

# Discrimination or Individual Effort?

Regional Productivity Differentials in a Large Italian Firm

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## Abstract

This paper documents the existence of striking regional differences in the reported behaviour of employees working within the same firm but in different Italian regions. In particular, the frequency of recorded and punished misconduct episodes is significantly higher among employees working in the south; migrants moving from the north to the south assimilate completely to the higher rate of misconduct in the receiving region while migrants moving from the south to the north assimilate only partially to the lower misconduct rate in the receiving region. These differences can in principle be attributed to discrimination or to individual effort. The absence of any evidence of regional discrimination in the process by which misconduct episodes are reported to the personnel office and in terms of careers and earnings suggests that the second explanation is more likely to be true. This conclusion is supported also by the evidence on absenteeism that replicates the findings on misconduct.

The hypothesis of discrimination had to be first dismissed before the existence of true regional differences in individual effort could be accepted. Now, the search for the possible ultimate causes of these differences comes next in our research agenda.

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# 1 Introduction

This paper documents the existence of striking regional differences in the reported behaviour of employees working within the same firm but in different Italian regions. In particular, the frequency of recorded and punished misconduct episodes is significantly higher among employees working in the south; migrants moving from the north to the south assimilate completely to the higher rate of misconduct in the receiving region while migrants moving from the south to the north assimilate only partially to the lower misconduct rate in the receiving region. Therefore, a significant positive effect of the southern region of birth on the probability of misconduct remains even after controlling for the region of work and for a wealth of other observable individual characteristics.

These results may indicate the existence of factors that reduce the productivity of employees working or born in the south. But one cannot accept this interpretation without having previously excluded that they might indicate the existence of discrimination due to the way in which misconduct episodes are reported to the personnel office and punished by the latter.<sup>1</sup>

In addition to documenting the evidence, this paper is aimed at understanding which of these two interpretations is the correct one and the main conclusion is that the hypothesis of discrimination is not supported by the data. This conclusion is reached on the basis of the following evidence. The institutional process by which misconduct episodes are brought to the attention of the personnel office does not seem to be characterised by features that lead to any form of systematic discrimination. Nor there is any evidence that misconduct episodes of the same type and gravity are punished differently in different regions. At the same time, additional collateral evidence on promotions and compensation levels allows to exclude with confidence the existence of discrimination on a regional basis in terms of careers and earnings; in these cases, the absence of regional discrimination is particularly evident if one compares regional differences with gender differences. Finally, the evidence on another potential indicator of lower productivity, i.e. absenteeism, replicates almost exactly the evidence on the frequency of misconduct episodes: while statistics on the Italian population show, if anything, a lower incidence of diseases in southern regions, absenteeism for health related reasons is substantially higher among employees working in the south; in this case an interesting difference with respect to misconduct episodes is given by the facts that migrants tend to fully assimilate to stayers in both receiving region, so that, controlling for the region of work, the region of birth becomes completely insignificant as a determinant of absenteeism.

Putting together this collage of evidence, regional differences in the frequency of misconduct episodes matched by analogous differences in the incidence of absenteeism can hardly be attributed to discrimination. If this conclusion is accepted, the evidence documented in this paper indicates the existence of regional productivity differentials due to individual effort. Checking whether the hypothesis of discrimination could be dismissed was a necessary first

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<sup>1</sup>Whatever the interpretation, the significance of these results is enhanced by the fact that they jumped out of data collected for totally different research purposes, i.e. for a study of the selection of cases for trial in litigations concerning unjust dismissals.

step before searching for alternative explanations of these regional differentials. But now, the search for these explanations is the natural next step in our research agenda.

This paper is organised as follows. After a description of the data in section 2, section 3 documents the basic evidence on misconduct episodes. Section 4 examines the process through which misconduct episodes are brought to the attention of the personnel office and punished by the latter and shows no evidence of discrimination on this side. Section 5 presents collateral evidence that allows to exclude the existence of discrimination in terms of careers and earnings. Section 6 shows that the evidence on absenteeism supports instead the hypothesis of differentials due to individual effort. The last section gives a summary of the results and indicates the main line of research on which we plan to focus in the future to explain the observed evidence.

## 2 The Data

The firm studied in this paper is a large bank with branches in every province of the Italian territory. Table 1 reports the level of employment at the firm and its regional distribution for the 1974-1994 period on which the analysis is focused.<sup>2</sup> Looking at the distribution by region of work in the top panel, approximately 67% of total employment is concentrated in the north, where the head-quarters of the firm are located, but the presence of the firm in the other regions has always been significant and increasing with time. Employment by region of birth (the bottom panel) is more uniformly distributed across regions, as one would expect given the migration flows that characterised the Italian labor market during the '50s and '60s<sup>3</sup>

From the personnel department of this bank we received several files containing, for different aspects of the employment relationship, information on all the relevant events characterising the history of each employee at the bank. In particular the files contain information on: 1) employee's characteristics independent of time at the firm, like date and region of birth, education (level, type and grade) and previous working experience; 2) compensation levels in 1994 and individual or collective wage increases and bonuses over the entire period; 3) careers, promotions, job descriptions and turnover between branches; 4) union membership for 1994 and union leadership position; 5) family loads for 1994; 6) supervisors evaluations; 7) reason and duration of absence and late arrival episodes; 8) merit, disciplinary measures and dismissals on disciplinary ground.<sup>4</sup>

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<sup>2</sup>The observations concerning workers born or working abroad (less than 3% of the total) have been dropped given the focus of the paper.

<sup>3</sup>For a description of these flows see Ichino and Gorio (1994). The north is defined as the geographic area covered by the following administrative regions: Valle D'Aosta, Piemonte, Liguria, Lombardia, Veneto, Trentino, Friuli and Emilia Romagna. The center includes: Toscana, Marche, Lazio Umbria and Sardegna. The south includes: Abruzzi, Molise, Puglia, Basilicata, Campania, Calabria and Sicilia.

