

The Effect of Employment Protection on Worker Effort.  
A Comparison of Absenteeism During and After Probation.

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**Abstract**

Employment protection systems are known to generate significant distortions in *firms'* hiring and firing decisions. We know much less about the impact of these regulations on *worker* effort. The goal of this paper is to fill in this gap and in particular to assess whether the provision of employment protection induces less effort among workers in the form of absenteeism.

Our analysis is based on weekly observations for the 858 white collar workers hired by a large Italian bank between January 1993 and February 1995. These workers begin to be protected against firing only after the twelfth week of tenure and we observe them for one year. We show that the absenteeism rate triplicates for males once employment protection is granted. For females the effect is smaller and not statistically significant. We also discuss to what extent this evidence can be used to estimate by how much the absenteeism rate would change in Italy if employment protection were eliminated.

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# 1 Introduction

A large literature has studied the effect of employment protection systems on the propensity of firms to hire and fire, showing that these effects are important and capable of causing significant inefficiencies.<sup>1</sup> Much less is known about the distortionary effects of employment protection systems on the behavior of workers. The goal of this paper is to fill in this gap and in particular to assess whether the provision of employment protection induces less effort among workers in the form of absenteeism.

To achieve this goal we exploit “quasi-experimental” personnel data generated by the institution of *probation* that characterizes hiring procedures in many countries<sup>2</sup> and in particular in Italy, the origin of our data. In the Italian case newly hired workers are subject to a probation period in which they can be fired at will by the employer. At the end of this period, full firing protection is granted to the workers. Since Italy is the OECD country with the most stringent protection against firing<sup>3</sup>, the change of job security implied by the end of probation is equivalent, from the viewpoint of the worker, to the change from a “US style” weak protection system to the most protective of the “European style” systems.<sup>4</sup> Therefore, behavioral changes that occur at the end of the probation period provide a powerful indicator of the effects of employment protection.

Our analysis is based on weekly observations for 858 white collar workers hired by a large Italian bank between January 1993 and February 1995. These workers were subject to a probation period of three months after which they received full protection. We observe them for one year and can therefore compare their weekly absenteeism with and without job security. We show that the absenteeism rate triplicates for males once employment protection is granted. For females the effect is smaller and not statistically significant. We cannot find a convincing explanation of this gender difference, which needs further research to be fully understood. We discuss instead, also with the help of collateral evidence, to what extent this evidence can be used to estimate by how much the absenteeism rate would change in Italy if employment protection were eliminated. A conservative calculation suggests that at

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<sup>1</sup>See the initial contributions by Lazear (1990), Bentolila and Bertola (1990), Bertola (1990) and later, among others, Hopenhayn and Rogerson (1993), Saint-Paul (1993), Grubb and Wells (1994), Bertola and Ichino (1995), Acemoglu and Angrist (1998), Garibaldi (1998), Kugler (1999), OECD (1999), and Kugler and Saint-Paul (2000).

<sup>2</sup>See for example Riphahn and Thalmaier (1999) for Germany.

<sup>3</sup> See, for example, Grubb and Wells (1994) and OECD (1999). Firing costs are higher in Italy than everywhere else because this is the only country in which, if firing is not sustained by a just cause, the firm is always forced to take back the employee on payroll and to pay the full wage that he/she has lost during the litigation period plus social insurance contributions; in addition, the firm has to pay a fine to the social security system for the delayed payment of welfare contributions up to 200 percent of the original amount due.

<sup>4</sup>A change from full protection to no protection was almost going to become reality in Italy through the referendum on firing regulations of May 2000. The referendum did not reach the quorum 50 percent of voters and therefore the outcome did not have an effect. If a quorum had been reached and the “Yes” votes had had the majority, firing regulations in Italy would have become similar to the US terms overnight.

least for males the absenteeism rate would decrease by at least 36 percent.

The paper is organized as follows. Section 2 describes the data and the “quasi-experiment” that generates them. Section 3 presents the basic evidence on the effect of the end of probation on absenteeism. Section 4 discusses the possibility to draw more general conclusions on the effects of employment protections on absenteeism at the national level. Section 5 concludes.

## 2 The Data

The firm studied in this paper is a large bank with many branches disseminated all over the Italian territory and with a century-long tradition of activity at the heart of the Italian financial system. At the end of 1992, 17,971 employees worked in this bank of which 14,266 were white collar workers. From the bank’s Personnel Office we received detailed information on the work history of 545 men and 313 females hired in white collar jobs between January 1, 1993 and February 28, 1995.<sup>5</sup> For each hired employee we constructed a panel of weekly observations covering the first full year of tenure. During the initial three months after hiring, these workers were on probation and could be fired at will, while during the remaining nine months of the observation period they were fully protected against firing according to the standard Italian legislation.<sup>6</sup>

These 858 workers are a relatively homogeneous group of young individuals at the beginning of their career and with similar educational backgrounds. The average age is 25 and 95 percent of them are below age 30. Half of them have a college degree and almost all have a high school degree.<sup>7</sup> The large majority of these degrees is in banking and economics (70 percent) with an additional 10 percent in law. It is also important to keep in mind that 98 percent of these workers are hired at the entry level in the bank hierarchy, traditionally with internal labor market careers ahead of them.

For each worker we computed the number of days of absence officially classified as “due to illness” in each calendar week of observation. This is the indicator of absenteeism on which we will base our evaluation of the shirking effect of employment protection.<sup>8</sup> Since the

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<sup>5</sup>These personnel data have also been used by Ichino A. and Ichino P. (1999) and by Ichino A. and Maggi (2000).

<sup>6</sup>See footnote 3. There were also 8 other workers hired during the same period (6 men and 2 females) who separated from the firm before the end of the first year. 3 were fired while on probation, 1 immediately after and the remaining 4 quit to other firms or for unknown motives. Since these workers could not be observed for a full year, and in particular for enough time after the end of probation, we were forced to drop them from the analysis. It should be noted that the 3 who were fired during probation did not have any absence episode while at the bank.

<sup>7</sup>Only 12 workers have just the compulsory junior high school degree.

