Worker Absenteeism and Incentives: Evidence from Italy

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Abstract: In Italy employees are fully insured against earning losses due to illness. Since worker's health is not easily verifiable, absenteeism due to illness is considered an empirical proxy for employee shirking. The Bank of Italy Household Survey (SHIW) provides individual data on days of absence. Controlling for personal characteristics and potential determinants of health status and family responsibilities (age, gender, education, marital status, children at home) we show that the nature of employment contracts affects workers' incentives to provide effort: sickness absences, at least partially, hide opportunistic behaviours. The type of occupation and the labour contracts affects workers' behaviour in that more protected and difficult to monitor jobs show significantly higher levels of absenteeism: employees in public sector or in large firms, with permanent contracts or with longer tenure, individuals living in regions with low unemployment rates.

JEL classification: J41, M51, J45.

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1. Introduction

In several labour markets, employees are insured (by their employers or by a public administered system) against earnings losses due to illness. In Italy, the National Institute of Social Security (INPS) pays for sick leave benefits (the so-called "indennità di malattia") after the third day of absence (benefits range from 50 to 67% of the daily wage). In addition, collective employment contracts typically establish that employers pay for the first three days and supplement Social Security benefits for the following days: a worker usually ends up obtaining almost 100 percent of his/her wage for the entire period of absence due to health problems.

Since the worker's effective state of health is typically costly to observe for the employer or for public authorities (and even for qualified doctors), a full-coverage insurance creates a classical moral hazard problem for workers, who are induced to take days off, gaining a wage without providing any effort. Therefore, sickness absences may hide opportunistic behaviour. In a recent body of literature, absenteeism is assimilated to shirking decisions: in a series of papers, Barmby, Sessions and Treble (1994), Riphahn (2004), Ichino and Riphahn

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(2005), Ichino and Maggi (2000), Winkelmann (1999) among others, have used absenteeism as an indicator of worker shirking.[1]

In following this approach, we estimate several specifications of a model of absenteeism – controlling for many individual characteristics (and for health status for a sub-sample of workers) – with the aim to show that contractual conditions and the institutional framework of Italian labour markets determine individuals' incentives to work loyally or to shirk.

Preliminarly, we verify whether sickness absences are affected by the availability of sick-pay, that is, if employees have higher absent rates in comparison to self-employed, who are not insured against earning losses due to illness.

As regards employees, since with the full-coverage insurance of earnings workers are tempted to behave opportunistically, taking days off, employers have interest to prevent this behaviour using available contractual instruments. The most common ways in which firms provide incentives is that they threat of firing workers in case of detection of shirking (Shapiro and Stiglitz, 1984), or adopt deferred compensation systems, awarding wage increases or promotions to workers exerting high effort (Prendergast, 1999; Lazear, 1981; Lazear and Rosen, 1981).[2]

However, the possibility of using "carrots" and "sticks" hinges on the institutional framework and contractual arrangements. Italian labour markets are highly regulated and collective employment contracts establish wages and cover many relevant aspects of job relationships. In particular, the employment protection legislation makes very hard or costly for firms to fire workers (see Boeri and Jimeno, 2005). Protection against dismissals is much less strict in small firms (less than 16 employees), but employment protection is very strong for public sector workers, who in practice cannot be dismissed, except in cases of severe misconduct. On the other hand, the employment relationship can be easily terminated with workers under fixed term contracts.

Therefore, given the different feasibility of the threat of firing, we expect to find that employees in small firms, as well as temporary workers, shirk less, whereas civil servants and large firm employees indulge more in opportunistic behaviour.

Furthermore, the threat of termination should be, in principle, more effective in labour markets characterized by large unemployment, where it is much more difficult to find a new job (see Cappelli and Chauvin, 1991). Therefore, absence rates should be lower in high unemployment regions.

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[1] Several other works – see, for example, Allen (1981), Barmby, Orme and Treble (1991), Johansson and Palme (2002) – instead deal with absenteeism as a labour supply decision, without focusing on firm policies which might affect worker incentives.

[2] On the other hand, raising current wage is hardly helpful, since workers have a 100-percent coverage insurance against absences.

Alternatively, workers might be incentivised – in order to prevent shirking – by conditioning wage increases or promotions on their current performance (subjectively evaluated by hierarchical superiors). However, in large firms it is relatively more difficult to monitor workers and the interests of hierarchical superiors, not being the residual claimants, to monitor and reward workers are less strong (see Prendergast and Topel, 1996; Milgrom and Roberts, 1988). Furthermore, we expect that this incentive mechanism does not work properly for public sector jobs, in which tend to prevail bureaucratic compensation systems (based on educational qualifications and seniority). These constitute additional factors contributing to a higher incidence of absences among public sector and large firm employees.

Finally, we expect that the incentive system works better in the initial stages of a job relationship, in which employees have greater interests to signal their qualities ("career concerns") while it is less effective for long-tenured workers, for whom uncertainty regards their ability has vanished.