<sup>4</sup>Compensation levels before 1994 and other information linked to compensation payments, like union membership and family loads will be provided by the firm in the near future. They were not provided initially with the rest of the data because of a recent change in the computing system at the firm that delayed the possibility to access certain archive files. Almost twelve months have been necessary to prepare

The information contained in these original files has been reorganised for the analysis into a panel data set with one observation per year for each worker on payroll in the month of November of each year between 1974 and 1994.<sup>5</sup> The panel contains information on 28651 workers observed for a maximum of 21 years, amounting to a total of 373781 worker-year observations. Employment per year grows from a minimum of 15103 units in 1974 to a maximum of 19072 units in 1984, and then declines to 17913 units in 1994. 23.7% of the employees are observed over the entire period.<sup>6</sup>

For each employee in a given year (i.e. for each observation in the panel) we created three types of variables based on the information contained in the original files:

- A) variables describing events like promotions, wage bonuses, supervisors' evaluations or absence episodes, etc, occurring to a worker during the 12 months that follow the month of November of each year (we will refer to these 12 months as to the *outcome period*)<sup>7</sup>;
- B) variables describing the characteristics of each worker as observed in the month of November of each year, like the hierarchical level, the wage, the working location or the union status, etc., of the worker;
- C) variables describing the history of the worker before the outcome period, like the date and place of birth, the number of previous wage increases, promotions, absence episodes, or the average supervisors' evaluations in the past.

The research strategy guiding this reorganisation of the data is aimed at looking at the effects of the retrospective variables (B) and (C) on the outcome variables (A).

In this paper the focus is concentrated in particular on one of these outcome variables that indicates whether an episode of misbehavior of a worker has been reported to the personnel office during the outcome period, *and* whether the personnel office punished this misbehavior with a disciplinary measure.<sup>8</sup> Inasmuch as these misconduct episodes appear to

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the data for the analysis.

<sup>5</sup>The choice of November is motivated by the fact that this is a relatively uneventful month for the industrial relations at the firm, and therefore offers the possibility to take a snapshot image of the employment situation at the firm in normal conditions.

<sup>6</sup>Total employment in selected years is described in the bottom panel dedicated to the region of birth in table 1. Due to missing information on the region of work for few workers temporarily not assigned to any branch, figures on total employment in the top panel by region of work do not represent correctly the true crosssectional dimension of the panel in each year; differences are, however, minimal.

<sup>7</sup>Therefore, the period covered by this study goes from 1974 to 1994 if one considers the time (month of November) in which the snapshot image of employment at the firm is taken in each year; but it goes from 1975 to 1995 if one considers the outcome periods that follow the month of November. In what follows we will use both time definitions according to which one is relevant for the specific variable under consideration

<sup>8</sup>We do not have information on episodes of misbehavior that were not reported to the personnel office or that were not considered by the latter as serious enough to deserve a punishment. In section 4 we characterise the nature of these misconduct episodes and the process by which they are brought to the attention of the personnel office.

be concentrated within certain groups of employees (e.g. regional groups), two very different interpretations of their significance are in principle possible: they could be interpreted as an indication that low productivity is more likely among employees in those groups, but also as an indication of discrimination against them. For the first interpretation to be true, a necessary condition is that all (or a random sample of) misconduct episodes are reported to the personnel office and that the latter decides impartially on the disciplinary measure that has to be issued. On the contrary, evidence that the signalling process and/or the punishment decision are biased against some groups of workers would suggest that the second interpretation is the relevant one.

Understanding the process by which misconduct episodes are reported to the personnel office and the determinants of the decision of the latter concerning their punishment is therefore crucial if one wants to discriminate between the two interpretations. But first, in order to motivate the analysis, we present in the next section evidence showing that the frequency of recorded and punished misconduct episodes is significantly higher in southern Italian regions.

### 3 Misconduct episodes and regions of birth and work

Table 2 describes the raw frequencies of misconduct episodes by region of birth, by region of work and by each cell obtained combining birth and working regions. These frequencies are computed as the ratio between the number of misconduct episodes in each regional cell divided by the total number of worker-year observations in the same cell.

The raw average frequency over the entire sample is 0.9%. Looking at the evidence by region of birth (the last column in table 2) the frequency of misconduct is lowest in the north (0.7%), intermediate in the center (1.1%) and highest in the south (1.4%). By region of work (the last row), the regional difference is even larger going from 0.7% in the north to 1.2% in the center and up to 1.6% in the south. Column 1 and 2 of table 3 report the odds ratios (for the center and for the south with respect to the north) estimated using logit models of the probability of misconduct.<sup>9</sup> The odds of misconduct are estimated to be 2.1 times higher if an employee is *born* in the south as opposed to the north, and 2.4 times higher if an employee *works* in the south as opposed to the north. These odds ratios are not only significantly different from 1 in their dimension, but, given the size of the sample, they are also significantly different in a statistical sense.

Whether caused by discrimination or by lack of individual effort, misconduct episodes appear to be strongly related to the regional working environment as well as to the regional birth environment in which an employee grew up. Since the correlation between region of birth and region of work is .72, the next relevant question is to measure the net effect of the working environment controlling for the birth environment, and viceversa. As shown in

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<sup>9</sup>Note that odds ratios greater than one imply that the variable is positively associated with greater frequency of misconduct; odds ratios equal to one imply no association; odds ratios lower than one imply negative association.

column 3 of table 3, when both work and birth regional dummies are included, central and southern working conditions are no longer different between each other, but the difference with respect to the north remains statistically and quantitatively significant: *independently of the region of birth* those not working in the north are approximately 80% more likely to be reported and punished for misbehavior. But what is perhaps even more striking is that the southern region of birth remains statistically and quantitatively significant even controlling for the region of work: i.e., workers born in the south, *independently of the region of work*, are 35% more likely to be associated with misconduct episodes.

These regional effects remain basically unchanged and equally significant when one controls for years and individual characteristics, as shown in the remaining columns of table 3. Column 4 adds the estimation of a linear time spline with knots equally spaced over the 1975-1995 outcome periods. The time effects are mild if compared with the regional effects. The odds of a misconduct episode increase slightly during the 80-84 period, and then decline in the following one, while remaining constant in the first and last intervals. The inclusion of these time effects is clearly without consequences for the regional odds ratios.

Column 5 adds “non-behavioral” individual characteristics: females are approximately 50% less likely to be associated with misbehavior; one additional year of education reduces by 5% the odds of misconduct, while the reduction implied by one additional year of tenure is equal to 1%; the odds that white collars and bluecollars get involved in misconduct episodes are respectively 14% and 19% lower than for managers; <sup>10</sup> previous experience outside the bank also reduces by 2% the odds of misconduct. <sup>11</sup> Despite the fact that these individual characteristics are all statistically significant (and some also quantitatively significant) the regional odds ratios appear unaffected in column 5.