<sup>8</sup>We replicated our analysis also with three other indicators of absenteeism (occurrence of an absence episode, occurrence of an episode of delay in morning arrival and minutes of delays in morning arrival) finding qualitatively similar results, which we do not report to save space.

first calendar week of work is shorter for all workers not hired on a Monday, absenteeism in this week cannot be compared with absenteeism in later weeks. We therefore dropped the first calendar week of observation for all workers.<sup>9</sup> Another complication is that since the length of probation is defined in months, the number of calendar weeks of probation may change across workers. All workers were however on probation for at least 12 weeks, and the corresponding observations are the ones we use to measure employees' behavior in the absence of employment protection. We consider the 40 weeks of observation after the end of probation, as the period in which to evaluate absenteeism in the presence of employment protection. As a result each worker is observed for 52 calendar weeks. Our sample is therefore composed of 28,340 worker-week observations for males and 16,276 worker-week observations for females.

The majority of workers (52 percent of male and 69 percent of female employees) is absent at least once during the period of observation. However, overall, absence episodes are relatively rare: 98 percent of all worker-week-observations are characterized by no absence for males, compared to 96 percent for females. As a result, the average number of days of absence per week in the sample is low: 0.05 for males and 0.09 for females. Note, however, that these averages correspond to absenteeism rates of 1 percent and 1.8 percent of the weekly working time (5 days), respectively.<sup>10</sup> Furthermore, focusing on the weeks in which absence episodes occur, their average length is 2.4 days for males and 2.5 days for females (i.e. approximately half of the weekly working time). So, absence episodes are, in general, relatively rare events, but a majority of workers is absent at some point during the year and absenteeism implies on average a substantial loss of working time and therefore output for these workers.

## 3 Absenteeism During and After Probation

### 3.1 Basic facts

Figures 1 and 2 depict the extent of absenteeism during and after probation for the male and female subsamples. Absenteeism is measured by the average number of days of absence for each of the 52 fully observed weeks of tenure. The vertical line corresponding to week 12 indicates the end of probation. For males (Figure 1) this event appears to be associated with a clear change of regime: After probation the average number of days of absence is always

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<sup>9</sup>Another adjustment of the duration of probation had to be made for workers who were absent during the initial probation period. Following the probation rules of the bank, we prolonged a worker's original time of probation by the number of days that they were absent during probation.

<sup>10</sup> For comparison, according to *Confindustria* - the association of Italian entrepreneurs - the average absenteeism rate in the Italian industrial sector in 1995 was 5.16 percent for blue collars and 2.23 percent for white collars (see *Confindustria, Rassegna di Statistiche del lavoro, 1995*). Using the Survey of Household Income and Wealth (SHIW) collected by the Bank of Italy, the average absenteeism rate for all non-self employed workers was 2.50 in the same year. We will comment again on these figures in Section 4.3.

higher than during probation. Absenteeism increases immediately after full protection is granted. For females (Figure 2) the change of regime is less evident, but still apparent, as the average number of days of absence is lower before than after probation.

If all workers were hired in the same period of the year, for example July, probation would take place during the summer and the arrival of the fall would coincide with receiving full protection. In this case an increase of absenteeism observed after the end of probation could simply be due to seasonal effects. This is, however, not the case. Figures 1 and 2 do not change after removing the effect of monthly dummies, nor do the other results presented here. Seasonality does not affect our results because hiring is uniformly distributed over the calendar year.<sup>11</sup>

In Table 1 we assess the size of the regime change effect displayed in the figures and test its statistical significance. Looking first at males in Panel A, the table reports estimates of a Poisson regression of the days of absence per week on an indicator that takes value 1 for the weeks after probation. The model is estimated using the sample of 28,340 worker-week observations for males and standard errors are computed controlling for within individual correlation of the error terms. The estimated coefficient is reported in column 1 as an Incidence Rate Ratio (IRR). It indicates that after probation, the incidence rate, which in our case is the absenteeism rate<sup>12</sup>, is three times as high than during probation. The asymptotic t-statistic suggests that this difference is highly statistically significant.

Columns 2 and 3 report the predicted absenteeism rates during and after probation, with 95 percent confidence intervals in parentheses. The ratio of these two predictions is the coefficient reported in column 1. In the first twelve weeks of tenure, the absenteeism rate is 0.4 percent<sup>13</sup> while in the remaining forty weeks the rate increases to 1.2 percent.<sup>14</sup> The difference between the two predicted absenteeism rates suggests that when full protection is granted 0.8 percent of total working time is lost for absenteeism among males.

The estimated IRR for females in Panel B is significantly smaller and not statistically significant at conventional levels. However, the predicted loss of working time associated with the end of probation for females (the difference between columns 3 and 2) is 0.8 percent i.e. equal to the males' one. Thus, the smaller IRR in column 1 for females compared to that for males is due to the fact that the females' absenteeism rate is higher in general and in particular during probation.

The estimates reported in Table 1 do not control for worker characteristics. At first sight one may wonder whether these results would change when characteristics like age at hiring, education and features of the work environment were included in the regression. Since by construction the probation indicator is uncorrelated with time invariant characteristics,

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<sup>11</sup>De-seasonalized results are not reported here to save space but are readily available from the authors.

<sup>12</sup>The absenteeism rate is the ratio between time lost for absences and total potential working time.

<sup>13</sup>This figure is obtained dividing the average number of days of absenteeism during probation (0.02) by the total number of working days in a week (5).

<sup>14</sup>After probation the average number of days of absence per week is 0.061.

their inclusion should not (and indeed does not) change the estimated coefficients.<sup>15</sup> More interesting and informative is the analysis of interactions between the probation effect and individual or local characteristics, which we discuss next.

## 3.2 Heterogeneity of Probation Effects

The evidence on heterogeneity in the response to probation incentives is described in Tables 2 and 3 separately for males and females. For males the most interesting result is that branch characteristics that create an environment more conducive to absenteeism interact significantly with the impact of the end of probation.