The micro-econometric evidence we provide for Italian workers – based on six waves of the Bank of Italy *Survey of Household Income and Wealth* (SHIW) – is consistent with these theoretical predictions of incentives theory: put it simply, incentives matter and workers' behaviour respond to contractual structure and job characteristics. Sickness absences do not purely represent the consequences of critical medical conditions but they are often voluntary absenteeism reacting to economic incentives. Controlling for individual and family characteristics (age, gender, education, marital status, number of children in the household under certain age) which could affect both the health status and the propensity to be absent, we find that self-employed workers are much less absent than employees and their absences are negatively related to their labour income; highly protected public sector workers and employees of large firms are absent more frequently than employees of small private firms; employees in high-unemployment regions show lower absenteeism rates; employees hired with fixed term contracts are less absent while employees with long tenure show more days of absence.

Obviously, workers' absences are due to some extent to health problems. We are able to control for individual health indicators only for a sub-sample of workers: in the 1995 wave of SHIW individuals were asked to describe their health status and to indicate if they suffer from chronic illness or disability. Controlling for these health status variables, our main findings are widely confirmed in this sub-sample of workers, confirming that the omission of health information does not distort estimates (probably because health conditions are not correlated to our variables of interest).

The paper is organized as follows. Section 2 presents the SHIW dataset we use and provides descriptive statistics. In Section 3 we present several OLS regression estimates explaining the number of days of absences as a function of personal and family characteristics and contractual conditions related to the type of employment which affect incentives of workers

to be absent. Section 4 estimates a probit model for the probability of being absent as robustness check. Section 5 offers some concluding remarks.

2. The Data

The data source for our empirical analysis is the *Survey of Household Income and Wealth* (SHIW) which is conducted every two years by the Bank of Italy on a representative sample of about 8,000 Italian households (made up of about 20,000 individuals).[3] The SHIW collects detailed information on demographic and social characteristics of individuals in the households (age, gender, marital status, education, region of residence) and on their working activity (earnings, employment status, type of occupation, firm size, type of contract, industry, work experience, and so on).

A characteristic of the SHIW data set which we exploit in this paper are the following questions asked to each worker: 1) "During [the past calendar year] were there any days in which you took sick leave (apart from maternity leave)?"; 2) Moreover, individuals are asked: "How many days you took sick leave?"

We use SHIW data drawn from the latest six waves (for years 1995, 1998, 2000, 2002, 2004, 2006) which we pool together in order to increase the degrees of freedom available. We restrict the sample to all full-time workers (considering only their main activity), both employees and self-employed, aged 15-65 years, ending up with a sample of about 44,000 observations.

We define a dummy variable *Absent* which takes on the value one if the individual took sick leave in the reference year; furthermore, we define a variable *Days of Absence* indicating the number of days in which the individual was absent from work due to illness.

Unfortunately, even if in the SHIW dataset there is a panel section with a sub-sample of individuals, it is not very useful for our purposes. The reason is that it is a rotating panel and typically individuals are observed only twice, in two adjacent periods. Transitions from an employment state to another, which would allow to estimate parameters of interest, are rather infrequent. Moreover, when transitions take place we are not able to know the date of switching and therefore we do not observe if the reported days of absence refer to the first or to the second employment state.

We report in Table 1 the summary statistics for the main variables used in the analysis.

Table 1. Descriptive statistics of the sample used in the analysis.

	Mean	Std. Dev.	Min	Max	Obs.
Days of Absence	4.464	16.351	0	365	44623

[3] SHIW data are freely available at www.bancaditalia.it. They have been used recently by Guiso, Sapienza and Zingales (2004). We refer to the Appendix of their work which contains many detailed information on the dataset. See also Brandolini and Cannari (1994).

Absent	0.297	0.457	0	1	44721
Female	0.387	0.487	0	1	44721
Age	39.860	10.492	15	65	44721
Education	10.890	3.802	0	20	44721
Married	0.656	0.475	0	1	44721
Self-employed	0.218	0.413	0	1	44721
Small Firm	0.249	0.432	0	1	44721
Medium Firm	0.169	0.374	0	1	44721
Large Firm	0.157	0.364	0	1	44721
Public Employee	0.205	0.404	0	1	44721
Labour Income (thousands euro, 2006 price)	16.063	12.582	-25.934	1037.357	41207
Fixed-Term Contract	0.086	0.281	0	1	29338
Number of Children of age<=5	0.187	0.462	0	4	44721
Number of Children of age>=6	0.545	0.795	0	5	44721
North-West	0.291	0.454	0	1	44721
North-East	0.229	0.420	0	1	44721
Centre	0.205	0.404	0	1	44721
South	0.187	0.390	0	1	44721
Islands	0.089	0.284	0	1	44721
Very Small City (<20)	0.471	0.499	0	1	44721
Small City (20-40)	0.135	0.341	0	1	44721
Medium City (40-500)	0.265	0.441	0	1	44721
Large City (>500)	0.130	0.336	0	1	44721

In our sample of workers, 22% are self-employed; 20% are public sector employees; among private employees, 25% are small firm employees (we define small firms those with less than 20 employees); 17% are medium firm employees (medium firms have a number of employees between 20 and 100), and 16% are large firm employees (firms with more than 100 employees). About 9% of workers have fixed term contracts.