The robustness of the regional differences is even more surprising in column 6 where several retrospective indicators of good or bad behavior of the worker are added to the regression and shown to be important determinants of the probability of misconduct. The numbers of previous promotions and of previous wage increases per year of tenure reduce the likelihood of misconduct. However, for reasonable changes of these variables measured at the sample averages these effects are relatively small.<sup>12</sup> Stronger and somewhat surprising is instead the positive effect of the total number of levels jumped at promotions per year of tenure. This is an indication that “fast tracks” lead to more misbehavior controlling for wage increases and number of promotions. <sup>13</sup> Finally, past turnover between branches

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<sup>10</sup>As discussed in a forthcoming paper on this issue, managers have higher incentives and opportunities to commit *internal violations* that, as shown in table 6 are the most frequent in our sample.

<sup>11</sup>Leaving out low service workers, almost 99% of the employees at this bank are hired at the lowest white collar entry level. The fact that the few workers hired at higher levels and with previous work experience are less prone to misconduct is an interesting piece of information to be interpreted within models of learning under asymmetric information on the quality of the worker; this is another issue that will be explored in forthcoming research.

<sup>12</sup>On average there is 1 promotion and 0.1 non-contractual wage increases every ten years.

<sup>13</sup>On average the total number of levels jumped per year of tenure is 1.4. One interpretation of this result, that will be analysed in greater depth in forthcoming research, is that workers on fast tracks takes greater risks.

has insignificant effects, while the effect of the number of previous absence episodes, due to illness, per year of tenure is positive.<sup>14</sup> Once again, even controlling for all these effects the regional differences in the likelihood of misconduct appear unchanged.

Further crucial insights on the role of working and birth environments can be gathered by the evidence on the frequency of misconduct for each combination of region of birth and work. These frequencies are reported in table 2 (rows and columns 1 to 3): while the workers born and working in the north are characterised by the lowest frequency of misconduct, this frequency increases if either the region of work or the region of birth changes towards south (i.e. moving down and right in the table). Table 4 shows that most of these differences are not only quantitatively but also statistically significant. The first three columns in this table report the odds ratios of misconduct by region of work estimated separately for the subsamples of workers born in the different regions. The last three columns report instead the odds ratios by region of birth for the subsamples of employees working in the different regions.<sup>15</sup>

The most striking evidence offered by these two tables concerns the odds of misbehavior for those who migrated (at least once) from north to south, or viceversa, between birth and the time of observation.<sup>16</sup> Among those born in the north (column 1 of table 4, those working in the south are 2.4 times more likely to be associated with misconduct episodes than those working in the north; viceversa among those born in the south (column 3 of table 4) those who remain there are 80% more likely to misbehave than those who move to the north. These effects are so large that (see table 2) southerners working in the north become less likely to misbehave than northerners working in the south. Therefore, whether misconduct is caused by discrimination or is evidence of low productivity, the working environment is clearly extremely important because it is capable to invert the ranking of the region of birth in terms of frequency of misconduct: while on average those born in the south are more likely to misbehave than those born in the north migration in opposite direction inverts the ranking.

However, the effect of the working environment is not symmetric. While migrants from

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<sup>14</sup>The sample average in this case is 1.2 episodes per year, with a recorded maximum of 26 episodes per year.

<sup>15</sup>Therefore, the first (last) three columns of table 4 correspond to the rows (columns) of table 2

<sup>16</sup>In the analysis of these results it should be noted that although the number of worker-year observations on which these regressions are estimated is large, the number of employees involved is in some cases relatively low. In 1974, 34% of those born in the south were working in the north, but less than 1% of those born in the north were working in the south; the analogous percentages are respectively 31% and 0.7% in 1984 and 28% and 0.8% in 1994. Slightly larger are the migration movements between the north or the south and the center. From the point of view of the working region, in each year approximately 10% of those working in the north are born in the south and approximately 3% of those working in the south are born in the north and these proportions are more or less constant over the entire period. All in all, out of the 28651 workers observed in the sample, 2510 (9%) are born in the south but work in the north in at least one year while 225 (0.8%) are those born in the north and working in the south. The relative dimension of these migration flows are comparable in size to the historical flows at the aggregate national level. The absolute size is small but it seems sufficient to generate interesting and reliable results at least for the case of migrants from south to north.

north to south almost completely assimilate to the southerners working there, for those moving in the opposite direction assimilation is far from complete. This is shown in the last columns of Table 4. In particular, in column 6, among those working in the south, those coming from the north are basically identical to southerners<sup>17</sup>; viceversa, in columns 4 among those working in the north, southerners are 40% more likely to misbehave than northerners.

Finally, looking just at column 4 one might think that the frequency of misconduct is just a result of diversity, in the sense that in any given region those coming from outside are more likely to be associated with misbehavior (once again either because of discrimination or because effectively less productive as a result of some kind of cultural shock). Yet columns 5 and 6 dismiss this possibility: among those working in the center, the frequency of misconduct is lower (or at most equal in terms of statistical significance) for those who are diverse because of birth in the north; among those working in the south, immigrants are at most equally misbehaving but certainly not more prone to misbehavior than natives.

The evidence presented so far shows unambiguously that regions matter. But matter for what? The episodes of misconduct recorded and punished by the personnel office indicate discrimination or lower individual effort? In order to find an answer to this question we begin in the next section by looking at how misconduct episodes are brought to the attention of the personnel office and what determines the intensity of their punishment.

## 4 Emergence and punishment of misconduct episodes

### 4.1 More on the data

Out of the 373781 worker-year observations in the panel, the number of misconduct episodes recorded and punished by the personnel office is 3404 (0.9%).<sup>18</sup> These misconduct episodes concern 2689 workers and therefore some workers have been reported for misbehavior in more than one year. Since the total number of workers considered in this study is 28651, the percentage of workers who misbehaved at least once in the 21 years of observation is equal to 9.4%

Table 5 shows the distribution of punishments issued for the 3404 misconduct episodes recorded by the personnel office. These punishments are ordered in terms of severity within a hierarchy established by collective bargaining: from the least serious verbal reproach to the ultimate level that implies firing and that in some instances induces a “voluntary” quit. With the exclusion of verbal reproaches, sect. 7 of the *Statuto dei Lavoratori*<sup>19</sup> foresees that

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<sup>17</sup>Note however that this result could also be explained by the small sample size

<sup>18</sup>The real number of episodes is in fact slightly larger because of the cases in which more than one misconduct episode has been recorded for the same worker in the same outcome period. In these cases only the episodes characterised by greater gravity (see below for the measure of gravity) have been included in the sample. 90 episodes have been dropped for this reason.