In the first panel of Table 2 we split the sample of male workers on the basis of the average absenteeism in their branches and estimate the Poisson model of Table 1 separately for each sub-sample. The “Low (High) absenteeism branch” group includes workers in branches where the average number of days of absences in the month before hiring was below (above) the median average number of days of absence over all branches in that month. Hence we can explore the interaction between the effect of probation and local absenteeism propensity. While during probation the absenteeism rate is similar in the two sub-samples, after probation it is bigger in branches characterized by more absenteeism. As a result, the effect of the end of probation on the IRR is bigger in this second type of branches.<sup>16</sup>

The following three panels focus on other branch characteristics that may indicate the existence of an environment more conducive to absenteeism. This is for example the case of big branches where more absenteeism is observed, perhaps because monitoring is more difficult or because the absence of one worker has a more limited effect on branch output.<sup>17</sup> More absenteeism is also observed in branches with a lower proportion of managers in the workforce, probably because these branches tend to be avoided by “career oriented” workers or because in these branches monitoring is less strict.<sup>18</sup> Finally, a higher fraction of females in the branch is also associated with more absenteeism, probably because females, more often than men, are induced to be absent by family duties.<sup>19</sup> Also these three panels of Table 2 suggest that the effect of the end of probation on absenteeism rates is higher where the environment is more conducive to absenteeism.<sup>20</sup> Somewhat surprisingly, instead, no difference is observed when we focus, in the fifth panel of Table 2, on the distinction between

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<sup>15</sup>These results, as those with seasonality controls, are omitted for brevity but are available from the authors. See below in Section 4.1 for results which control for time varying characteristics like tenure.

<sup>16</sup>Note, however, that the p-value of a test for the equality of the two IRRs does not allow to reject the null hypothesis at standard levels of significance. The same is true for the other, similar tests in Tables 2 and 3. Thus the pattern of evidence suggested by these tables, although interestingly coherent, is weak from a statistical point of view.

<sup>17</sup>We use the median size of all branches to discriminate between the two groups.

<sup>18</sup>We use the median fraction of managers in all branches to discriminate between the two groups.

<sup>19</sup>We use again the median fraction of females in all branches to discriminate between the two groups.

<sup>20</sup>The differences are, however, not statistically significant as we noted already.

northern and southern branches, although as discussed by Ichino and Maggi (2000), on average more absenteeism is observed in the south.<sup>21</sup>

The last panel of Table 2 explores the interaction between the effect of probation and education, finding less surprising results. Splitting the sample in two educational groups (those with a college degree and those without), we show in columns 2 and 3 that the absenteeism rate of college graduates is always lower, independent of whether they are on probation or not, but the difference between the two columns is approximately the same at both levels of education. As a result, the absenteeism rate ratio in column 1 is bigger for the more educated.

The evidence for females, presented in Table 3, is similar to that for males, although there are some important differences. Most notably, the effect of probation is never statistically significant among female employees, who work in environments characterized by low absenteeism, and is always significant in the opposite type of environment. Particularly remarkable is the interaction between the effect of probation and the local fraction of female employment (fourth panel in Table 3). When a female worker is hired in a predominantly male branch, the end of probation has basically no effect on absenteeism. If the branch is instead one in which women are strongly represented, the absenteeism rate effects of the end of probation are large and statistically significant. Also, the effect of the branch-region differs between the sexes: For females hired in the south, absenteeism increases significantly after the twelfth week of work, while no significant effect is observed in the north.<sup>22</sup>

In sum, there seems to be substantial evidence suggesting that newly hired male workers are significantly less absent during probation than once they are fully protected against firing. The evidence is less strong for female workers, but for both genders the difference between the two periods tends to be larger in a local environment conducive to absenteeism.<sup>23</sup> Next, we discuss the implications of our results.

## 4 Discussion

In the previous sections we have shown that the end of probation implies a substantial change of the degree of protection against firing and is associated with a significant increase of the

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<sup>21</sup>In this panel we drop observations of 10 male workers, who changed region of work during the first tenure year.

<sup>22</sup>In this panel we drop observations of 4 female workers, who changed region of work during the first tenure year.

<sup>23</sup>A number of studies have attempted to explain gender differences in competitive behaviors. Most recently Gneezy et al. (2001) investigated competitive behaviors to explain gender inequality at high-ranking jobs. They concluded on the basis of puzzle solving efforts that women are less competitive than men unless they are in single sex environments. However, these findings are not confirmed here, where we observe stronger female responses to behavioral incentives in branches with a higher share of females. Thus more research is needed to get at the mechanisms driving behavioral differences between the sexes.

absenteeism rate. It is tempting to explore the possibility of using these results to evaluate how much the absenteeism rate would decrease in Italy if the degree of protection against firing were hypothetically reduced to the degree prevailing during probation in our bank (i.e. essentially no protection).

Such an ambitious extrapolation from our “case-study” is meaningful only if some crucial conditions are satisfied. First, the observed association between the end of probation and absenteeism should be due to the “causal effect” of the sudden increase in protection against firing and not due to a spurious correlation between tenure and absenteeism. Second, the causal effect of the increase in protection on absenteeism should not be limited to the first weeks after the end of probation, as it would happen if workers simply deferred absence episodes during probation to look better. Third, the absenteeism effect of a change in protection due to the end of probation for the newly hired workers of our firm, should be representative of the effect of a similar change of protection for the average Italian worker under protection. At least, there should be reasons to believe that the effect we estimate is a lower bound of the economy-wide effect. We discuss these three issues in turn.

#### **4.1 Alternative Explanations of the Tenure - Absenteeism Correlation**

One might argue, that the absenteeism effect described in Section 3 may not be due to the change in employment protection occurring at the end of probation. There are two plausible reasons why individual shirking may increase after hiring even without probation. One is the career concern mechanism pointed out by Holmstrom (1982): If a worker’s ability is unobservable and if individual output is used by supervisors to learn about ability, workers have an incentive to exert more effort in order to bias the process of inference in their favor. However, the returns to exerting effort depend on the uncertainty about ability: Early in the process, when there is less information, supervisors put more weight on individual output when revising their beliefs. But later, when uncertainty decreases, individual output becomes less relevant for inference on ability. Hence, the incentive to exert effort is high at the beginning of a career and declines with tenure. Thus, inasmuch as absenteeism measures lack of effort, one would observe absenteeism growing with tenure independent of probation.

Alternatively, individual shirking might increase over the first tenure months because the worker has to learn about the social norms in the newly joined branch of the firm. If a worker derives disutility from work but needs a job to maintain her monthly income, the conflict is apparent: The individual will resolve the countervailing interests of working as little as possible and ensuring not to be laid off, by shirking as much as local employment conditions allow. If these employment conditions or social norms are unknown when the contract commences, the risk-averse worker will initially prefer to supply too much rather than too little work. Over time the individual learns about the norms and shirking increases to maximize utility subject to the perceived norm, or “no firing condition.” This mechanism

may explain a positive slope in early tenure absenteeism, as well.