Females are 39%. Married people 66%. Average years of education are about 11, average age is 40. Average labour income (after tax) is 16,000 euros (in 2006 prices). About 50 percent of individuals live in the North and 27% in the South and Islands.[4]

About seventy percent of the workers in the sample reports no absence day. The average number of days of absence is 4.5 for the whole sample, while is 15.1 for workers who made at least 1 day of absence.

Since our measure of absenteeism are workers' self-reported absences due to illness, there is the justifiable concern that absences are underreported. However, other measures of absenteeism from different sources are consistent with our estimates. For example, Ichino and Riphahn (2005) using firm administrative records find that absenteeism rate among white collars employees of a large bank is 1.3% (during their first year of employment). Assuming 240 working days per year, in our sample large firm white-collars show an absenteeism rate of 2.3%. Barmby, Ercolani and Treble (2002) compare major European countries (unfortunately not Italy) and report absence rates similar to those in our sample: for example, France and Spain

[4] North-West includes the following regions: Piemonte, Valle d'Aosta, Lombardia, Liguria; North-East includes Veneto, Trentino Alto Adige, Friuli Venezia Giulia, Emilia Romagna; Center includes Toscana, Lazio, Marche, Umbria; South includes Abruzzi, Campania, Puglia, Molise, Basilicata, Calabria; Islands include Sicilia and Sardegna

– with sick-pay systems similar to Italy – have absence rates equal to, respectively, 2.59% and 2.48%. Sweden is somehow an outlier with a rate of 6.31%.[5]

Table 2. Workers' Absences by Type of Employment and Job

	Days of Absence	Absent
Self-employed	1.985	0.129
Small Firm Employee	3.786	0.263
Medium Firm Employee	5.250	0.339
Large Firm Employee	6.192	0.403
Public Employee	5.976	0.401
Fixed Term Contract	3.283	0.204

Some preliminary evidence reported in Table 2 sheds light on the incidence of type of employment and contractual forms on absenteeism. Self-employed are absent about 2 days per year (only 13% makes any absence) while employees are absent 5.2 days; private employees are 4.7 days absent while public employees are 6 days (40% of public employees are absent at least a day). Employees in large firms miss 6.2 days, medium firms employees 5.2 and small firms employees 3.8. Workers on fixed term contracts have 3.3 days of absence while permanent workers 4.5. All these differences are statistically significant at the one percent level.

In the next section we carry out an econometric analysis to verify if these differences remain when one controls for individuals and family characteristics which might affect absenteeism.

3. The Determinants of Worker Absenteeism

Our paper is related to a growing literature showing that contractual arrangements and, in particular, employment protection legislation affect workers' behaviour. In particular, Ichino and Riphahn (2005) show that employees of a large Italian bank are less absent during their probationary period (the initial three months of employment) – because of a lower degree of employment protection. Similarly, Riphahn and Thalmaier (2001) find that German employees show a higher probability to be absent after their probationary period of six months. Along the same lines, Riphahn (2004) shows that German public sector workers with long tenure are absent more often than their younger colleagues.

Winkelmann (1999) finds that German workers in large firms have 1.6 days more absent days than workers in small firms and argues that this difference is due to shirking because of a lower probability of being caught in large firms. Johannson and Palme (1996, 2002) analyze the impact of economic incentives on absenteeism, using a sample of Swedish

[5] However, absences of public employees seem considerable underreported since the average number of days of sickness absence ranges between 10 to 12 days according to the 2006 Public Sector Annual Account of Minister of Economy ("Ragioneria Generale dello Stato"). Our findings are valid, *a fortiori*, if absences of public employees are underreported.

blue-collar workers. They find that worker absences significantly declined when sickness benefits were reduced and when the unemployment rate increased.

Barmby, Sessions and Treble (1994) present a theoretical model to illustrate the relationship between wage and absence, and Barmby, Orme and Treble (1995) find that an increase in wage reduce absence rates.

We follow this approach and complement their findings showing that for a representative sample of Italian workers the propensity of the worker to be absent depends on the type of employment and the related contractual conditions. We emphasize that absenteeism is determined not only by the employment protection legislation, but also by other contractual aspects and job characteristics which are consistent with incentives models.

Our dependent variable is the annual number of days in which a worker was absent referred to the past calendar year (*Days of Absence*). In this Section we estimate the determinants of absenteeism with OLS. In Section 3.3, as a robustness exercise, we estimate instead the probability of being absent with a Probit model.

We regress the number of *Days of Absence* allegedly due to illness on a series of dummy indicating the type of employment, controlling for several personal and family characteristics (age, gender, marital status, presence of children in the household, education) which might affect absences: for example, age affects health conditions and family responsibilities tend to cause absences. In addition, in all regressions we control for regional dummies, city size dummies and time dummies.