<sup>19</sup>The *Statuto dei Lavoratori* (Law 20 May 1970, n. 300) is the chart of workers rights that regulates the most crucial aspects of Italian industrial relations. For a description in English of the main characteristics



the punishments cannot be issued if the employer (in our case: the personnel office of the company) has not previously given to the employee a written notice containing a detailed description of the misconduct episode; the employee has then five days for a written or verbal reply. In all these cases, of course, also the punishment itself has to be issued in written form. It is possible that a written notice of misconduct is issued but no letter of punishment follows, because the personnel office, after receiving the employee's reply, decides to limit the sanction to a verbal reproach.

The legal division of the personnel office keeps a complete and reliable record of the letters of notice of misconduct and of the communications of sanction issued since 1980. These letters are a fundamental source of information for this research because they give a detailed description of the type of misconduct and of punishment. We were given access to this archive from which we gathered information on 1859 cases of misconduct which correspond to 63% of the 2952 cases occurred since 1980. A large part of the difference is due to cases for which no written notice was required; a smaller part is due to the fact that the letters and the computerised files on punishments came from different divisions in the personnel office and the matching between the two sources of information has not been straightforward. In the end, despite the difficulties, the merging procedure was quite successful since it failed in only 66 cases in which the letter was missing (3.9% of the 1678 cases that should have merged because a letter was required). These cases were dropped from the analysis. In addition we have also 247 written notices of misconduct for cases in which in the end only a verbal sanction was issued.

In what follows, whenever the analysis takes into consideration the type and gravity of misbehavior, we refer to the subsample of 1859 cases occurred after 1980 and for which a full description of the misconduct episode is available. Otherwise, as in tables 1-4 the whole sample of worker-year observations with 3404 cases of misconduct will be considered.

## 4.2 How misconduct episodes are reported to the personnel office

The central personnel office is the only authority in the company entitled to issue disciplinary sanctions if these are more serious than verbal reproaches; therefore, at least for these more severe sanctions, the punishment process is fully centralised at the head quarters of the bank, but it is conditional on the fact that misbehaviour episodes emerge and are reported to the personnel office.<sup>20</sup>

The ways in which misconduct episodes are brought to the attention of the personnel office differ according to the nature of the episodes. Following the classification described in Benvenuti (1997) there are four relevant categories of misbehaviour:

- i. unjustified late arrival and absence episodes;

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of Italian industrial relations, see Erickson and Ichino (1994) and Bertola and Ichino (1995).

<sup>20</sup>The fact that one category of written reproaches is labelled as "local" (see table 5) just indicates a reproach of lower gravity and has no real meaning as far as the punishment procedure is concerned.

- ii. *external violations*, i.e. actions taken by a worker outside the employment relationship with the bank, but potentially relevant for the latter (e.g. fraud, theft, drug smuggling, working activity in competition with the bank, etc);
- iii. *internal violations*, i.e. violations of the internal regulations of the bank (e.g. omitted controls on checks or new accounts, irregular operations on the stock market, credit to unreliable customers, etc);
- iv. inappropriate behavior inside the workplace and insubordination (e.g. sexual harassment, improper dressing, violence or insults against colleagues, superiors or clients, etc)

This classification is primarily based on the content of each misconduct episode but from the point of view of this paper it is crucial also because it corresponds to different ways in which episodes are brought to the attention of the personnel office.

Episodes of type 2 and 3 emerge in ways that are largely out of the control of local directors of branches and fairly independent of possible regional biases within the personnel office. For example, within the category 2 (*external violations*), episodes of excessive personal debt exposure, dud cheques or criminal law infringements, are brought to the surface by quite visible procedures that have their own life outside and independently of the bank (like, respectively, the distraintment of the employee's wage, the bouncing of a cheque in another bank or the notification of impending criminal investigation by the public prosecutor). Often these procedures reach the attention of the head quarters independently of local supervisors and in any case even the most prone-to-collusion director of a local branch would not dare to hide these cases of misconduct given the high risk of being caught soon or later, facing very serious disciplinary measures.

*Internal violations*, i.e. episodes concerning the technical implementation of banking services related to the job description of each employee, are primarily brought to the attention of the personnel office through *routine* inspections sent without notice in each local branch, officially once every two years on average. These inspections are performed by managerial employees that depend directly from the security department at the central head quarters. If southern branches were inspected more frequently than northern branches it would be natural to suspect a discriminatory attitude of the personnel office; but this is not the case: in a randomly chosen year (1988), while 36.6% of the northern branches were inspected, the same happened to only 26.5% of the southern branches.

A residual fraction of episodes of type 3 emerges as a consequence of *special* inspections sent to a local branch if some specific disfunctions are observed. For example, if the frequency of "suffering" loans is too high or if a fraud by third parties against the company is denounced a special inspection is always sent. Sometimes, while looking at the entire documentation concerning the local branch, these special inspections discover misconduct episodes of type 3 that are not necessarily related to the disfunctioning that originally motivated the inspection. This feature of the inspection process may lead to regional differences in the observed frequency of misconduct if the disfunctions that cause special inspections are more frequent

in the south independently of the employees' behaviour. For examples, if insolvencies are larger in the south because of the weakness of the economy in the "Mezzogiorno", special inspections could be more frequent there and even if the employees' propensity to misbehave were equal in the south and in the north, southern employees would be more frequently inspected and possibly caught shirking. But the evidence is that the frequency of special inspections in southern and northern branches is approximately the same in the randomly chosen year 1988 (11.8% ad 11.6% respectively).

Episodes of type 1 and 4 instead reach the personnel office only if the director of the local branch denounces them. Therefore, in this case the frequency of *recorded* episodes may differ substantially from the frequency of *real* episodes because of collusion between local directors and their subordinates or because of discriminatory attitudes or other idiosyncratic characteristics of the former.