To establish whether these hypotheses indeed explain the significant probation effect described in Section 3, we repeated the analyses described in Table 1, this time adding linear or quadratic tenure effects to the model. If the probation effect is due to a misspecification of the tenure profile, it should disappear once a polynomial in tenure is added to the specification.

Table 4 presents the estimates of the effect of the end of probation obtained controlling for quadratic tenure effects.<sup>24</sup> The results indicate a large positive effect of probation for men, which is economically and statistically significant. While the coefficient estimate is somewhat smaller compared to the model without tenure controls, the predicted absolute change in absence probabilities is almost identical. For females the positive probation effect disappears when controlling for a quadratic polynomial in tenure. This suggests that for women tenure mechanisms like the ones discussed above might dominate the effect of the end of probation.

## 4.2 The “Deferral” Hypothesis

Probation may reduce absence behavior by motivating individuals to postpone necessary absences until they enjoy employment protection. Such deferral behavior should determine an increase of absenteeism only in the first weeks after probation and not later. If this were the case, it would be difficult to extrapolate the effect of a long-term change of employment protection regulations from observed differences in absenteeism during and after probation.

To test for evidence of deferral behavior, we repeated the Poisson estimations of Section 3 separating the “after probation indicator” in two dummies: one for the first month after probation and the other for later months. If the deferral hypothesis held, we would expect a higher first month effect and a lower permanent effect of protection. The estimation results are presented in Table 5 and show that neither for men nor for women there is a significant difference in absence behavior in the two post probation periods. Actually, absenteeism seems to be lower immediately after probation as opposed to later. Therefore, we are confident that our findings do not result from deferral behavior.

## 4.3 Possibility of Extrapolation

The evidence presented in Section 3 suggests that for male workers the absenteeism rate triplicates at the end of probation, thus absenteeism during probation is approximately 67 percent lower than after probation. In this section we discuss whether we can use this evidence to approximate the overall effect of removing employment protection on absenteeism in a country like Italy. Figures 3 and 4 clarify the issue. In the analysis of the previous sections we look at the difference in absenteeism around the end of probation, i.e. absenteeism

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<sup>24</sup>We obtain similar results using linear tenure effects and we do not report them for brevity.

level “A” after probation minus absenteeism level “B” during probation, as depicted in Figure 3. Our objective is to draw conclusions for the difference between the absenteeism level “C” with employment protection minus the absenteeism level “D” without employment protection, as depicted in Figure 4.

Two main issues need to be addressed: First, the newly hired workers in our bank are a homogeneous sample of young and healthy individuals at the beginning of their career, who are certainly not representative of the population of Italian workers. This suggests that both levels “A” and “B” might underestimate the overall absenteeism rates that would prevail in Italy without and with employment protections. Second, reducing absenteeism for a (probation) period of just three months is likely to be easier than reducing absenteeism for the longer and indeterminate period that would begin with the hypothetical generalized elimination of employment protection. This suggests that absenteeism level “B” observed in our data underestimates further the absenteeism level “D” in the hypothetical situation without employment protection. If both of these concerns hold true and we underestimate “D” by more than “C”, then the 67 percent reduction in the absenteeism rate during probation might be an overestimate of the actual absenteeism response to an abolition of employment protection. In the following paragraphs we discuss evidence supporting the view that even if 67 percent is an overestimate, the likely effect of cutting back employment protection might still be substantial.

With respect to the first problem, it is indeed probable that the average absenteeism rate of our newly hired workers after probation (1.22 percent) is lower than the average absenteeism rate of all Italian workers. In the industrial sector, for example, the average absenteeism rate in 1994 was 5.16 percent for blue collars and 2.23 percent for white collars.<sup>25</sup> However, if the effect of probation is invariant with respect to the characteristics that reduce absenteeism in our sample below that of the population of Italian workers - an assumption which does not seem utterly unplausible - an extrapolation of the probation effect measured here to the entire population is nevertheless possible.

The second issue, i.e. that it is easier to reduce absenteeism for three months than for a long and possibly indeterminate period, seems more problematic. In terms of Figures 3 and 4, the question is whether and by how much our level “B” might underestimate the level “D” in which we are interested. In order to permit an assessment of the dimension of this possible bias we now present three pieces of evidence.

First, we obtained an indicator of the level of absenteeism in an environment without employment protection regulation, the United States. Using data from the Panel Study of Income Dynamics for year 1992, we calculated the share of absences in total contractual working time.<sup>26</sup> For a representative sample of fulltime employed men (i.e. omitting oversample observations) this yielded an absenteeism rate of 0.7 percent, compared to our

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<sup>25</sup>See footnote 10 for source. These figures do not change much in other years.

<sup>26</sup>Individuals were asked to indicate how much work they missed due to own illness related absences. We compared that to the total contractual working time. The contractual working time was approximated as the sum of actual weeks worked, work absence weeks, vacation weeks, and weeks on strike.

estimate of 0.4 for young male Italian bank employees during their three months of probation (see Table 1, column 2). If we recalculate the effect of interest using this estimate of the longterm level of “C”, the abolition of employment protection should be expected to reduce absenteeism by 43 percent.<sup>27</sup>

Second, we generated measures of worker response to financial absenteeism incentives. Before we can discuss the evidence presented in Table 6, some institutional details must be explained.

The Italian social security system (INPS) compensates workers for the loss of earnings if they miss work due to illness. However, INPS pays no compensation for the first three days of absence and only a partial compensation afterwards. Since the 1970s, collective bargaining has forced employers to add to the INPS payments after the third day, in order to guarantee that workers receive full pay when they are absent due to illness. For the first three days, union agreements differed across sectors. In some sectors, like metal manufacturing and chemical industries, employers had to pay fully since 1972 even for the first three days of absence. In sectors where unions were not as powerful such a favourable agreement was obtained only later or never (e.g. in construction and in the food and paper sector it was implemented only after 1974).<sup>28</sup>

Table 6 provides worker absenteeism rates for industries with and without full coverage of the first three days of absence. We can now compare differences in short term absenteeism rates<sup>29</sup> with the differences in overall absenteeism rates<sup>30</sup> across industries for which the first three days of absence are compensated or not. The difference in short term absenteeism rates between metal manufacturing (0.98) and construction (0.23) in 1973 amounted to 77 percent, whereas the difference in overall absenteeism rates was much smaller, being equal to 32 percent. Clearly, there might be systematic differences in typical worker absences between these sectors. However, at least the time invariant component of these differences cancel in Panel B where we take the difference between the calculated differences. The result of 45 percent then provides an indicator for the percentage reduction of the absenteeism rate induced by eliminating the entitlement to compensation during the absence period. The figures for 1974 yield an even stronger response of 55 percent for the analogous comparison. These two figures, 45 and 55 percent, encompass the range of similar estimates that we have obtained for other pairs of sectors characterized by similar differences in regulations and which we omit for brevity.