Table 3. OLS regression estimates for the annual number of *Days of Absence*

	(1)	(2)	(3)	(4)	(5)
Self-employed	-3.335***	-3.035***	-1.848***	-2.332***	-1.472***
	(0.220)	(0.242)	(0.275)	(0.356)	(0.340)
Public Employee		1.033***	2.271***	2.171***	2.773***
		(0.291)	(0.323)	(0.422)	(0.360)
Medium Firm Employee			1.518***	1.360***	1.574***
			(0.344)	(0.409)	(0.343)
Large Firm Employee			2.411***	2.321***	2.525***
			(0.396)	(0.526)	(0.403)
Female	0.746***	0.648***	0.718***	0.939***	0.885***
	(0.245)	(0.243)	(0.242)	(0.318)	(0.249)
Age	0.266***	0.252***	0.210***	0.191**	0.209***
	(0.067)	(0.067)	(0.067)	(0.085)	(0.067)
Age Squared	-0.002***	-0.002***	-0.002**	-0.002	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	-0.125***	-0.154***	-0.180***	-0.125***	-0.093***
	(0.027)	(0.029)	(0.029)	(0.038)	(0.036)
Married	0.010	0.009	-0.050	0.075	-0.029
	(0.298)	(0.298)	(0.297)	(0.383)	(0.299)
Children age<=5	1.612***	1.603***	1.605***	2.065***	1.607***
	(0.349)	(0.349)	(0.349)	(0.478)	(0.349)
Children age >6	-0.225	-0.254*	-0.250	-0.358*	-0.256*
	(0.154)	(0.154)	(0.154)	(0.210)	(0.154)
Labour Income (log)	0.214	0.162	-0.041	-0.110	0.073
	(0.203)	(0.201)	(0.204)	(0.260)	(0.202)
Fixed-Term Contract				-1.632***	
				(0.435)	
Blue Collar					0.903**
					(0.356)

Teacher					-1.333***
					(0.422)
Manager-Cadre					-1.102**
					(0.493)
Constant	-2.113	-1.139	0.788	0.426	-1.884
	(1.842)	(1.820)	(1.830)	(2.454)	(1.889)
Observations	41048	41048	41048	27171	41048
R-squared	0.012	0.013	0.015	0.017	0.016

Notes: The Table reports OLS estimates. The dependent variable is *Days of Absence.* Sample weights are used. In all the regressions we control for regional dummies, city size dummies and year dummies. Standard errors (corrected for heteroskedasticity) are reported in parentheses. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

Estimation results are reported in Table 3. Results in all columns show that personal and family-related variables are highly significant. Absences due to illness increase with the age (although at decreasing rate), almost certainly because health problems are more frequent as individuals become older. Females are typically more absent, perhaps because they bear family responsibilities more than males. Being married does not lead to more absences while having children aged 5 or less in the family significantly increases absences.[6] Years of education strongly reduce absences: it is likely that educational levels represent a proxy for the quality of job environment and the physical heaviness of tasks. In all the regressions we control also for labour income (in log) and it turns out to be not significant (on this aspect, see below, Table 4).[7]

As regards the type of employment, we verify firstly if *Self-Employed* are less absent. Column (1) shows that self-employed are absent 3.3 days less than employees. The coefficient is statistically significant, with a *t*-stat of −15. Relative to the sample average of 4.5 days, self-employed are absent about 75% less.

We interpret this as a first evidence of moral hazard arising in insurance contracts: self-employed are not insured at all, so they have full incentives for not being absent; employees who are fully insured against earning losses have weaker incentives to show up at work, harming the employer and the social security system who fully cover earnings against the negative event of illness.

A similar comparison between self-employed and employees have been exploited by Lazear and Moore (1984) who used self-employed as a benchmark to highlight the differences in the incentives faced by employees affecting the shape of their age-earnings profile. As they put it, "a major difference between self-employment and work for other is that agency problems are unimportant in self-employment" (p. 275).

In column (2) we insert a dummy *Public Employee*. The reference category is in this case *Private Employee*. Due probably to the high degree of employment protection and a lack of importance of incentives in the public sector (see Dixit, 2002), public employees are absent

[6] The presence of children aged 6 or more has a negative effect on absences although marginally insignificant (p-values range from 0.09 to 0.15 according to specification). The presence of children might induce workers to be more responsible, discouraging opportunistic behaviour.

[7] Results do not change is wage is inserted linearly or in other non-linear forms.

significantly more often than private employees (whereas, in turn, self-employed are much less absent than private employees).[8]

In column (3) we distinguish private employees according to the size of the firm in which they work, inserting two dummies for *Medium Firm* (from 20 to 99 employees) and *Large Firm* (100 or more employees).[9] The reference category in this specification is *Small Firm*. Results show clearly that worker absenteeism increases with the size of the firm: workers in medium firms are absent 1.5 days more while workers in large firms are absent about 2.4 days more than workers in small firms. The difference between medium and large firm is statistically significant at the 5 percent level.

