficient=-0.014; s.e.=0.0069). In the next Section, using individual data, we carry out an econometric analysis of these relationships.

5 The Effect of Unemployment and EPL on Absenteeism

In order to investigate the impact of local unemployment on individual propensity to take sick leave we estimate the following model by OLS:

$$Absenteeism_{it} = \beta_0 + \beta_1 Unemployment_{it} + \beta_2 SmallFirm_{it} + \beta_3 X_{it} + \lambda_t + \epsilon_{it} \quad (1)$$

where $Absenteeism_{it}$ represents the fraction of weeks of sickness absences (over the total number of weeks worked) of individual i in period t; $UnemploymentRate_{it}$ is the unemployment rate at provincial level, $SmallFirm_{it}$ is a dummy for firms with 15 or less employees, X_{it} is a vector of individual and other firm characteristics (including gender, age, region of birth,[5] professional

[5]We consider 20 Italian regions plus one region for being Born Abroad.

qualification, experience, tenure, sector of activity, lagged gross wage, etc.), λ_t represents year dummies and ϵ_{it} is an error term.

Even though we have no information of the health status of the worker which is a key determinant of her absence behavior, we try to take into account the individual health condition by controlling for the individual characteristics mentioned above. Most of these characteristics have been found to be strongly correlated with absenteeism due to health reasons, as shown in Costa et al. (2011) (we will also provide additional evidence on this issue in Section 6 where we control for some indicators of health at the provincial level).

Table 2 reports OLS estimates. Standard errors are corrected for heteroskedacity and allowed for within province correlation to take into account possible common shocks to employees working in the same province. In column (1) results show that employees working in provinces with higher unemployment are less absent from work: in a province in which unemployment is 10 percentage points higher than in another, employee absenteeism is 0.37 percentage points lower, or about 17% less. The effect is highly statistically significant (t-stat=-5.88). Working in a small firm reduces the probability of being absent by 0.713 percentage points (about 33% less), confirming that workers less sheltered by the EPL tend to be more present at work (as also shown by Ichino and Riphahn, 2005).

We then investigate whether individuals employed in small firms, and thus less protected against dismissal by the legislation, are more disciplined in their shirking behavior by the local unemployment. To this end we include the interaction between the *Unemployment Rate* and *Small Firm* variables in equation 1:

$$Absenteeism_{it} = \beta_0 + \beta_1 Unemployment_{it} + \beta_2 SmallFirm_{it} + \beta_3 Unemployment_{it} \times SmallFirm_{it} + \beta_4 X_{it} + \lambda_t + \epsilon_{it} \quad (2)$$

where β_1 represents the impact of unemployment on absences for workers employed in large firms, and $\beta_1 + \beta_3$ measures the impact of unemployment on the absences of small firm employees.

In column (2) of Table 2 we find that the *Unemployment Rate* has a negative impact on absences of large firms' employees (-0.029), but this effect is significantly stronger for employees of small firms (-0.045=-0.029-0.016). The difference between small and large firms (measured by the coefficient on the interaction term) is highly statistically significant (t-stat=-3.63). Control variables have the expected sign, in line with the results of the literature on absenteeism: females show a higher propensity to take sick leave;[6] blue-collars are much more absent; absences and age are related by

[6]The differences in absenteeism behavior by gender will be investigated in more depth in Section 6.

a U-form relationship, absences increase with tenure. Regions of birth coefficients indicate, in line with Ichino and Maggi (2000), that individuals born in some Southern regions tend to be more absent, ceteris paribus, than individuals born in the North.[7]

In column (3) we add as control variable the lagged gross wage (in log). We include the lagged value of wage since the current wage could be affected by a reverse causality problem: more absences reduce (to some extent) the wage paid by the employer. However, also the estimates using the lagged wage should be interpreted with caution since the individual unobservable factors (for example, diligence or loyalty) might simultaneously affect the absence behavior and the employee wage. Notwithstanding these problems, estimation results in column (3) do not differ much from our previous estimates: unemployment has a negative effect on absences, larger in magnitude for small firm employees. As expected, the lagged wage is negatively correlated to the absenteeism rate.

By taking advantage of the panel structure of our data, we can control for time-invariant unobserved individual characteristics. In particular, the error term ϵ_{it} can be divided into:

$$\epsilon_{it} = \mu_i + v_{it}$$

where μ_i represents an individual fixed effect and v_{it} is an i.i.d error term. The individual specific effect, μ_i, picks up the effect of all unobserved individual characteristics, including human capital and initial health endowment, which unfortunately are not observed in our data.

Columns 4 (without controlling for lagged wage) and 5 (controlling for lagged wage) of Table 2 report the fixed effects (FE) estimates. However, we should mention that these estimates are not free from distortions. In fact, unemployment at the provincial level is a rather persistent variable and by controlling for individual fixed effects we exploit little inter-temporal variation in the unemployment rate while a large part of the variation comes from workers moving between provinces with different levels of unemployment. However, these movements cannot be considered completely exogenous, giving rise to some sort of bias. Furthermore, measurement errors are magnified in fixed effects estimates when the independent variables are persistent over time (see Griliches and Hausman, 1986). Nonetheless, our qualitative results are confirmed: a higher unemployment induces employees to take less absences and this effect is much stronger for employees in small firms. Both these effects are statistically significant, although the FE estimates are lower in magnitude

[7] In a specification in which we do not control for regions of birth (not reported) the estimates of β_1 and $\beta_1 + \beta_3$ are negative and statistically significant but lower in magnitude (-0.018 and -0.032 respectively) with respect to the estimates in Table 2. These effects are probably downward biased due to the fact that Southerns tend to be more absent and unemployment is higher in the South.

and with lower statistical significance with respect to the OLS estimates reported in columns (2) and (3).

6 Robustness Checks

In this section we perform a number of checks to control if the results presented in Section 5 are robust to alternative definitions of variables or to different samples.