These results suggest that workers do respond to the compensation systems foreseen by collective agreements for the first three days of absence. The nature of this financial

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<sup>27</sup>This is the percent change between 1.22 (the absenteeism rate after probation in our Italian sample) and 0.7 (the absenteeism rate without employment protection in the PSID sample).

<sup>28</sup>See Ichino P. (1976) for further details and for evidence on other sectors.

<sup>29</sup>These rates are calculated as the ratio between the average yearly number of hours lost for episodes of 3 days or less and the total potential yearly number of working hours.

<sup>30</sup>Similarly, these absence rates are calculated as the ratio between the average yearly number of hours lost for all episodes and the total potential yearly number of working hours.

disincentive to absenteeism for e.g. construction workers is comparable to the effect of losing employment protection against firing. The ranking of these two prospects, where individuals adjust behavior in one case to avoid the loss of compensation and in the other to avoid layoff during probation, depends on parameters like the discount rate, the degree of risk aversion, the extent to which absenteeism increases the probability of firing and many others for which evidence can hardly be obtained. However, inasmuch as it is plausible that the prospect of layoff is worse than that of losing three days of pay, 45 percent could be considered a lower bound on the generalised effect of the elimination of employment protection on the absenteeism rate.

Our third piece of evidence supporting the relevance of absenteeism incentives uses the fact that in Italy the *Chart of Workers Rights* of 1970<sup>31</sup> establishes that workers in enterprises with fewer than 16 employees can be fired at will, as in the US environment, and therefore do not enjoy the level of employment protection granted to workers in larger establishments.

Using data from the 1995 wave of the Italian Survey of Household Incomes and Wealth, we computed average absenteeism rates for a representative sample of Italian non-self employed workers, distinguished by firm size.<sup>32</sup> Unfortunately the firm size categories in the SHIW do not match those of the employment protection regulation. We can distinguish only between small firms, with less than 4 employees, medium firms with 5 to 19 employees, and large firms, with more than 19 employees. The average absenteeism rates for male workers in these three categories are respectively 1.68, 1.72, 2.69. This suggests that absenteeism grows with firm size which is a finding running through the entire literature on the determinants of absenteeism. Many different mechanisms may actually cause the difference in absenteeism rates by firm size, including systematic differences in the age and health of employees in the different types of firms. However, the existing literature suggests that, even controlling for such worker characteristics, as well as for characteristics of the job and the employer, workers in small establishments have fewer days of absence than those in large firms.<sup>33</sup> If employment protection is one of the causal mechanisms of this residual effect, the 36 percent difference between the absenteeism rate of large firms (more than 19 employees) and the absenteeism rate of medium firms (less than 19 employees) can be considered as an approximate measure of the effect of interest.

Summarizing what we have learned from the three pieces of evidence presented in this section, the measure of the absenteeism response to the removal of employment protection based on employer size amounts to 36 percent. 45 percent is instead the measure based on the different financial incentives for short absences by sectors, while 43 percent is the measure obtained with PSID data. All these three measures are smaller than the 67 percent described in Section 3 based on the effect of probation. However, all of them suggest strong employee responses to absenteeism-related incentives. While our measure of 67 percent may

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<sup>31</sup>The *Statuto dei Lavoratori*.

<sup>32</sup>Absenteeism rates are here calculated as the fraction of of days of absence in a standard 240 workday year.

<sup>33</sup>See e.g. Barmby and Stephan, 2000 and literature cited there.

overestimate the magnitude of the response when extrapolating to the overall labor force, it is the one based on the cleaner “quasi-natural” experiment and does present a statistically and economically highly significant effect. Despite the undisputable pitfalls of each of these alternative measures, they all suggest consistently that the effect of removing employment protection on absenteeism rates is likely to be relevant and probably not smaller than 36 percent.

## 5 Conclusions

Using the “quasi-experimental” evidence generated by the institution of *probation periods*, we have shown that the end of these periods is associated with a significant increase of absenteeism. Our sample considers 858 newly hired Italian white collar workers during their first 52 weeks of tenure, of which the initial 12 are weeks of probation. The end of probation implies an increase of job security comparable to a change from a “US style” weak protection system to the most protective of the “European style” systems, and we argue that the behavioral change observed at the end of probation is a causal effect of the change of employment protection.

We discuss the conditions under which this causal interpretation is plausible and extrapolate an estimate of the decrease in the absenteeism rate that would be induced by the elimination of employment protections. Our evidence suggests that for male workers the decrease of absenteeism would range between 36 and 67 percent. No effect for females is supported by the evidence and the explanation of this surprising gender difference requires further research.

It is important to point out that absenteeism is but one dimension of employee behavior where incentives deriving from employment protection may be effective. Numerous additional dimensions, such as delays at work, misdemeanors, such as playing computer games or surfing the internet, and finally overall worker effort were not considered here. It seems plausible that behavioral adjustment to the presence of employment protection encompasses all of these dimension. Thus a correct and reliable estimate of the precise cost of employment protection regulation is difficult to derive.

We have no criterion to establish whether this loss is large or small, nor do we want to venture into an evaluation of whether it is socially optimal to offer employment protection when this causes a loss of output. However, since empirical estimates of this incentive effect did not exist in the literature, our finding may be informative.

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Table 1: Absenteeism During and After Probation

	Estimated Incidence Rate Ratio	Predicted absenteeism rate during probation (%)	Predicted absenteeism rate after probation (%)	N. of obs.
	1	2	3	4
PANEL A: MALES				
Effect of end of probation	3.05 (6.16)	0.40 (0.28-0.50)	1.22 (1.02-1.46)	28,340
PANEL B: FEMALES				
Effect of end of probation	1.68 (1.77)	1.18 (1.18-1.98)	1.98 (1.58-2.48)	16,276

Note: Maximum likelihood estimates based on a Poisson regression of days of absence per week on a dummy taking value 1 in the weeks after the end of probation. The coefficient in column 1 is the ratio between the predicted absenteeism rates reported in columns 2 and 3 for the two values of the probation dummy. The absenteeism rate is the percentage ratio between the number of days of absence and the total weekly working time (5 days). In parentheses: asy. t-statistics in column 1 and 95 percent confidence intervals in columns 2 and 3, all adjusted for within individual correlation.