In particular as far as absences due to illness are concerned, the Italian Law gives to family doctors complete freedom in the evaluation of the state of illness of the employee and in the decision concerning the number of days that are necessary for a full recovery. In a world without collusion and moral hazard this would be perfectly reasonable, but in practice any Italian worker willing to stay home for few days can do it even if he/she is not really sick without any substantial risk of a disciplinary sanction. The length of authorisations to absences depends only on the sense of duty of the doctors to whom the employees ask for the authorisation. Section 5 of the already quoted "Statuto dei Lavoratori" foresees that the employer can ask that the state of illness of an employee is inspected by a public medical service. Unjustified absence episodes occur when an employee remains at home without exhibiting a medical certificate or when inspections do not find at home an employee supposed to be sick. Evidently the fact that inspections are sent out depends only on the willingness of the local director who is also the only one who may decide whether a delay has to be considered justified or not.<sup>21</sup>

It is fairly obvious that without the co-operation of local supervisors, routine or special inspections by the Security Department cannot identify late arrivals, unjustified absences or unacceptable behaviour on the workplace.

### 4.3 Type, gravity and punishment of misconduct episodes

Table 6 describes the distribution of misconduct episodes across the four types described above. The category of internal violations features the highest frequency followed by external violations, while the cases of unjustified absence and of unacceptable behaviour on the workplace are substantially less frequent. More interesting from the point of view of this paper is the fact that regional differences exist not only in the overall frequency of misconduct, as shown in section 3, but also in the frequency of the different types of misconduct. Table 7 reports the regional odds ratios for each misconduct type, computed from a multinomial logit regression in which the excluded category is *no misconduct*. This table is particularly

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<sup>21</sup>In some cases, employees who should be sick at home according to a medical certificate are discovered working for a different employer.

important in the light of the above discussion on the mechanisms through which the different types of misbehavior emerge and are reported to the personnel office.

As far as unjustified absences and late arrivals are concerned, the odds of misbehaviour are significantly larger for employees working in the center with respect to those born and working in the north. The odds are also larger for employees born in the south, but they are lower or at most equal for employees working in the south. These results are somewhat surprising if compared with those presented in tables 15-19 that describe how the region of work and birth affect the number of all episodes of absence due to illness, including the justified ones: in these tables employees working in the center appear to be significantly more prone to illness (both justified and unjustified), but the same is true also for employees working in the south, that in table 7 are shown instead to be as likely as those working in the north to be late or absent without justifications.<sup>22</sup>

Since, as argued above, unjustified absence and late arrival can only be brought to the attention of the personnel office by local supervisors this evidence suggests that in the south the propensity to illness creates the conditions for collusion between supervisors and employees. This collusion leads to a significant under reporting of unjustified episodes. Note that the same type of collusive agreement does not seem to prevail in the center where both justified and unjustified episodes are substantially more frequent.

Coming back to table 7, like in the case of unjustified absence, also in the case of incorrect behavior on the workplace all cases of misconduct are brought to the attention of the personnel office by local supervisors. Table 7 shows that workers born or working in the south are more likely to be involved in this type of misconduct, but odds ratios are not precisely estimated and one cannot exclude the hypothesis of absence of regional differences. This again may suggest the existence of collusion between employees and supervisors in the south, but in this case there is no equivalent of the total number of absence episodes to get insights on the validity of this hypothesis.

Where, in table 7, regional differences appear both quantitatively and significantly more evident is in the case of internal and external violations. When they misbehave, employees working in the center and in the south are much more likely to be involved in these two types of violations than in the other categories. Southerner employees are particularly prone to internal violations while central employees tend to run into external violations. From the point of view of birth, instead, the category of external violations is the one in which southerners are more frequently involved.

As argued above, among the four types of misconduct, internal and external violations are the types more likely to be brought to the attention of the personnel office in a way that more closely corresponds to the real dimension of the phenomenon. These episodes, in fact, emerge because of external procedures, random internal inspections or signalling at intermediate levels of the hierarchy. The evidence concerning internal violations, that are generally discovered through inspections, is particularly striking: while southern branches are inspected less often (see section 4.2), employees working in the south are more frequently involved in this type of misconduct episodes.

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<sup>22</sup>We will come back to these tables at greater length in section 6

Given the importance of internal and external violations, we repeated the analysis presented in tables 2-4 restricting the dependent variable to indicate just the episodes of external or internal violation. In the interest of space we do not present the resulting tables here, but as expected from table 7 regional differences maintain the same sign and become much more dramatic in terms of both quantitative and statistical significance.

Moving to the analysis of the gravity of misconduct episodes, Table 8 reports its distribution for the 1980-1995 outcome periods across the 8 levels identified by Benvenuti (1997). This ordinal ranking of gravity, and the related classification of misconduct types described above, have been prepared and discussed in a series of interviews with members of the personnel office for research goals totally unrelated with the ones of this paper, i.e. for a study of labor conflicts and of the selection of cases for trials. For most misconduct episodes the classification into higher gravity levels was dictated by the nature of the misconduct type: for example, the length of the absence, the extension of debt exposure, the sum involved in the fraud etc. In other cases it has been left to the judgement of the personnel officers. The equivalence across types has also been established with the help of the personnel office and with reference to criteria that were claimed to be relevant for 1995.

Table 9 reports ordered logit estimates of the probability that an employee is involved in misconduct episodes of increasing gravity. The estimation is conditional on the existence of a misconduct episode, i.e. this table tells us which factors are correlated with greater misconduct gravity given that an episode of misconduct has been observed.<sup>23</sup>

While the region of birth is estimated to be irrelevant, employees working in the south appear to get involved in episodes of greater gravity if they misbehave. These effects remain significant at the 5% level even when individual characteristics are controlled for in columns 5 and 6.<sup>24</sup> Further evidence on the existence of collusion between employees and supervisors as far as unjustified absence episodes are concerned, is offered by the analysis of the gravity of misconduct restricted to this type of misbehavior. While apparently more prone to illness (see section 6, employees born and working in the south appear to be significantly less likely to be involved in unjustified absences of greater gravity i.e. greater length.<sup>25</sup>

As argued above, the classification of misconduct gravity has been performed independently of any regional consideration. Therefore, the fact that employees who misbehave while working in the south are more concentrated in higher levels of gravity may be interpreted in at least two ways: the first possibility is that workers in the south misbehave in a more serious manner; the second possibility is that the personnel office, in the communication

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<sup>23</sup>Therefore, positive coefficients imply that the variable is associated with misconduct episodes of greater gravity and the opposite is true for negative coefficients, while in tables presenting odds ratios the reference value to understand the sign of the effect of each variable is 1.

<sup>24</sup>Among the effects of these controls it is interesting to note that the gravity of misconduct tends to decrease during the late '80s; female or more educated workers commit misconduct of lower gravity while, not surprisingly, the opposite is true for managers. Employees with previous experience, who were found on average to be less prone to misconduct, if they do misbehave they do it in a less serious way. Past turnover between branches seems to lead to higher gravity and the same happens for the number of past wage increases per year of tenure, although this latter result appears of difficult interpretation.