First, the variable *Unemployment*, built by the ISTAT according to the standard International Labour Office definition,[8] could not capture the actual labor situation in Italy where many individuals are discouraged from searching for a job in stagnant labor markets. In this case, the official unemployment rate would represent an underestimate of the effective number of people available to work.

A possible strategy to avoid this problem is to calculate for each province an alternative rate of unemployment - which we call *Proxy Unemployment* - based on the effective number of employed people and the working age population. More precisely, we define *Proxy Unemployment* as:

$$ProxyUnemployment_{it} = (WorkingAgePopulation_{it} - Employed_{it})/(WorkingAgePopulation_{it})$$

In practice, our *Proxy Unemployment* is equal to 1 minus the *Employment Rate*. With this measure, we count as unemployed also individuals discouraged from searching for a job. However, it should be noted that a different kind of measurement error might emerge if provinces have, for example, different percentages of adults in the educational process.

In the first column of Table 3 we show that the provincial unemployment, as measured by *Proxy Unemployment*, has a negative impact on the propensity to be absent from work. A worker in a large firm reduces his absenteeism rate by about 0.15 (on an average of 2.11) if she works in a province with a level of unemployment 10 percentage points higher (statistically significant at 1 percent level). On the other hand, given the same variation of unemployment a worker in a small firm reduces her absenteeism rate by 0.24 percentage points (=0.15+0.09). The same results hold true when we control for the lagged wage (column 2). Finally, in column (3) we present the FE estimates. The results are qualitatively the same, although the effects of interest are smaller in magnitude and with lower p-values.

[8] According to the International Labour Office, "unemployed workers" are those who are currently not working but are willing and able to work for pay and have actively searched for work. Individuals who are actively seeking job placement must make the effort to: be in contact with an employer, have job interviews, contact job placement agencies, send out resumes, submit applications, respond to advertisements, or some other means of active job searching within the prior four weeks.

Second, we explore the possibility that not only the unemployment in the individual's province of work influences worker's absence behavior but also the unemployment in the provinces nearby. To this end we use the regional unemployment to capture the labor market conditions of a broader area of potential work (without controlling for region of birth dummies). The effect of regional unemployment on absenteeism rate turns out to be slightly higher than the one found considering provincial unemployment (Table 2), implying perhaps that workers in their decisions consider a labor market wider than simply their province of work. The differential impact of regional unemployment according to the firm size is instead very similar to the one found with provincial unemployment (results not reported but available from the authors).

In Table 4, instead of comparing very heterogeneous types of firms in terms of size, we compare small firms (15 or less employees) with, respectively, firms of 16-100 employees (column 1), firms of 16-200 employees (column 2) and firms of 16-1,000 employees (column 3). Our main results are again confirmed: the *Unemployment Rate* has a negative effect on the rate of absenteeism in large firms (the coefficient being about -0.030), whereas the effect on firms with less than 15 employees is considerable larger (about -0.048=-0.030-0.018) and the differential impact between small and large firms is always statistically significant. In columns (4)-(6) we replicate the specifications (1)-(3) controlling for individual FE. The results are again reassuringly similar, although the statistical significance of the effects are typically lower.

In all the previous tables we computed the standard errors allowing for clustering at the province level. Following Petersen (2009) and Cameron, Gelbach and Miller (2006) we also experiment using multi-way clustering for standard errors, both at province and individual level. Results are reported in Table 5, where we replicate the specifications 2 and 3 of Table 2. Standard errors using multiway clustering change only slightly and all our previous findings are confirmed.

Most previous studies have shown that women have more sickness absences than men (see Barmby et al., 2000, Laaksonen et al., 2008). Various factors relating to home and private life have been suggested to explain female excess in sickness absences. Women often bear the main responsibility of children care and household tasks which increase their total work load and may cause difficulties in combining work and family life. To take into account gender differences in absence behavior, in Table 6 we analyze men and women separately. The results for males (columns 1-3) widely confirm our previous estimates: males are less absent for sickness if they are employed in small firms and if they work in provinces with a higher level of unemployment. Moreover, their reaction to the unemployment level is much larger if they work in small firms, -0.050 (=-

0.026-0.024), rather than in large firms (-0.026). These results hold true also when we control for individual FE. Females (columns 4-6) show a much stronger reduction of absences if they work in small firms (-1.049) and their absence behavior reacts to the unemployment rate similar to males if they work in large firms (-0.029). On the other hand, the reactions of females to unemployment do not appear different if they work in small or large firms. Finally, FE estimates are rather puzzling for females (no effects of unemployment emerge neither in large nor in small firms) but as explained in Section **??** the identification of the effect comes from workers moving between provinces with different levels of unemployment. Not surprisingly, women experience less changes of province of work than men do (6.0% for men vs 3.4% for women).

According to Arai and Thoursie (2005) and Leigh (1985), a possible alternative explanation for the uncovered negative relationship between absenteeism and unemployment could be that in periods of low unemployment, firms are induced to employ marginal workers, with worse individual characteristics, less attachment to the labor force and more prone to take sick absences. On the other hand, in downturns individuals employed are on average of better quality, perhaps in good health, and as a consequence they tend to be less absent from work.

To investigate this aspect and following the previous mentioned works, we focus on a sample of individuals who have been continuously working and are observed for the entire period analyzed, i.e from 1993 to 2002. In case we still find an effect of unemployment on absences, we can argue that this behavior is affected by the incentives of workers to take sick leave, and we can confidently exclude the alternative explanation of a change in the composition of the workforce.

The estimates on this sample (about 189,000 observations instead of 690,000) are reported in Table 7. We find that even considering workers with strong attachment to the labor force, the effect of unemployment on their decisions to take sick leave is similar to the one shown in previous estimates. Employees of large firms in provinces with high rates of unemployment take less absences (the coefficient on unemployment is -0.026), whereas employees of small firms react to unemployment more strongly (-0.042=-0.026-0.016). On the other hand, using this particular sample the impact of unemployment does not appear different from zero when we control for individual FE (column 3). However, as already mentioned for women, for this particular sample of workers employed in all the periods movements across jobs and provinces are rather rare (2.4% vs 5.3% for the entire sample), thus making the FE estimates less reliable.