Table 2: Heterogeneity of the Effect of Employment Protection on Absenteeism for Males

Type of Heterogeneity	Estimated Incidence Rate Ratio	Predicted absenteeism rate during probation (%)	Predicted absenteeism rate after probation (%)	N. of obs.
	1	2	3	4
Low absenteeism branch (230 workers)	2.64 (3.60)	0.42 (0.28-0.62)	1.10 (0.8-1.52)	11,960
High absenteeism branch (315 workers)	3.37 (4.84)	0.40 (0.24-0.64)	1.30 (1.06-1.62)	16,380
P-value of diff. = 0.506				
Small branch (249 workers)	2.22 (3.43)	0.52 (0.32-0.84)	1.16 (0.90-1.48)	12,948
Big branch (296 workers)	4.28 (5.44)	0.30 (0.18-0.46)	0.72 (0.89-1.64)	15,392
P-value of diff. = 0.063				
Few managers branch (326 workers)	3.31 (4.86)	0.38 (0.24-0.62)	1.24 (1.02-1.54)	16,952
Many managers branch (219 workers)	2.72 (3.65)	0.44 (0.28-0.70)	1.18 (0.86-1.64)	11,388
P-value of diff. = 0.591				
Few females branch (261 workers)	2.70 (4.37)	0.46 (0.30-0.72)	1.26 (0.96-1.66)	13,572
Many females branch (284 workers)	3.50 (4.25)	0.34 (0.18-0.58)	1.18 (0.94-1.5)	14,768
P-value of diff. = 0.484				
North (343 workers)	3.25 (5.41)	0.40 (0.26-0.62)	1.30 (1.06-1.6)	17,836
South (192 workers)	3.09 (3.22)	0.36 (0.18-0.66)	1.12 (0.80-1.58)	9,984
P-value of diff. = 0.902				
No college degree (240 workers)	2.40 (3.78)	0.60 (0.38-0.94)	1.46 (1.14-1.88)	12,480
With college degree (305 workers)	4.35 (5.32)	0.24 (0.14-0.38)	1.04 (0.82-1.34)	15,860
P-value of diff. = 0.097				

Note: Maximum likelihood estimates based on Poisson regressions of days of absence on a dummy for the weeks after the end of probation, using the sub-samples indicated in each row. See Section 3.2 for the definition of the different sub-samples and Table 1 for other definitions. In parentheses: asy. t-statistics in column 1 and 95 percent confidence intervals in columns 2 and 3, all adjusted for within individual correlation.

Table 3: Heterogeneity of the Effects of Employment Protection on Absenteeism for Females

Type of Heterogeneity	Estimated Incidence Rate Ratio	Predicted absenteeism rate during probation (%)	Predicted absenteeism rate after probation (%)	N. of obs.
	1	2	3	4
Low absenteeism branch (154 workers)	1.57 (0.97)	1.46 (0.60-3.52)	2.28 (1.60-3.24)	8,008
High absenteeism branch (159 workers)	1.85 (3.10)	0.90 (0.66-1.24)	1.66 (1.30-2.12)	8,268
P-value of diff. = 0.745				
Small branch (171 workers)	1.43 (0.79)	1.32 (0.54-3.18)	1.88 (1.48-2.42)	8,892
Big branch (142 workers)	2.08 (3.12)	0.98 (0.72-1.36)	2.06 (1.40-3.06)	7,384
P-value of diff. = 0.456				
Few managers branch (185 workers)	1.91 (3.68)	0.94 (0.70-0.72)	1.80 (1.36-2.38)	9,620
Many managers branch (128 workers)	1.47 (0.71)	1.52 (0.54-4.20)	2.20 (1.52-3.22)	6,656
P-value of diff. = 0.640				
Few females branch (146 workers)	1.03 (0.59)	1.42 (0.65-3.70)	1.46 (1.12-1.92)	7,592
Many females branch (167 workers)	2.55 (4.76)	0.94 (0.70-1.28)	2.40 (1.74-3.30)	8,684
P-value of diff. = 0.079				
North (178 workers)	1.52 (1.09)	1.54 (0.74-3.20)	2.36 (1.74-3.20)	9,256
South (131 workers)	2.14 (3.08)	0.66 (0.44-0.98)	1.40 (1.04-1.90)	6,812
P-value of diff. = 0.455				
No College (183 workers)	1.45 (0.94)	1.42 (0.66-3.08)	2.06 (1.62-2.6)	9,516
College (130 workers)	2.23 (3.06)	0.84 (0.58-1.16)	1.86 (1.18-2.94)	6,760
P-value of diff. = 0.912				

Note: Maximum likelihood estimates based on Poisson regressions of days of absence on a dummy for the weeks after the end of probation, using the sub-samples indicated in each row. See Section 3.2 for the definition of the different sub-samples and Table 1 for other definitions. In parentheses: asy. t-statistics in column 1 and 95 percent confidence intervals in columns 2 and 3, all adjusted for within individual correlation.

Table 4: Absenteeism During and After Probation, Controlling for Tenure

Absence indicator	Estimated coefficient	Prediction during probation (%)	Prediction after probation (%)	N. of obs.
	1	2	3	4
<b>PANEL A: MALES</b>				
Days of absence	2.25 (2.10)	0.58 (0.28-1.20)	1.32 (1.04-1.66)	28,340
<b>PANEL B: FEMALES</b>				
Days of absence	0.83 (-0.52)	2.26 (1.14-4.44)	1.88 (1.42-2.44)	16,276

Note: Maximum likelihood estimates based on a Poisson regression of days of absence per week on a dummy taking value 1 in the weeks after the end of probation. The coefficient in column 1 is the ratio between the predicted absenteeism rates reported in columns 2 and 3 for the two values of the probation dummy. The absenteeism rate is the percentage ratio between the number of days of absence and the total weekly working time (5 days). In parentheses: asy. t-statistics in column 1 and 95 percent confidence intervals in columns 2 and 3, all adjusted for within individual correlation.