Several factors might explain the uncovered relations between absenteeism and firm size. First of all, the employment protection legislation is much stronger in firms with more than 15 employees.[10] However, the finding that medium and large firms have different absence rates even if their employees have the same level of employment protection, suggests that other factors may be at work in affecting employees behaviour: unionization rate increases with firm size and makes more difficult disciplinary firing; monitoring workers' behaviour is increasingly harder in larger firms and direct supervisors are not the residual claimants but are themselves agents of other principals/owners.

An alternative explanation which might contribute to explain this fact is based on labour demand considerations: large firms might contrast absenteeism less vigorously because they bear lower costs for absenteeism since their size allow them to solve problems of absences more easily, for example holding a smaller buffer stock of workers (see Barmby and Stephan, 2000).

In column (4) we verify that employees under fixed term contracts are significantly less absent (–1.6 days, significant at the 1 percent level). Temporary workers are easily threatened by firms of non renewal of the labour contract in case of shirking: therefore they are induced to work hard and try to avoid any absence. Note that in this specification we lose many observations because data on temporary contracts are available only since 2000.

In column (5) of Table 3 we control for worker's professional qualification, inserting dummies for *Blue Collar*, *Teacher* and *Manager-Cadre*. The omitted category is *White Collar*. Results show that blue-collars record significantly more absences, probably due physical

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[8] Renato Brunetta, the Italian Minister of Public Administration, in June 2008 has launched a vigorous campaign against the absenteeism of public sector employees and has introduced more restrictive rules for sick leave in order to reduce absences.

[9] Unfortunately, in the dataset no information is available for public employees regards to the size of the organizations in which they work.

[10] In case of dismissal the worker can appeal to a court against the dismissal. If the judge rules that the firing is "unfair" in firms with more than 15 employees the worker has to receive as compensation: 1) all the foregone earnings after the dismissal; 2) either an extra financial compensation of 15 months earnings or reinstated in the same firm (the choice is up to the worker). In firms with less than 16 employees, the firm has the right to choose between re-employment or paying financial compensation ranging between 2.5 and 6 months wages. In addition, the firms have to pay the legal costs and a penalty for the delayed payment of social security contributions.

heaviness of job, to higher risks of injury and exposure to factors leading to illness. Teachers and managers-cadres are instead significantly less absent than white collars.

Furthermore, we control for industries, inserting 10 industry dummies (not reported): apart from public sector (in which workers are more absent) and agriculture (in which workers are less absent) there are no significant differences across industries in the absenteeism rate. Our main findings on the relationship between absenteeism and type of employment are not altered when we control for workers' qualifications or for industries.

3.1. The Threat of Firing and the Influence of Unemployment

The threat of firing may have greater effectiveness in preventing worker's shirking in situations in which the worker's outside option is lower, for example, when in the local labour market is difficult to find a job because of a high level of unemployment. This is the inspiring idea of the empirical analysis of Cappelli and Chauvin (1991) who find more shirking episodes in plants of a large firm located in low-unemployment US areas.

To investigate this aspect we replicate our main specification, considering first only private employees, using the average unemployment rate in each region as explanatory variable.[11] The standard errors are adjusted for the potential clustering of residuals at the regional level.[12]

Results are reported in Table 4. Controlling for all the individual and job characteristics considered above, we find that in regions with high unemployment the worker absenteeism rate is significantly lower (*p*-value is 0.001). To illustrate, the absenteeism rate decreases by 17%, ceteris paribus, moving from a region as Veneto (with unemployment rate equal to 5%, the 25th percentile) to a region as Basilicata (with unemployment rate equal to 14%, the 75th percentile).

Therefore, Southern regions – characterized by higher unemployment rates – show lower absenteeism rates. This is particularly remarkable because – as shown in a number of studies (see the classical works by Banfield (1958) and Putnam (1993) and, more recently, Ichino and Maggi (2000) and Guiso, Sapienza and Zingales (2004) among others) – Southern regions are less endowed with social capital and typically show a greater propensity to opportunistic behavior.

As explained above, because of a very rigid employment protection legislation, public sector workers are almost un-dismissable. This implies that the local rate of unemployment should not affect their behaviour. This is confirmed by results in regression (2) (Table 4) where we consider only public sector employees. For this sub-sample, the unemployment rate turns out

[11] Unfortunately, the province of residence of individuals is not available in the dataset.
[12] Results are very similar without adjusting standard errors for clustering (not reported).

to be positive (significant at 10% level). Therefore, in stark contrast to the private sector, in high-unemployment (Southern) regions, the absenteeism rate of public employees is higher.

These findings are confirmed in column (3) of Table 4 where we consider jointly private and public employees (excluding self-employed) and insert an interaction variable *Public*Regional Unemployment Rate*. Results show that for private employees, a higher unemployment rate significantly reduces absenteeism (–0.07). On the other hand, for public employees a higher unemployment rate determines higher absenteeism (–0.078+0123=+0.045).

Table 4. Absenteeism and Regional Unemployment.