As mentioned in section 4, our measure of absenteeism could be affected by true health problems (beyond shirking). Unfortunately, it is not possible to observe health conditions at the individual

level in our dataset. However, according to Costa et al. (2011), the absenteeism due to health reasons is mainly related to variables like gender, age, place of residence, type of occupation (blue vs white collar), education and sector of activity (public vs private), most of them used in our regressions as controls. As a further check on the assumption that our results are not driven by the health component of the absenteeism we control in two separate set of regressions for two variables collected at provincial-year level related to the health conditions of the Italian population, i.e. life expectancy and mortality rate (Health for All, ISTAT, 2012). The results in Table 8 show that these two variables have a strong significant effect on absenteeism rate (negative the first in Panel A and positive the second in Panel B), but the main findings on the impact of unemployment in small firms and large firms are unchanged in both set of estimates, thus reassuring us about the validity of our assumption.

Finally, since the dependent variable *Absenteeism Rate* has a high fraction of zeros (almost 80 percent of the workers takes no sick leave in a year), it is interesting to use as a dependent variable the dummy variable *Being Absent*. In this way we neglect differences in weeks of absences and we investigate the determinants of being or not being absent from work.[9]

In Table 9 we estimate a Linear Probability Model (Logit estimates, not reported, are very similar). Table 9 shows that small firm employees have a probability of taking absences for sickness of about 6.7 percentage points less than large firm employees in a province with average unemployment (-0.057-0.001*9.2) (see column 2). More importantly, an increase in the unemployment rate by 10 percentage points leads to a lower probability of being absent by 2.4 percentage points for a large firm employee (t-stat=-5.17). A small firm employee reacts to the same increase of unemployment reducing the probability of being absent by 3.5 percentage points (=-2.4-1.1). Both effects are highly statistically significant. Very similar results are found when we control for the lagged wage and for individual FE (columns 3 to 5).

An indirect proof of the hypothesis that unemployment affects workers' behavior in relation to the degree of employment protection they enjoy would be the evidence that almost not dismissible workers as Italian public employees are not affected by the unemployment level. Unfortunately, in our dataset we do not observe public employees. To investigate the behavior of public employees we use the Bank of Italy Survey of Household Income and Wealth (SHIW), conducted every two years on a representative sample of about 20,000 individuals, collecting detailed information on

[9]We also use a Tobit model to take into account the high fraction of zeros in our dependent variable. Through Tobit we estimate both the probability of being absent and the expected value of weeks of absence given the individual has been absent. The results are very similar to the previous estimates and are not reported for the sake of brevity.

demographic and social characteristics and on the working activity of employees (both public and private). In some waves of the SHIW workers were asked how many days of absence they took in a year. We pool together 4 waves: 1995, 1998, 2000, 2002 since these overlap with our sample period and include consistent information on key variables. Unfortunately, in the SHIW we only observe the region of residence of individuals and therefore we can only use the unemployment level at the regional level.

We estimate by OLS using as dependent variable "Days of Absence".[10] Our main explanatory variable is the regional unemployment rate in each region. The standard errors are adjusted for the potential clustering of errors at the regional level. We control for a number of firm and personal characteristics (small firm, gender, age, age squared, years of education, marital status, children at home age<=5, tenure). Results are reported in Table 10. In column (1) we focus on the sample of private employees. We find that in regions with high unemployment worker's absenteeism rate is significantly lower (the coefficient is -0.072, statistically significant at 5 percent level). In regression (2) we consider only public sector employees. The unemployment rate turns out to be not statistically significant. These findings are confirmed in column (3) of Table 10 where we consider jointly private and public employees and include among explanatory variables an interaction term (Unemployment Rate)*(Public Employee). Results show that for private employees a higher unemployment rate significantly reduces absenteeism (-0.066; s.e.=0.030). On the other hand, for public employees a higher unemployment rate does not affect absenteeism (+0.007=-0.066+0.073; s.e.=0.032).

This finding represents further evidence that unemployment affects absenteeism only in relation to the threat of unemployment: for employees not affected by this threat, the impact of unemployment on days of absence is null.

7 Sickness Absences and the Risk of Dismissal

Due to its generous sickness benefit system, in Italy the compensation level for sickness absence has been close to the normal wage during the period we consider. Therefore, the everyday decision for the worker of whether to be present at work cannot be simply explained with the wage penalty deriving from a day of absence. However, not all countries with relatively generous compensation schemes show high absence rates (see Barmby et al., 2000). This suggests that other types of incentives offered by firms play a role in affecting the employee's decision. The threat of dismissal

[10] For a more comprehensive analysis see Scoppa 2010b.

if a worker is perceived as less productive or is considered a 'shirker' by his employer is arguably a powerful mechanism in inducing an employee to work hard and not indulging in too many absences (Hesselius 2007).

The purpose of this section is to test whether sickness absences are associated with an increased risk of future unemployment. Moreover, we investigate if the risk of being dismissed is different in small and large firms. The finding of a positive association between absence spells and risk of dismissal would support the idea that unemployment acts as worker's discipline device against shirking.

Since in the original Whip dataset it is not possible to track individuals who move to unemployment,[11] we need to augment the original data with information on unemployment benefits recipients provided by the Laboratorio Revelli in a separate file (called "*Unemployment Benefits*"). In this file we observe for each year the individual identifier, the number of days in which the individual obtained unemployment benefits and the type of benefits (ordinary, reduced, "mobility") received. Unfortunately, we do not observe the date of beginning and ending of each unemployment spell. Moreover, we do not observe the reason for dismissal. Firms could have fired the worker "for justified reasons concerning the production activity or the organization of labor in the firm or alternatively for "a significantly inadequate fulfillment of the employee's tasks". It is worth mentioning that workers voluntarily quitting the firm are not entitled to receive any unemployment benefits.