Table 5: Evidence on the Deferral Hypothesis

Weekly indicator of absenteeism	First month after probation	Other months after probation	P-value of one-sided test	N. of obs.
	1	2	3	4
<b>PANEL A: MALES</b>				
Days of absence	2.82 (4.00)	3.07 (6.22)	0.32	28,340
<b>PANEL B: FEMALES</b>				
Days of absence	1.42 (1.15)	1.70 (1.79)	0.18	12,676

Note: Maximum likelihood estimates based on a Poisson regression of days of absence per week on a dummy for the first month after probation and a dummy for the remaining months after probation. The coefficient in column 1 is presented as an Incidence Rate Ratio and the asy. t-statistics are reported in parentheses. Column 3 shows the p-value of one sided test that the coefficient for the first months is higher than the coefficient for the other months. Standard errors for the computations of asy. t-statistics are robust and adjusted for within individual correlation.

Table 6: Absenteeism rates with different regimes of compensation during absence periods

Sector and collective agreement regulation	1973		1974	
	3 days or less	all episodes	3 days or less	all episodes
Panel A				
<i>Metalmanufacturing</i>				
Full compensation for all days of absence	0.98	8.98	1.74	9.57
<i>Constructions</i>				
No compensation for the first 3 days of absence	0.23	6.11	0.34	7.11
Panel B				
Difference in difference for metal manufacturing and constructions	-45		-55	

Note: Panel A reports percentage absenteeism rates measured as the ratio of average yearly hours lost for (short or all) illness episodes and total potential working hours. For each year, the first column refers only to absence episodes that lasted 3 days or less. The second column refers instead to all absence episodes.

Panel B reports the following difference in difference calculations

$$\frac{(r_{sm} - r_{sc})}{r_{sm}} - \frac{(r_{am} - r_{ac})}{r_{am}}$$

where  $r$  denotes an absenteeism rate,  $m$  denotes metal manufacturing,  $c$  denotes constructions,  $s$  denotes short episodes and  $a$  denotes to all episodes.

All figures are the result of our calculations based on statistics published by Confindustria (the confederation of Italian private employers) in *Rassegna di statistiche del lavoro* (various years).