<sup>25</sup>To save space we omit the tables concerning these results.

letters to the employees, describe misconduct episodes in the south as more serious, leading the team of researchers to classify them in higher levels of gravity.

Under the first interpretation this evidence would favor the hypothesis of lower individual effort in the south, while the second interpretation would favor the hypothesis of discrimination. However, it should be noted that unfair accusations of misconduct can be always taken to court by the employee and the Italian litigation procedure code gives to the plaintiff the choice between the court of the branch in which he/she works and the court corresponding to the head quarters of the company. Therefore, the firm has to be careful in preparing the case, given the risk of trial: expectations on what judges will decide have a decisive influence on this preparation and in particular on the content of the notification letters.<sup>26</sup> If the firm expect judges to be biased in favor of workers in the south it may be induced to describe the episodes of misconduct differently from what they are in reality not because of discrimination but simply as a rational strategy in this three actors game.

A further substantial piece of evidence against the hypothesis of discrimination is offered by table 10. This table measures the effect of regions on the intensity of the punishment through the estimation of ordered logit models in which the dependent variable ranks in six categories of increasing severity the sanctions tabulated in table 5.<sup>27</sup>

While in column 2, employees working in the south are associated with more severe punishments, in column 1, controlling for the type and gravity of misbehavior, the regional effect disappears. A similar result occurs in columns 3 and 4, which focus on the effect of the region of birth. In other words, misbehaviour of equal type and gravity is punished with the same severity in the north and in the south. If there existed discrimination, one would have expected southerner employees to be not only recorded more often for misbehaviour but also to be punished more severely for similar misconduct episodes. The available evidence suggests that this is not the case.

All in all, the evidence described in this section does not suggest the existence of any systematic form of regional discrimination in the way in which misconduct episodes are brought to the attention of the personnel office and are punished by the latter. In order to exclude with greater confidence the hypothesis of discrimination we move in the next section to the analysis of other outcome variables that might indicate the existence of other forms of regional discrimination in the firm under study.

## 5 Collateral evidence on other outcome variables

### 5.1 Internal hierarchy and promotions

We begin the analysis of collateral evidence by looking at how the region of birth and work affect the likelihood of being in one of the three major categories in which the employees

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<sup>26</sup>The role of judges and of verdict expectations in shaping the strategies of the firm and of the employee in case of conflict will be the explicit focus of a forthcoming paper in this research project.

<sup>27</sup>The six categories are: 1 = verbal reproaches; 2 = written reproaches; 3 = suspensions of less than 5 days; 4 = suspensions between 5 and 9 days; 5 = suspension of 10 days; 6 = firing or voluntary quit.

of this bank are divided: managers, white collars and low service workers. In table 11 we present the regional odds ratios of being in the top or bottom categories, instead of the intermediate one, calculated from multinomial logit models. The employees working in the south are significantly less likely to be managers instead of white collars than the employees working in the north, but they are also significantly less likely to be low service workers. While the first finding may be interpreted as evidence of discrimination in the access to higher management levels, it is probably explained by the location of headquarters in the north. Anyway, this conclusion would be at odds with the estimates by region of birth. Employees born in the south are significantly more likely to be managers than white collars, although they are also more likely to be low service workers than white collars. So, by region of work, southerners are concentrated in the intermediate category while by region of birth they are dispersed in the top and bottom categories. The hierarchical dispersion of employees born in the south, suggests the existence of greater heterogeneity in the family backgrounds of these workers, inasmuch as these backgrounds affect future labor market careers.

The evidence on promotions between levels is presented in table 12.<sup>28</sup> A promotion is defined as a change of level occurring during the outcome period with respect to the level observed in the month of November preceding the outcome period. Without controls, employees born or working in the south are approximately 3% less likely to be promoted, but when controls are included these effects are no longer estimated to be significant, except for the effect of the southern region of work in column 5. But even this effect disappears in column 6 where we control for the hierarchical level of the worker before the outcome period through the inclusion of 14 level dummies in the regressions. Employees working in the center are instead estimated to be significantly less exposed to the possibility of a promotion, a fact that might be related to the higher incidence of illness episodes described in section 6. But focusing just on the south-north comparison the evidence presented in this table, and in particular in column 6, suggests that for given individual characteristics and past behavior, southern workers are not discriminated in promotions.

Where discrimination, if anything, appears more likely is in the case of females, who are 17% less likely to be promoted even when they have the same observable characteristics as men (see column 6) . Note that this is true even controlling for the past number of illness episodes, that is one crucial dimension in which females appear less productive than men as shown in section 6. Regional differences in promotions are anyway insignificant if compared to gender differences.<sup>29</sup>

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<sup>28</sup>Levels are defined according to the methodology suggested in Baker, Gibbs and Holmstrom (1994).

<sup>29</sup>The size of these gender differentials is a well known fact in the Italian financial sector and, at least in this bank, it has fostered several initiatives, conducted in co-operation with trade unions, aimed at reducing gender discrimination and at favoring the access of females to the highest hierarchical levels. The evaluation of the effects of these initiatives will be the object of a forthcoming paper in this research project.

## 5.2 Wages and supervisors' evaluations

As far as compensation levels are concerned we have information only on the cross section of workers on payroll in November 1994, but the evidence is consistent with the findings on hierarchies and promotions described above for the entire panel. Table 13 reports the OLS coefficients of (log) earning functions. In column 1 employees working in the center or in the south are estimated to earn 3% less than their colleagues working in the north, but in column 2, employees born in the center appear indistinguishable from those born in the north and those born in the south earn 2% more. When both classifications are included in column 3, the divergence between the effects of working and birth environments become even larger and more significant: employees *working* in the north are paid more, independently of the region of birth, but employees *born* in the north are paid less independently of the region of work.

While the effect of the working environment is likely to be due to the fact that higher managerial levels are located in the north near to the head quarters, the positive effect of the southern region of birth is hardly reconcilable with the existence of discrimination against southern workers. In any case, in column 6 where we control for the hierarchical level of workers, the region of work becomes absolutely insignificant (the estimate is precisely zero for those working in the south) while employees born in the center and in the south are estimated to earn 1% more than those born in the north. In other words within levels and controlling for individual characteristics and past behavior workers born in the south are certainly not discriminated in terms of wages and if anything they are favored.