We build a variable "*Dismissed*" equal to one if a worker receives some type of unemployment benefits in period t, and equal to zero if she does not receive any unemployment benefits in the same period. Due to the limited availability of data on unemployment benefits, the period of observation for this analysis is 1996-2002.

We assess if the observed sick-leave behavior pattern (observed at year $t-1$) affects the risk of unemployment at time t. As a robustness check we also consider the average sick leave rate in the 3 years preceding the period at risk of dismissal. It could be that it takes some time for a firm to learn about the behavior of an employee or it has to wait until a reduction of employment is in order to dismiss her. As before, the sick absence variable has been computed as the fraction of weeks the individual is absent from work over the total number of weeks actually worked. The control variables are the same used in the previous analysis but to take into account the local labor market conditions we include 103 province of work dummies (and exclude region of birth dummies).

[11] Neither we observe movements to retirement, public sector, self-employment, agricultural sector or black market jobs.

Table 11 reports parameter estimates of four specifications of a Linear Probability Model in which the dependent variable is *Dismissed*. On the whole sample, the probability of being dismissed is 4.0 percent.

The simplest model reported in column (1) only analyzes the impact of sick-leave behavior, as measured by the *Rate of Absenteeism*, on the future risk of dismissal. Model (1) shows that an increase of 4 weeks of absences (about 8 percentage points in the absenteeism rate for a full-time worker) increases the risk of unemployment by 0.62 percentage points (=0.078*0.08). The effect is highly statistically significant (t-stat=14.10). In other words, this result represents clear evidence of a positive relation between sickness absences and future risk of being dismissed.

In Column (2) we analyze the risk of being dismissed in relation to the size of the firm (*Small Firm*) and interact the *Rate of Absenteeism* with *Small Firm*. Moreover, we control for employee's gender and age. We find that worker's absenteeism significantly increases the probability of dismissal in large firms (0.067) but this effect is larger for small firm employees (0.101=0.067+0.034). In a large firm, 4 more weeks of absence increase the probability of future unemployment by 0.54 percentage points, while in a small firm this probability increases by 0.81 percentage points. Moreover, regardless of worker's absence behavior, individuals working in firms employing more than 15 workers have a lower risk of future unemployment. These differences between small and large firms are probably due in part to the fact that, as explained above, small firms have higher flexibility in firing their workers according to the Italian EPL.

In column (3) we add other individual characteristics (in addition to gender and age, we control for blue collar, tenure, experience) together with provincial dummies (103), industry dummies (10) and year dummies (7). In column (4) we also control for wage.

In all the specifications, the effects of interest are remarkably stable: employee's absences increase the risk of future dismissal in large firms, and this effect is much stronger in small firms.

Some of the personal characteristic variables yield interesting significant parameter estimates. Women have a higher risk of unemployment as compared to men (about 3 percentage points more), given all other explanatory variables, as well as blue collar workers with respect to white collars (1.6% more). A worker with high tenure or experience has lower probability of dismissal, whereas, ceteris paribus, older workers are more often dismissed. The sector of work is not very relevant in explaining future risk of dismissal except for "Hotels and Restaurants", notoriously characterized by high employment volatility.

Table 12 shows the results of the effect of the average sickness absence in the past three years on

the future risk of unemployment.[12] The findings confirm the results of Table 11 both in sign and in magnitude showing that the overall behavior of workers in the years preceding the unemployment spell matters for future risk of dismissal.

The finding that absence-prone workers have a higher risk of unemployment provides a convincing explanation for the results of the previous section, i.e. the threat of firing and subsequent unemployment have a disciplinary effect on the worker's behavior in terms of sickness absences.

8 Conclusions

An inverse relationship between sickness absences and unemployment has been documented in a number of studies. However, to the best of our knowledge, no studies have linked the role of unemployment as discipline device to the employment protection legislation. In this paper we have investigated whether a high unemployment rate has a disciplinary effect on the sick-leave rate and whether this effect is stronger for workers less sheltered by the legislation. In particular we examined whether workers in small and large firms, who have a different degree of employment protection, react differently to the threat of unemployment.

We find a strong negative impact of unemployment on absenteeism rate, which is larger in magnitude in small firms, due to the significantly lower protection from dismissals for employees in small firms. These results are robust to a number of checks regarding the definition of unemployment, the heterogeneity of firms, the group of analysis and the estimation method.

As a further evidence of the role played by the unemployment as deterrent for shirking we show that public employees, virtually impossible to fire, are not affected by local unemployment. This result reconciles our findings with those of Ichino and Maggi (2000): they show that, notwithstanding high unemployment rates in the South, Southern employees are more absent than Northerns. This result is probably due to the fact that, similarly to public employees, the probability of being fired is almost zero for workers in their sample, employed in a large bank.

In the final part of the paper we examine whether a worker's sickness absence behavior might influence the risk of becoming unemployed. The results indicate that higher sick absenteeism is associated with a higher risk of becoming unemployed. The fact that absence-prone workers have a higher risk of unemployment provides a convincing explanation for the role played by unemployment as workers' discipline device.

[12] We have also considered the average rate of absenteeism in the past two and in the past four years but the results are unchanged.

Our analysis suggests that the Italian health insurance system with an almost full coverage of the wage for sick leaves protects excessively employees who are induced to take days off even when their effective state of health is not too bad. This is costly for the employers that try to prevent opportunism with the threat of firing. Probably - for the factors explained in the economics of contracts literature (see, for example, Prendergast, 1999) firms have difficulties in using other incentive systems - as wage bonuses and promotion - to discourage shirking and to reward employees who work hard.