	(1)	(2)	(3)
Regional Unemployment Rate	-0.085***	0.051*	-0.078***
	(0.023)	(0.029)	(0.026)
Public*Regional Unemployment Rate			0.123***
			(0.035)
Public Employee			0.909*
			(0.469)
Medium Firm Employee	1.445***	0.000	1.437***
	(0.386)	(0.000)	(0.386)
Large Firm Employee	2.315***	0.000	2.312***
	(0.551)	(0.000)	(0.529)
Age	0.158	-0.120	0.070
	(0.126)	(0.294)	(0.109)
Age Squared	-0.001	0.003	0.000
	(0.002)	(0.003)	(0.001)
Female	0.564*	2.077***	0.970***
	(0.309)	(0.493)	(0.301)
Education	-0.175***	-0.415***	-0.239***
	(0.040)	(0.077)	(0.041)
Married	0.478	-1.266	0.015
	(0.359)	(0.734)	(0.269)
Children age<=5	1.803**	1.999***	1.853***
	(0.634)	(0.449)	(0.505)
Children age >6	-0.283	-0.161	-0.266
	(0.188)	(0.490)	(0.167)
Labour Income (log)	-0.122	1.394**	0.236
	(0.314)	(0.629)	(0.277)
Tenure	0.028	0.230*	0.073
	(0.066)	(0.112)	(0.057)
Tenure Squared	-0.001	-0.008**	-0.003*
	(0.002)	(0.003)	(0.002)
Constant	3.339	-4.355	1.727
	(2.801)	(7.195)	(2.458)
Observations	24520	9399	33919
R-squared	0.012	0.015	0.012

Notes: The Table reports OLS estimates. The dependent variable is Days of Absence. Sample weights are used. In all the regressions we control for city size dummies and year dummies. Standard errors (corrected for heteroskedasticity and adjusted for the potential clustering of residuals at the regional level) are reported in parentheses. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

3.2. The Influence of Labour Income, Tenure and Hours of Work

As we have seen above, labour income does not appear to have any effect on the rate of absenteeism. However, when we split the sample between self-employed and employees we find an interesting result – that is, labour income has a different effect on absences made by self-employed and employees – which confirms our explanation of moral hazard under full

insurance for employees. In column (1) of Table 5 we focus on self-employed. An increase in their labour income strongly reduces absences due to illness. Considering absenteeism as a form of leisure, results show that the substitution effect (that is, the increase in the opportunity cost of leisure caused by the increase in labour income) dominates the income effect (the tendency to consume more leisure since income is higher). This is consistent with Barmby (2002) who finds that the cost of absence, as defined by the difference between daily earnings and sick pay entitlement, has a significant negative effect on the probability of absence of employees of a large UK firm. Furthermore, note that the presence of children (aged 5 years or less) does not increase significantly absences for self-employed.

In column (2) of Table 5 we consider only employees. Labour income has a positive effect on absenteeism, although not significant at conventional values (p-value=0.20). For employees a higher wage does not imply higher income losses in case of absences, since labour market institutions and collective employment contracts establish a complete insurance against absences due to illness. Therefore, only an income effect is at work.

A clear implication of this finding is that in a system in which sickness benefits are equal to nearly 100% of the wage, raising worker wages in order to prevent shirking might be counterproductive for firms.

In column (3) we verify that the length of worker's tenure (measured as the number of years a worker has been in his/her present firm) is an important determinant of absenteeism. As tenure increases, workers tend to make more days of absences. This is probably due to the fact that at the initial stages of an employment relationship workers are monitored more often and that their future career depends on the observed performance: therefore, they have strong incentives to work harder and not being absent.[13] It is interesting to note that worker's age is no longer significant when tenure is controlled for: perhaps the positive effect of age on the absence rate which emerged in previous equations was due to the fact that age is highly correlated to the tenure. The high collinearity among these two variables causes very high standard errors for the respective coefficients.

Some studies (Barmby, Ercolani and Treble, 2002; Winkelmann, 1999) have argued that if hours of work are fixed, then workers wishing to work less hours could choose to be absent to move closer to their preferred choice. We experiment this aspect in column (4) (Table 5) inserting as explanatory variable the total number of hours worked: this variable turns out to be not significant. It does not emerge from our data that workers are absent because they would like to work fewer hours.

Table 5. OLS regression for the annual number of *Days of Absence*.

	(1)	(2)	(3)	(4)	(5)

[13] Moreover, an additional factor which might explain higher absenteeism of long-tenured workers is that their dismissal is increasingly costly for firms.