Note that wage differentials within levels are in large part due to non-contractual individual merit bonuses or wage increases. This is the only dimension in which discriminatory wage policies, if it exists, can take place in a highly unionised and regulated industrial relations environment. 14 level dummies alone explain in fact almost 90% of the variance of wages for all employees and 8 level dummies explain 60% of the variance for non managerial employees. The comparison with gender differentials is instructive: column 6 shows that within levels and controlling for individual characteristics females earn a substantial 7% less than men. At least in comparison with females southern workers can hardly be considered discriminated in terms of wages.

This is even more true if one considers the determinants of the probability of higher supervisors' evaluations presented in table 14. This table reports the coefficients of ordered logit models in which the dependent variable is the evaluation given by supervisors to non managerial workers during the month of December of each year.<sup>30</sup> Column 6 in this table shows that, controlling for individual characteristics and hierarchical levels, both females (wherever born) and employees born in the south tend to receive better evaluations but the gender effect is more than 10 times larger than the regional effect. Yet females are paid less than men while workers born in the south are paid more than their colleagues born in the north.

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<sup>30</sup>The restriction to non managerial workers explain the smaller sample size in these regressions. Evaluations take values from 1 to 6.



Looking at the first two columns in table 14 one might conclude for the existence of regional discrimination in the evaluations given by supervisors: this because employees born or working in the south appear to be significantly associated with worse evaluations. But column 3 shows that the effect of the southern region of birth disappears once we control for the region of work. This fact is quite important: given the small dimension of migration flows from north to south, supervisors of employees working in the south are likely to be southerners and in addition we know from table 11 that employees born in the south are more likely to be in the managerial category that evaluates lower categories.

Secondarily, when we control for individual characteristics and in particular for levels in the last three columns the negative regional effects become statistically insignificant or turns positive. Only employees working in the center appear to receive significantly better evaluations: a result which appears somewhat puzzling given the evidence on the incidence of illness presented in table 6.

Putting together the evidence on misconduct and the evidence on careers and promotions, the hypothesis of regional discrimination seems to find very little support in our data.

## 6 Regional differentials in absenteeism due to illness

If discrimination can be excluded on the basis of the above evidence, the incidence of illness episodes is another dimension in which regional differences seem to suggest the existence of productivity differentials.

Columns 1 and 3 in table 15 report the raw frequencies of at least one episode of absence due to illness, occurred during the outcome period, by region of birth and by region of work: the employees working in the center appear to be 20% more likely than their colleagues working in the north to be sick at least once during an outcome period (12 month); those working in the south are instead only 10% more likely. The differences by region of birth are similar. Columns 2 and 4 in the same table report instead the average number of episodes per outcome period for those worker-year observations in which at least one episode was observed: those who are sick at least once have approximately 5 episodes of absence every two years if they work in the south or center and 4 if they work in north; the difference is slightly smaller by region of birth. Therefore, in this table, the central working and birth environments play a dominant role with respect to the frequency of at least one episode of absence. Nevertheless, also the southern working and birth environments appear to be associated with a higher probability of illness, and in particular with a higher number of episodes among those who are absent at least once.

These regional differences are particularly striking if compared with the evidence for the entire Italian population. Table 17 displays the death rates per 100000 inhabitants by region and by type of disease. These death rates are always substantially lower in the south compared to the north and center for all types of diseases except for the category of unclassifiable diseases and for the residual category <sup>31</sup> Unless fatal and non-fatal diseases hit

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<sup>31</sup>And in these two cases differences are relatively small.

the two regions in opposite ways, the southern environment seems to be characterised by a lower incidence of illnesses. It is therefore surprising that absenteeism due to health related reasons among the employees considered by this study is significantly higher in the south.

In order to ensure that the differences observed in our sample are statistically significant, Table 18 estimates the incidence of morbidity through Poisson regressions in which the dependent variable is the number of illness episodes (zero or positive) per outcome period.<sup>32</sup> Column 1 shows that the incidence rate is 39% higher for those who work in the south and 46% higher for those who work in the center. Column 2 shows that also the central and southern backgrounds of birth expose individuals to higher risks of illness. Yet it is important to note that the raw effect of the *birth* dummies is largely due to the correlation between region of birth and work. In fact in column 3, controlling for the region of work the south dummy is insignificant and the central dummy implies a *reduction* of risk.

The incidence of illness remains significantly higher in central and southern working regions even when time, individual characteristics and individual past behavior are controlled for in columns 4, 5 and 6.<sup>33</sup><sup>34</sup> Interestingly and somewhat surprisingly, when these controls are added, the central and southern regions of birth acquire again the positive significance lost in column 3, even controlling for the region of work. This evidence suggests that there is something in the birth environment that increases the incidence of morbidity even controlling for individual characteristics.

Yet, in columns 4, 5 and 6, the working environment more than the birth environment plays the dominant role in increasing the incidence of illness episodes. Looking at the estimates in column 6, which include the maximum number of controls, employees *working* in the center and in the south face an incidence of illness that is respectively 31% and 20% higher than the incidence faced by employees working in the north, while for the employees *born* in the center and in the south the incidence increases just by 5% and 13% respectively.

As for the analysis of misconduct episodes, further interesting insights on the role of birth and working environments is offered by the analysis of the incidence of illness within the subsamples of employees born or working in different regions. Table 16 contains for each of these subsamples the raw frequencies of at least one episode (the top figure in each cell) and the average number of episodes for the observations with at least one episode (the bottom figure). Table 19 reports instead the incidence of morbidity computed from the results of

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<sup>32</sup>Note that the this approach combines the consideration of the likelihood of at least one episode and of the number of episodes.

<sup>33</sup>In these regressions note, in particular, the high incidence of absence for female (at least 60% higher than for male): this is one of the few aspects of female performance on the job that may explain why (see below) women are mistreated in terms of wages, promotions and careers. Another aspect that we will explore in forthcoming research on gender differentials is the lower willingness of females to accept turnover between branches because of family problems. The willingness to move is traditionally one of the most important preconditions for promotions in this bank as shown also in table 12.

<sup>34</sup>Before 1990 only regular absence episodes of at least one day are recorded in our dataset while for later years we have information on all the absence and late arrival episodes of any duration. For this reason in column 3 of table 18 the 90-95 spline effect is very large and significant. We estimated the same regressions on 1995 only, to check for possible distortions caused by the above problem, finding no relevant difference with respect to the results presented in the text.