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Figure 1: Correlation between provincial unemployment rate and absence rate by firm size

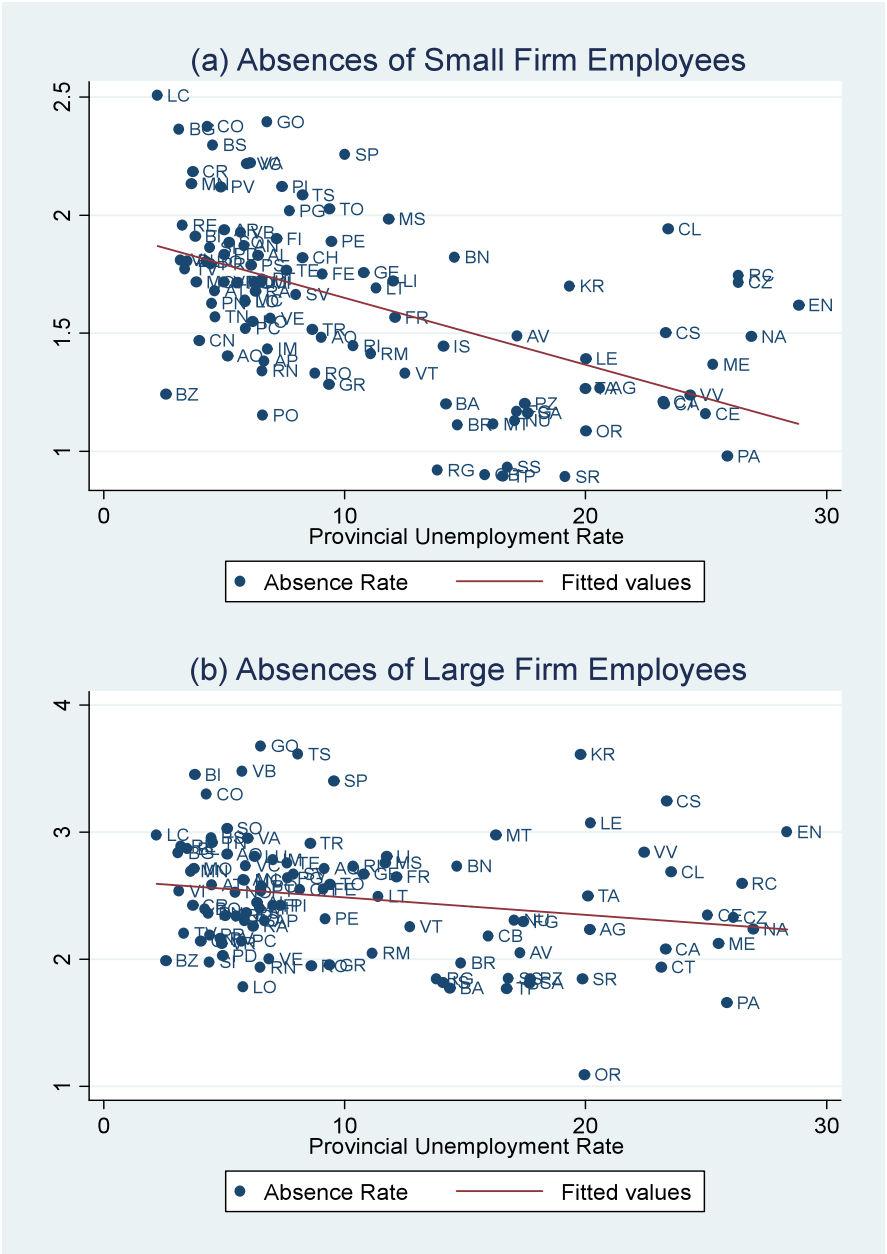

Table 1: Summary statistics

			Small Firms		Large Firms	
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Rate of Absenteeism	2.111	6.717	1.663	6.242	2.441	7.029
Absent (dummy 0/1)	0.193	0.395	0.144	0.352	0.229	0.420
Small Firm (<=15)	0.425	0.494				
Unemployment Rate	9.323	6.929	10.103	7.297	8.747	6.586
Proxy Unemployment	39.028	10.503	40.269	10.744	38.112	10.226
Female	0.252	0.434	0.260	0.439	0.246	0.431
Age	35.590	10.466	34.335	10.305	36.515	10.488
Blue-Collar	0.883	0.321	0.869	0.337	0.893	0.309
Tenure	3.872	4.330	3.222	3.985	4.351	4.508
Actual experience	7.231	4.854	6.290	4.631	7.926	4.898
ln(Wage)	4.038	0.337	3.979	0.295	4.074	0.339
Mining and quarrying	0.003	0.058	0.004	0.059	0.003	0.057
Manufacturing	0.471	0.499	0.367	0.482	0.547	0.498
Construction	0.105	0.307	0.180	0.384	0.050	0.218
Commerce	0.199	0.399	0.258	0.437	0.156	0.363
Hotels and restaurants	0.071	0.257	0.104	0.305	0.046	0.210
Transport and communications	0.071	0.256	0.045	0.207	0.090	0.286
Financial intermediation	0.059	0.235	0.019	0.135	0.089	0.284
Business services	0.007	0.083	0.005	0.070	0.008	0.091
Other social/personal service act.	0.014	0.119	0.020	0.139	0.010	0.101
Year=1993	0.096	0.294	0.104	0.305	0.090	0.286
Year=1994	0.097	0.296	0.101	0.301	0.094	0.292
Year=1995	0.102	0.303	0.103	0.304	0.101	0.302
Year=1996	0.099	0.299	0.100	0.300	0.099	0.299
Year=1997	0.101	0.301	0.099	0.298	0.102	0.302
Year=1998	0.093	0.291	0.091	0.287	0.095	0.293
Year=1999	0.098	0.297	0.094	0.292	0.100	0.301
Year=2000	0.103	0.304	0.100	0.299	0.106	0.308
Year=2001	0.106	0.307	0.103	0.304	0.108	0.310
Year=2002	0.106	0.307	0.107	0.309	0.105	0.306
North-West	0.328	0.469	0.287	0.452	0.358	0.479
North-East	0.263	0.440	0.242	0.428	0.279	0.449
Centre	0.180	0.384	0.192	0.394	0.171	0.377
South	0.160	0.367	0.191	0.393	0.137	0.344
Islands	0.068	0.252	0.088	0.283	0.054	0.226
N	691849		293783		398066	

Notes: WHIP dataset.