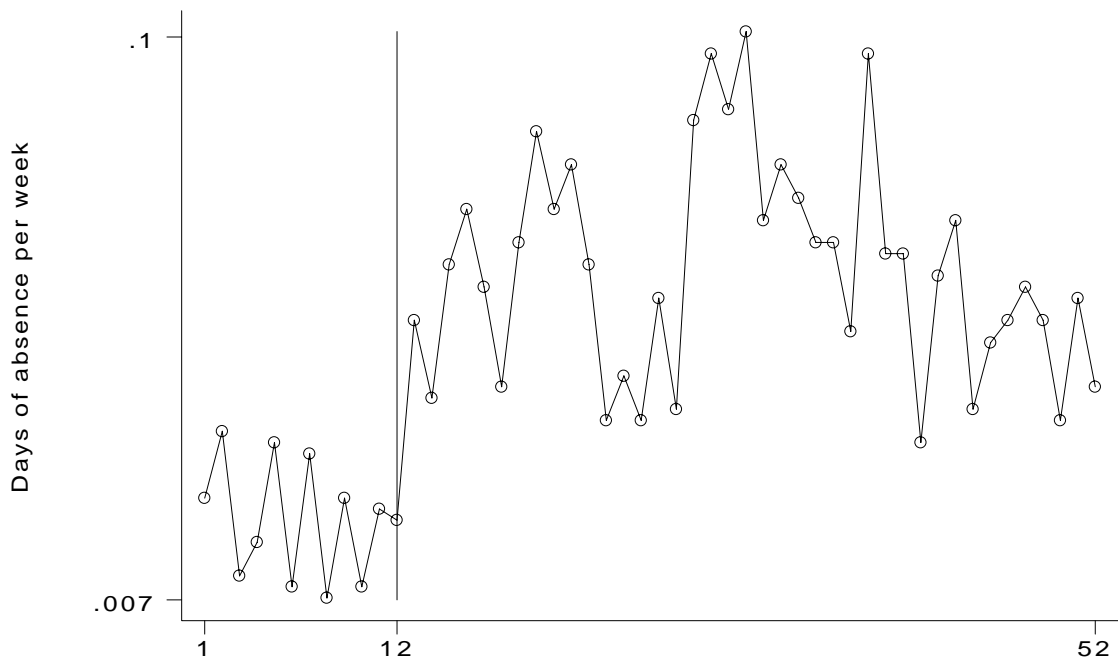


Fig. 1: Absenteeism during and after probation - Males

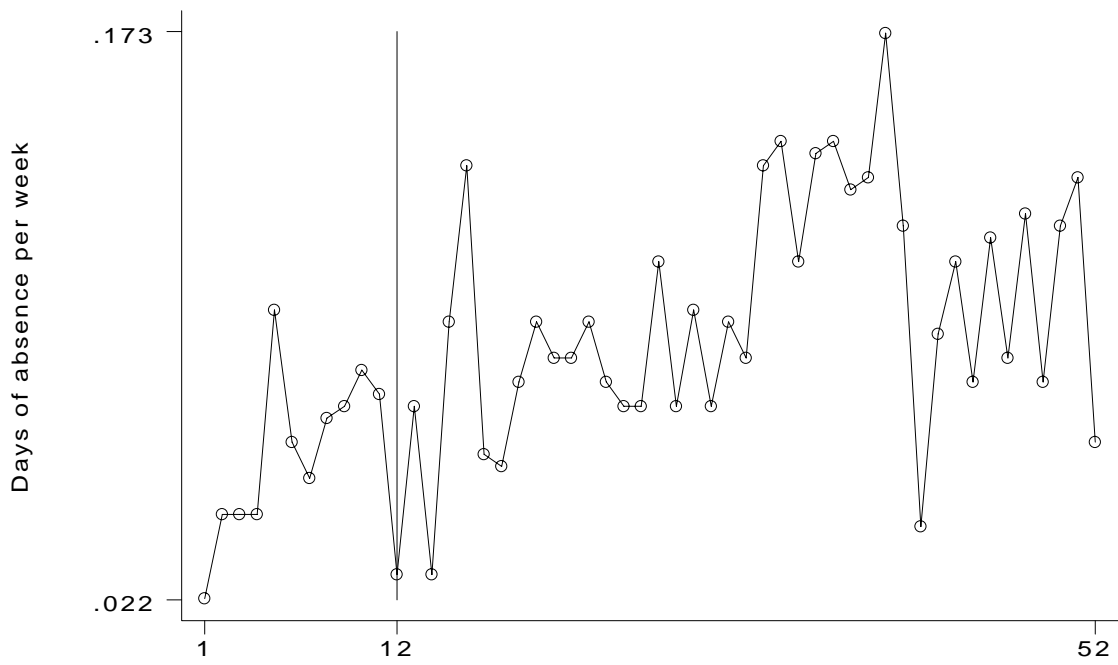


Fig. 2: Absenteeism during and after probation - Females

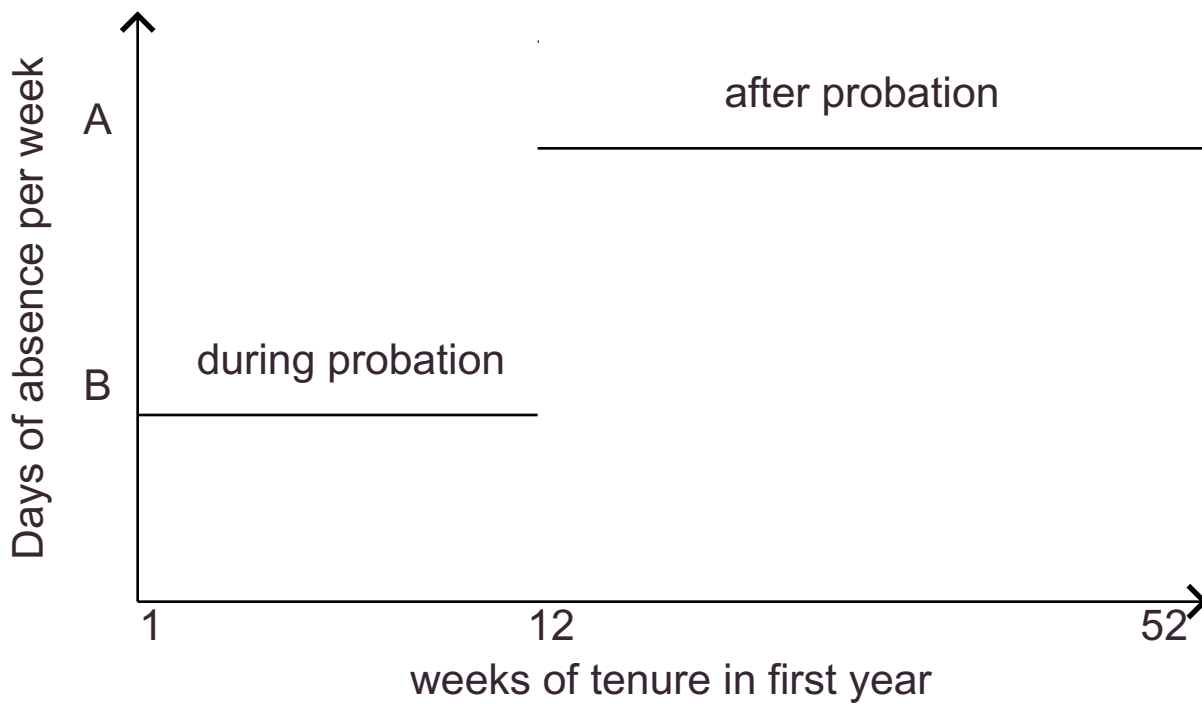


Fig. 3: Observed effect of the end of probation

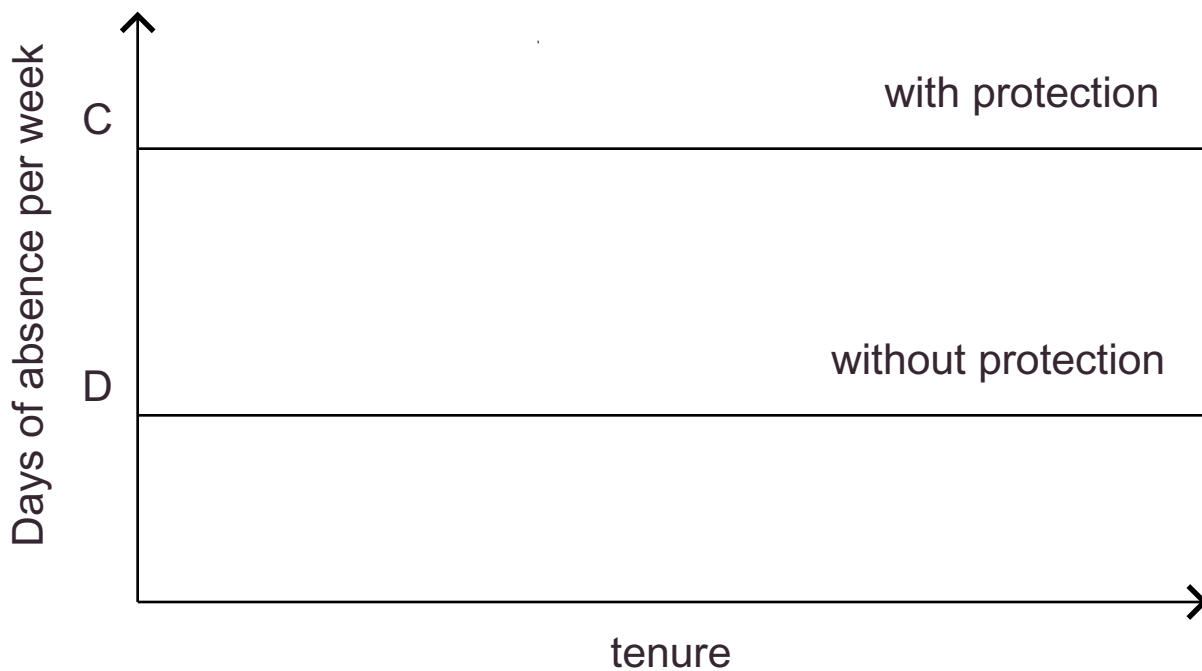


Fig. 4: Unobservable effect of a change of protection