Public Employee		2.264***	2.178***	2.233***	3.430***
		(0.333)	(0.332)	(0.332)	(0.624)
Medium Firm Employee		1.516***	1.489***	1.520***	3.003**
		(0.346)	(0.348)	(0.347)	(1.172)
Large Firm Employee		2.398***	2.390***	2.212***	3.248***
		(0.401)	(0.405)	(0.357)	(0.781)
Age	0.212*	0.171**	0.064	0.165**	0.109
	(0.124)	(0.079)	(0.085)	(0.079)	(0.154)
Age Squared	-0.002	-0.001	0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Female	-0.578	1.020***	0.991***	1.109***	0.144
	(0.389)	(0.278)	(0.282)	(0.270)	(0.502)
Education	-0.005	-0.236***	-0.241***	-0.244***	-0.226***
	(0.038)	(0.035)	(0.035)	(0.034)	(0.060)
Married	0.360	-0.101	0.001	-0.170	-0.268
	(0.558)	(0.336)	(0.338)	(0.329)	(0.661)
Children age<=5	0.382	1.879***	1.840***	1.775***	0.944
	(0.351)	(0.423)	(0.427)	(0.410)	(0.636)
Children age >6	-0.132	-0.251	-0.275	-0.209	0.099
	(0.166)	(0.181)	(0.182)	(0.177)	(0.278)
Labour Income (log)	-0.841***	0.359	0.322	0.440	0.206
	(0.297)	(0.268)	(0.274)	(0.271)	(0.600)
Tenure			0.071*		
			(0.038)		
Tenure Squared			-0.003***		
			(0.001)		
Total Hours				0.001	
				(0.016)	
Self-employed					-1.134*
					(0.609)
Health Status					-5.481***
					(0.660)
Disability					9.294*
					(4.978)
Chronic Illness					4.612***
					(1.287)
Constant	5.197*	-1.828	0.064	-2.374	27.012***
	(2.868)	(2.330)	(2.477)	(2.251)	(6.671)
Observations	6791	34257	33919	34231	7296
R-squared	0.010	0.011	0.012	0.011	0.099

Notes: The Table reports OLS estimates. The dependent variable is *Days of Absence*. Sample weights are used. In all the regressions we control for regional dummies, city size dummies and year dummies. Standard errors (corrected for heteroskedasticity) are reported in parentheses. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

3.3. Controlling for Health Status

Workers' absences might obviously be caused by true health problems. If workers with different health conditions self-select in different type of occupations and jobs, our estimations might be seriously biased. To evaluate this aspect, we are able to control for health conditions for a sub-sample of workers. In the 1995 wave of SHIW, workers were asked to describe their own health status, classifying it from a score of 5 (very good) to 1 (very bad). We insert the variable *Health Status* as a cardinal measure.[14] In addition, workers were asked if they suffer from any chronic illnesses and if they suffer from any form of disability. We insert a dummy *Chronic Illness* and a dummy *Disability* to take into account these information.

[14] Furthermore, we experimented inserting a dummy variable for each health status level. Results (not reported) are very similar.

We replicate our preferred specification (column 3 in Table 3) for the year 1995 sub-sample, regressing the number of *Days of Absence* as function of individual's health status. Results are shown in column (5) of Table 5. Workers in good health have significantly fewer days of absence than workers in bad health, while *Chronic Illness* and *Disability* strongly increase days of absence. Interestingly, our findings regarding self-employed, public employees and employees of small and large firms are not altered, implying that our results are not driven by selection of workers with different health status in particular type of employment and firm of different size.

4. Robustness Checks: A Probit Model for the Probability of Being Absent

As robustness checks of our estimation results, we estimate the probability of being absent in a given year using the dummy *Absent* which takes the value of one if the worker has been absent one day or more in the past calendar year and zero if the worker has never been absent.[15]

Notwithstanding some precious information are lost following this approach, this measure might be more reliable if the respondent finds it easier to remember if he was ever absent from work but has difficulties to remember the precise number of days of absence.

We estimate with a Probit model. Marginal effects (evaluated at the mean values of the explanatory variables in the sample) from Maximum Likelihood Estimator (MLE) are shown in Table 6. Our main results are widely confirmed using this alternative measure of absenteeism.

As in previous estimates, age increases absences; females and less educated workers are more absent; the presence of children at home increases absence rates; marital status does not affect absenteeism, labour income appears to increase the absence rate (except for self-employed, not reported).

In column (1) we show that *Self-employed* are 17 percentage points less likely to be absent than small-firm employees (the reference category). Public employees are 11 points more likely to be absent, whereas medium firm employees and large firm employees show, respectively, 6.6 and 11.3 more percentage points for the probability of being absent.

In column (2) we confirm that temporary employees are much less absent than permanent workers (–8 percentage points). In column (3) we find that workers with longer tenure are more likely to be absent. After ten years of tenure, the probability of being absent increases by about 5 percentage points.

The effect of unemployment is analyzed in regression (4) in which we consider only private employees. Probit estimates confirm that in regions with higher unemployment absenteeism rate is significantly lower.

[15] As we have seen before the share of those who have never been absent if quite high (about 70%).

Finally, we verify if controlling for health status (for the 1995 sub-sample) our results are modified. In column (5) probit estimates confirm that better health conditions make less likely to be absent, but even controlling for health status, self-employed are less absent (−17%), while public employees (+16%), medium (+9%) and large firm (+15%) employees show a higher probability of being absent.

Table 6. The probability of being absent due to illness. Probit estimates.