Table 2: Absenteeism and Unemployment: OLS and FE estimation results

	(1)	(2)	(3)	(4)	(5)
Unemployment Rate	-0.037***	-0.029***	-0.029***	-0.017***	-0.019***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Small Firm (<=15)	-0.713***	-0.563***	-0.612***	-0.171***	-0.139**
	(0.028)	(0.047)	(0.049)	(0.060)	(0.065)
Small Firm*Unemployment Rate		-0.016***	-0.019***	-0.009	-0.011*
		(0.004)	(0.005)	(0.006)	(0.006)
Lag ln(Wage)			-0.850***		0.031
			(0.080)		(0.068)
Female	0.192***	0.192***	0.063		
	(0.044)	(0.044)	(0.047)		
Age	-0.096***	-0.095***	-0.092***	-0.200***	-0.226***
	(0.012)	(0.012)	(0.011)	(0.020)	(0.027)
Age squared	0.002***	0.002***	0.002***	0.005***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Blue-Collar	0.665***	0.669***	0.504***	0.273***	0.245**
	(0.068)	(0.068)	(0.053)	(0.076)	(0.096)
Tenure	0.137***	0.137***	0.110***	0.279***	0.272***
	(0.009)	(0.009)	(0.009)	(0.013)	(0.014)
Tenure squared	-0.009***	-0.009***	-0.007***	-0.015***	-0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Actual experience	-0.008	-0.009	-0.012**	-0.025	-0.020
	(0.006)	(0.006)	(0.006)	(0.016)	(0.023)
Constant	2.948***	2.862***	6.111***	2.664***	2.695***
	(0.269)	(0.266)	(0.459)	(0.452)	(0.675)
Observations	691849	691849	576470	691849	576470

Notes: WHIP dataset. OLS (columns 1 to 3) and FE (columns 4 to 5) estimates. Unemployment at provincial level. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 3: Robustness check I: proxy for unemployment rate

	OLS		FE
	(1)	(2)	(3)
Proxy Unemployment	-0.015***	-0.016***	-0.011**
	(0.003)	(0.003)	(0.005)
Small Firm (<=15)	-0.372***	-0.407***	-0.069
	(0.102)	(0.119)	(0.123)
Small Firm*Proxy Unemployment Rate	-0.009***	-0.010***	-0.004
	(0.002)	(0.003)	(0.003)
$\ln(\text{Wage})_{t-1}$		-0.865***	0.028
		(0.081)	(0.068)
Female	0.199***	0.067	
	(0.046)	(0.048)	
Age	-0.095***	-0.092***	-0.237***
	(0.012)	(0.011)	(0.027)
Age squared	0.002***	0.002***	0.005***
	(0.000)	(0.000)	(0.000)
Blue-Collar	0.697***	0.533***	0.250**
	(0.072)	(0.057)	(0.095)
Tenure	0.135***	0.108***	0.272***
	(0.008)	(0.009)	(0.014)
Tenure squared	-0.009***	-0.007***	-0.014***
	(0.001)	(0.001)	(0.001)
Actual experience	-0.008	-0.011*	-0.021
	(0.006)	(0.006)	(0.023)
Constant	3.340***	6.701***	3.418***
	(0.286)	(0.456)	(0.790)
Observations	691849	576448	576448

Notes: WHIP dataset. OLS (columns 1 and 2) and FE (column 3) estimates. Proxy Unemployment has been obtained by subtracting from 1 the employment rate at provincial level. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 4: Robustness check II: Comparing more homogeneous firms

	OLS			FE		
	(1)	(2)	(3)	(4)	(5)	(6)
	size: <=100	size: <=200	size: <=1000	size: <=100	size: <=200	size: <=1000
Unemployment Rate	-0.029***	-0.029***	-0.030***	-0.012	-0.011	-0.017**
	(0.006)	(0.006)	(0.006)	(0.008)	(0.007)	(0.007)
Small Firm (<=15)	-0.359***	-0.427***	-0.525***	-0.126*	-0.145**	-0.168**
	(0.050)	(0.054)	(0.051)	(0.073)	(0.070)	(0.069)
Small Firm*Unemployment Rate	-0.017***	-0.018***	-0.018***	-0.012*	-0.012*	-0.010
	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)	(0.006)
$\ln(\text{Wage})_{t-1}$	-0.720***	-0.708***	-0.724***	-0.047	-0.017	0.004
	(0.080)	(0.083)	(0.084)	(0.078)	(0.077)	(0.071)
Female	-0.081*	-0.034	0.028			
	(0.047)	(0.045)	(0.043)			
Age	-0.083***	-0.085***	-0.087***	-0.151***	-0.168***	-0.187***
	(0.011)	(0.011)	(0.012)	(0.033)	(0.032)	(0.028)
Age squared	0.002***	0.002***	0.002***	0.004***	0.005***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Blue-Collar	0.539***	0.569***	0.592***	0.291***	0.247***	0.299***
	(0.053)	(0.052)	(0.054)	(0.106)	(0.090)	(0.096)
Tenure	0.086***	0.091***	0.106***	0.258***	0.263***	0.273***
	(0.010)	(0.010)	(0.009)	(0.015)	(0.015)	(0.014)
Tenure squared	-0.006***	-0.007***	-0.007***	-0.014***	-0.014***	-0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Actual experience	-0.020***	-0.018***	-0.017***	-0.057**	-0.052**	-0.040
	(0.005)	(0.005)	(0.006)	(0.025)	(0.024)	(0.024)
Constant	5.451***	5.406***	5.465***	1.213	1.577**	1.934***
	(0.437)	(0.461)	(0.475)	(0.848)	(0.778)	(0.727)
Observations	416701	458273	522598	416701	458273	522598

Notes: WHIP dataset. OLS (columns 1 to 3) and FE (columns 4 to 6) estimates. Models 1 and 4: only firms below 100 employees; Models 2 and 5: only firms below 200 employees; Models 3 and 6: only firms below 1000 employees. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 5: Robustness check III: clusters at individual and province of work levels

	(1)	(2)
Unemployment Rate	-0.029***	-0.029***
	(0.006)	(0.006)
Small Firm (<=15)	-0.563***	-0.612***
	(0.047)	(0.050)
Small Firm*Unemployment Rate	-0.016***	-0.019***
	(0.004)	(0.005)
$\ln(\text{Wage})_{t-1}$		-0.850***
		(0.080)
Female	0.192***	0.063
	(0.044)	(0.047)
Age	-0.095***	-0.092***
	(0.012)	(0.012)
Age squared	0.002***	0.002***
	(0.000)	(0.000)
Blue-Collar	0.669***	0.504***
	(0.068)	(0.053)
Tenure	0.137***	0.110***
	(0.009)	(0.009)
Tenure squared	-0.009***	-0.007***
	(0.001)	(0.001)
Actual experience	-0.009	-0.012**
	(0.006)	(0.006)
Constant	2.861***	6.113***
	(0.267)	(0.461)
Observations	691849	576448

Notes: WHIP dataset. OLS Estimates with cluster standard errors computed at individual and provincial level. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 6: Robustness Check IV: by gender

	Men			Women		
	OLS		FE	OLS		FE
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment Rate	-0.026***	-0.027***	-0.022***	-0.029***	-0.028**	0.007
	(0.005)	(0.006)	(0.006)	(0.011)	(0.011)	(0.019)
Small Firm (<=15)	-0.375***	-0.426***	-0.144*	-1.049***	-1.104***	-0.142
	(0.045)	(0.046)	(0.077)	(0.092)	(0.100)	(0.122)
Small Firm*Unemployment Rate	-0.024***	-0.027***	-0.012*	0.003	-0.001	-0.003
	(0.004)	(0.004)	(0.006)	(0.010)	(0.011)	(0.017)
$\ln(\text{Wage})_{t-1}$		-0.862***	0.048		-0.755***	-0.006
		(0.086)	(0.072)		(0.114)	(0.127)
Age	-0.104***	-0.097***	-0.279***	-0.056***	-0.062***	-0.072
	(0.013)	(0.012)	(0.032)	(0.017)	(0.019)	(0.048)
Age squared	0.002***	0.002***	0.006***	0.001***	0.001***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Blue-Collar	0.764***	0.572***	0.286**	0.520***	0.446***	0.189
	(0.066)	(0.057)	(0.130)	(0.087)	(0.083)	(0.141)
Tenure	0.120***	0.098***	0.273***	0.178***	0.142***	0.267***
	(0.009)	(0.009)	(0.015)	(0.014)	(0.016)	(0.024)
Tenure squared	-0.009***	-0.007***	-0.014***	-0.010***	-0.007***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Actual experience	-0.017***	-0.019***	-0.008	0.010	0.003	-0.046
	(0.006)	(0.006)	(0.025)	(0.009)	(0.010)	(0.040)
Constant	2.972***	6.193***	3.639***	2.397***	5.346***	-0.263
	(0.296)	(0.515)	(0.834)	(0.339)	(0.624)	(1.289)
Observations	517455	435688	435688	174394	140760	140760

Notes: WHIP dataset. OLS (columns 1, 2, 4 and 5) and FE (columns 3 and 6) estimates. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 7: Robustness check V: balanced panel

	OLS		FE
	(1)	(2)	(3)
Unemployment Rate	-0.026***	-0.027***	-0.006
	(0.009)	(0.009)	(0.012)
Small Firm (<=15)	-0.518***	-0.582***	-0.303***
	(0.061)	(0.070)	(0.102)
Small Firm*Unemployment Rate	-0.016***	-0.017***	0.015
	(0.006)	(0.006)	(0.010)
$\ln(\text{Wage})_{t-1}$		-0.510***	-0.233**
		(0.120)	(0.110)
Female	0.084	-0.005	
	(0.065)	(0.064)	
Age	-0.126***	-0.113***	0.148**
	(0.020)	(0.023)	(0.065)
Age squared	0.002***	0.002***	0.004***
	(0.000)	(0.000)	(0.000)
Blue-Collar	0.570***	0.484***	0.309**
	(0.077)	(0.064)	(0.129)
Tenure	0.045***	0.039***	0.115***
	(0.010)	(0.011)	(0.013)
Tenure squared	-0.003***	-0.002***	-0.005***
	(0.001)	(0.001)	(0.001)
Actual experience	-0.018**	-0.014*	-0.327***
	(0.008)	(0.008)	(0.063)
Constant	3.491***	4.943***	-5.742***
	(0.396)	(0.662)	(1.778)
Observations	189060	170905	170905

Notes: WHIP dataset. OLS (columns 1 and 2) and FE (column 3) estimates. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 8: Absenteeism and Unemployment: OLS estimation results controlling for health indicators

	OLS			FE	
	(1)	(2)	(3)	(4)	(5)
PANEL A					
Unemployment Rate	-0.040***	-0.033***	-0.032***	-0.019***	-0.021***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Small Firm (<=15)	-0.710***	-0.563***	-0.613***	-0.172***	-0.140**
	(0.028)	(0.047)	(0.050)	(0.060)	(0.065)
Small Firm*Unemployment Rate		-0.016***	-0.019***	-0.009	-0.011*
		(0.005)	(0.005)	(0.006)	(0.006)
Life expectancy (at 45)	-0.131***	-0.130***	-0.125***	-0.069**	-0.051
	(0.034)	(0.034)	(0.037)	(0.028)	(0.031)
Lag ln(Wage)			-0.849***		0.032
			(0.080)		(0.068)
Constant	7.134***	7.010***	10.093***	4.357***	3.921***
	(1.066)	(1.072)	(1.146)	(0.853)	(0.992)
Observations	691849	691849	576467	691849	576467
PANEL B					
Unemployment Rate	-0.033***	-0.025***	-0.026***	-0.013**	-0.015**
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
Small Firm (<=15)	-0.713***	-0.563***	-0.611***	-0.174***	-0.142**
	(0.028)	(0.047)	(0.049)	(0.059)	(0.065)
Small Firm*Unemployment Rate		-0.016***	-0.019***	-0.009	-0.010*
		(0.004)	(0.005)	(0.006)	(0.006)
Mortality rate	0.004**	0.004**	0.003	0.005**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Lag ln(Wage)			-0.846***		0.032
			(0.081)		(0.068)
Constant	2.481***	2.392***	5.758***	2.154***	2.178***
	(0.375)	(0.373)	(0.582)	(0.466)	(0.674)
Observations	691364	691364	576023	691364	576023