	(1)	(2)	(3)	(4)	(5)
Self-employed	-0.168***	-0.172***			-0.172***
	(0.008)	(0.010)			(0.021)
Public Employee	0.110***	0.107***	0.110***		0.162***
	(0.011)	(0.013)	(0.011)		(0.024)
Medium Firm Employee	0.066***	0.069***	0.069***	0.064***	0.088***
	(0.010)	(0.012)	(0.011)	(0.010)	(0.029)
Large Firm Employee	0.113***	0.113***	0.118***	0.112***	0.147***
	(0.011)	(0.013)	(0.011)	(0.012)	(0.026)
Age	0.009***	0.012***	0.003	0.006	0.001
	(0.002)	(0.003)	(0.003)	(0.004)	(0.006)
Age Squared	-0.000***	-0.000***	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.058***	0.054***	0.076***	0.064***	0.061***
	(0.007)	(0.009)	(0.008)	(0.012)	(0.017)
Education	-0.004***	-0.003**	-0.006***	-0.005***	-0.004*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Married	0.003	-0.007	-0.000	0.003	-0.001
	(0.009)	(0.010)	(0.010)	(0.015)	(0.022)
Children age<=5	0.023***	0.030***	0.023***	0.020	0.007
	(0.008)	(0.010)	(0.009)	(0.013)	(0.017)
Children age >6	0.002	-0.002	0.002	0.006	0.027**
	(0.004)	(0.005)	(0.005)	(0.008)	(0.010)
Labour Income (log)	0.060***	0.038***	0.078***	0.069***	0.093***
	(0.006)	(0.008)	(0.008)	(0.012)	(0.016)
Fixed-Term Contract		-0.081***			
		(0.013)			
Tenure			0.005***	0.003*	
			(0.001)	(0.002)	
Tenure Squared			-0.000***	-0.000***	
			(0.000)	(0.000)	
Regional Unemployment Rate				-0.004***	
				(0.001)	
Health Status					-0.107***
					(0.011)
Disability					0.053
					(0.053)
Chronic Illness					0.089***
					(0.026)
Observations	41140	27250	33994	24577	7308
Pseudo R-squared	0.051	0.053	0.028	0.029	0.090
Log-likelihood	-24104.438	-15549.144	-21268.808	-15024.882	-4306.782
obs. P	0.308	0.291	0.344	0.323	0.350

Notes: The Table reports marginal effects evaluated at the mean values of the explanatory variables in the sample. The dependent variable is *Absent*. Sample weights are used. In all the regressions we control for regional dummies, city size dummies and year dummies. (not reported). Standard errors (corrected for heteroskedasticity) are reported in parentheses. The symbols ***, **, * indicate that coefficients are statistically significant, respectively, at the 1, 5, and 10 percent level.

5. Concluding Remarks

Workers in Italy are typically entitled to receive sickness subsidy if ill-health. Adding up Social Security's and firm's sickness benefits, employees receive almost 100 percent of their wage if they are absent for illness and, therefore, they do not suffer any penalization from absence. Since it is not difficult to mask absenteeism with health related issues (a worker's health state is, to a large extent, private information), workers have incentives to be absent falsely declaring illness.

Using absenteeism as a shirking measure, we have shown that the nature of employment contract and the institutional context affect workers' incentives to provide effort. It is reasonable to think that absent workers enjoy higher leisure but increase the risk of being fired by their employers or the probability that they will penalized in terms of future career or future earnings. Therefore, we infer that a rational (selfish) worker chooses to be more absent the lower the probability of being penalized and the lower the expected costs.

The effects of several variables on observed individual behaviour can be interpreted in terms of standard moral hazard models and incentives. Controlling for personal and family characteristics and, for a sub-sample of workers, also for direct indicators of health status, we find that: 1) self-employed workers (who are not insured against income losses due to illness) are much less absent than employees; 2) public employees, who are highly protected against firing and have bureaucratic systems of compensations based on tenure, are more absent than private employees; 3) absenteeism is increasing with the size of the firm: this may be explained with the fact that the degree of employment protection legislation is higher in large firms (firms with more than 15 employees); furthermore, monitoring workers' behaviour is more difficult in large firms and supervisors have less incentives to control workers since they are not the residual claimants; 4) the threat of unemployment disciplines employees behaviour, in that they are less absent – other factors being equal – in regions with higher unemployment rates; 5) workers on temporary contracts have fewer days of absence; 6) employees with longer tenure tend to be more absent.

If we consider absences made by self-employed – who fully internalize the costs of being absent – as absences due to true illness and effective inability to work, then the differences between absences of employees and self-employed are the result of moral hazard problems. Under these assumptions, the economics losses due to the "excess of absences" can be estimated as large as 1-2 percentage point of GNP.

The policy implications of our findings are quite straightforward: the Italian sick pay system should introduce co-insurance and/or deductible (similarly to private insurance contracts), that is, a significant fraction of the cost of absence should be borne by the worker (with the exception of more serious illness) rather than indistinctly by other employees, employers or taxpayers.

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