Notes: WHIP dataset. OLS (columns 1 to 3) and FE (columns 4 and 5) estimates. Further Controls and specifications: the same used in Table 2. Life expectancy and mortality are collected from *Health for All* (ISTAT, 2012). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 9: Being absent (dummy 0/1) and unemployment: Linear Probability Model and FE estimation results

	(1)	(2)	(3)	(4)	(5)
Unemployment Rate	-0.003***	-0.002***	-0.002***	-0.001**	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Small Firm (<=15)	-0.067***	-0.057***	-0.058***	-0.028***	-0.027***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Small Firm*Unemployment Rate		-0.001***	-0.001***	-0.000	-0.001*
		(0.000)	(0.000)	(0.000)	(0.000)
Lag ln(Wage)			-0.029***		0.009***
			(0.005)		(0.003)
Female	0.010**	0.010**	0.007		
	(0.005)	(0.005)	(0.004)		
Age	-0.005***	-0.005***	-0.005***	-0.018***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Age squared	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Blue-Collar	0.057***	0.057***	0.054***	0.014***	0.016**
	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)
Tenure	0.026***	0.026***	0.024***	0.030***	0.029***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tenure squared	-0.002***	-0.002***	-0.001***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Actual experience	0.003***	0.003***	0.003***	0.013***	0.020***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)
Constant	0.224***	0.218***	0.308***	0.493***	0.435***
	(0.016)	(0.016)	(0.025)	(0.041)	(0.049)
Observations	691849	691849	576470	691849	576470

Notes: WHIP dataset. OLS (columns 1 to 3) and FE (columns 4 to 5) estimates. Unemployment at provincial level. Further Controls: Dummies for regions of birth (21), for Sectors of work (9), for years (10). Standard errors are allowed for within provincial correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 10: Days of Absence and Regional Unemployment: OLS estimation results

	(1) Private	(2) Public	(3) Private and Public
Unemployment Rate	-0.072**	0.020	-0.066**
	(0.030)	(0.034)	(0.030)
Public Employee			-0.350
			(0.567)
(Unemployment Rate)*(Public Employee)			0.073
			(0.049)
Implied Effect of Unemployment on Public Employee			0.007
			(0.032)
Observations	25011	9540	34551
Adjusted R^2	0.009	0.010	0.009

Notes: SHIW dataset (waves 1995, 1998, 2000, 2002). The dependent variable is Days of Absence. OLS estimates. Further Controls: Small Firm, Female, Age, Age Squared, Years of Education, Married, Children age<=5, Tenure, Year dummies. Standard errors are allowed for within region of work correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 11: Effect of sickness absence on risk of unemployment

	(1)	(2)	(3)	(4)
Rate of Absenteeism	0.078***	0.067***	0.071***	0.068***
	(0.006)	(0.007)	(0.007)	(0.006)
Small Firm (<=15)		0.015***	0.002**	0.004***
		(0.001)	(0.001)	(0.001)
Small Firm*Rate of Absenteeism		0.034***	0.039***	0.046***
		(0.012)	(0.012)	(0.012)
Female		0.028***	0.029***	0.033***
		(0.001)	(0.001)	(0.001)
Age		0.002***	0.005***	0.005***
		(0.000)	(0.000)	(0.000)
Age squared		-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)
Blue-Collar			0.016***	0.021***
			(0.001)	(0.002)
Tenure			-0.001***	-0.001***
			(0.000)	(0.000)
Tenure squared			-0.000***	-0.000***
			(0.000)	(0.000)
Actual experience			-0.002***	-0.002***
			(0.000)	(0.000)
ln(Wage)				0.027***
				(0.001)
Constant	0.039***	-0.013***	-0.103***	-0.213***
	(0.000)	(0.004)	(0.021)	(0.021)
Observations	508440	508440	508440	508112

Notes: WHIP dataset. OLS estimates. Further Controls: Dummies for Province of work (102), for Sectors of work (9), for years (6). Standard errors are allowed for within individual correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Table 12: Effect of sickness absence (past 3 years) on risk of unemployment

	(1)	(2)	(3)	(4)
Rate of Absenteeism (past 3 years)	0.070***	0.066***	0.073***	0.074***
	(0.007)	(0.009)	(0.008)	(0.008)
Small Firm (<=15)		0.015***	0.002**	0.004***
		(0.001)	(0.001)	(0.001)
Small Firm*Rate of Absenteeism (past 3 years)		0.024*	0.031**	0.037***
		(0.014)	(0.014)	(0.014)
Female		0.028***	0.029***	0.033***
		(0.001)	(0.001)	(0.001)
Age		0.002***	0.005***	0.005***
		(0.000)	(0.000)	(0.000)
Age squared		-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)
Blue-Collar			0.016***	0.021***
			(0.001)	(0.002)
Tenure			-0.001***	-0.001***
			(0.000)	(0.000)
Tenure squared			-0.000***	-0.000***
			(0.000)	(0.000)
Actual experience			-0.002***	-0.002***
			(0.000)	(0.000)
ln(Wage)				0.026***
				(0.001)
Constant	0.039***	-0.012***	-0.103***	-0.210***
	(0.000)	(0.004)	(0.021)	(0.021)
Observations	508440	508440	508440	508112

Notes: WHIP dataset. OLS estimates. Further Controls: Dummies for Province of work (102), for Sectors of work (9), for years (6). Standard errors are allowed for within individual correlation. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.