Poisson regressions estimated on each subsample. The central working environment increases significantly the incidence of illness (at least by 30%, row 1 in table 19) for the employees born in every region and in particular for those born in the center (by 76%, row 1 in table 19). Interestingly, though, the employees *born* in the center are on average less prone to illness if they migrate, i.e. if they work in the south (36% less, row 3 in table 19) or in the north (16% less, row 3 in table 19).

The crucial role of the working environment is highlighted by the fact that those who migrate from north to south (between birth and work) face an increase of almost 40% in the incidence of illness with respect to stayers (column 1 in table 19) and assimilate themselves completely to the morbidity characteristics of the arrival southern working region (column 6 in table 19). While in the case of misconduct episodes migrants from south to north reduce the likelihood of misconduct with respect to stayers but do not fully assimilate to northerners, in the case of illness the assimilation is complete: column 4 in table 19 shows that the incidence of morbidity is the same among those working in the north independently of the region of birth.

## 7 Conclusions

The regional differentials documented in this paper are striking, but certainly do not have an easy explanation. Because of the nature of the observed indicators of individual performance, they are potentially open to at least two preliminary different interpretations. The fact that employees working or born in the south are substantially more likely to be reported and punished for misconduct could be an indication of lower productivity but also an indication of discrimination. The evidence offered in this paper allows to exclude the latter hypothesis because there is no sign of discrimination in the process by which misconduct episodes are brought to the attention of the personnel office nor in the process by which these episodes are punished. Furthermore, no sign of discrimination on a regional basis is offered by the evidence on careers and promotions. And finally the evidence provided by another potential indicator of lower productivity, i.e. absenteeism due to illness, replicates almost exactly the evidence offered by misconduct episodes. And this occurs even if, over the total Italian population, the incidence of illnesses seems to be lower in the south.

Since the hypothesis of discrimination can be excluded, this paper provides a measure of regional productivity differentials due to individual effort, that, as far as we know, have rarely (if ever) been identified and measured in Italy. These differentials are measured within the population of employees working in a single large bank with branches distributed over the entire territory. This allows to exclude that the evidence might be due to job related characteristics.

Checking whether the observed evidence could be due to discrimination was a necessary preliminary step before considering the possibility of regional differentials due to individual effort. But now the ultimate causes of these differentials remain to be explored.

Given the focus on misconduct and shirking labor economists might be inclined to search for explanations based on the Shapiro and Stiglitz (1994) model of efficiency wages. Cappelli

and Chauvin (1991) show, with similar plant level data for the US Auto Industry, that greater wage premia with respect to the local alternative wage and higher local unemployment rates reduce misconduct episodes, as predicted by that model. However, in our case, this interpretation seems unlikely to hold, although a more careful testing procedure is necessary to dismiss it with confidence. Indeed, the wages paid by our bank imply higher wage premia in the south, where, in addition, unemployment rates are substantially higher. And yet, misconduct episodes and absenteeism are more frequent.

A more promising line of research is instead represented by the hypotheses proposed and tested at the macro level by Putnam (1993) concerning the role of civic traditions in northern and southern Italian regions. “Collective life in the civic regions [of the north] is eased by the expectation that others will probably follow the rules. Knowing that others will, *you* are more likely to go along, too, thus fulfilling *their* expectations. In the less civic regions [of the south] nearly everyone expects everyone else to violate the rules. It seems foolish to obey the traffic laws or the tax code or the welfare rules, if you expect everyone else to cheat. So you cheat, too, and in the end everyone’s dolorous, cynical expectations are confirmed.” (p. 111.)

The role of the working environment in our evidence is reminiscent of the mechanism described by this quote. But at the same time Putnam, quite convincingly, traces back the different degrees of *civic-ness* in northern and southern regions to their medieval history. This suggests that also the pre-labor market environment, captured by the region of birth, should contribute to explain the observed evidence, even controlling for the working environment. The macro level of Putnam’s analysis suggest that both these effects should be at work but does not allow to disentangle their relative strength at the individual level. One of the questions left open by his fascinating book is how much of the effect of worse or better civic traditions absorbed by an individual in the birth environment is offset by better or worse civic traditions in the work environment. Our data seem to offer the possibility to answer this question and this objective comes next on our research agenda.

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Table 1: Regional distribution of employment - selected years

| By region of work<br>year | north  | centre | south | total  |
|---------------------------|--------|--------|-------|--------|
| 1974                      | 10379  | 2702   | 1879  | 14960  |
|                           | 69.38  | 18.06  | 12.56 | 100.00 |
| 1978                      | 11605  | 3103   | 2214  | 16922  |
|                           | 68.58  | 18.34  | 13.08 | 100.00 |
| 1982                      | 12738  | 3551   | 2591  | 18880  |
|                           | 67.47  | 18.81  | 13.72 | 100.00 |
| 1986                      | 12234  | 3577   | 2582  | 18393  |
|                           | 66.51  | 19.45  | 14.04 | 100.00 |
| 1990                      | 11821  | 3461   | 2594  | 17876  |
|                           | 66.13  | 19.36  | 14.51 | 100.00 |
| 1994                      | 11494  | 3468   | 2781  | 17743  |
|                           | 64.78  | 19.55  | 15.67 | 100.00 |
| Total                     | 248532 | 70301  | 51624 | 370457 |
|                           | 67.09  | 18.98  | 13.94 | 100.00 |

  

| By region of birth<br>year | north  | centre | south | total  |
|----------------------------|--------|--------|-------|--------|
| 1974                       | 8977   | 2870   | 3256  | 15103  |
|                            | 59.44  | 19.00  | 21.56 | 100.00 |
| 1978                       | 9957   | 3298   | 3811  | 17066  |
|                            | 58.34  | 19.32  | 22.33 | 100.00 |
| 1982                       | 10931  | 3775   | 4332  | 19038  |
|                            | 57.42  | 19.83  | 22.75 | 100.00 |
| 1986                       | 10658  | 3721   | 4179  | 18558  |
|                            | 57.43  | 20.05  | 22.52 | 100.00 |
| 1990                       | 10285  | 3621   | 4134  | 18040  |
|                            | 57.01  | 20.07  | 22.92 | 100.00 |
| 1994                       | 10068  | 3596   | 4249  | 17913  |
|                            | 56.20  | 20.07  | 23.72 | 100.00 |
| Total                      | 215261 | 73864  | 84656 | 373781 |
|                            | 57.59  | 19.76  | 22.65 | 100.00 |

Note: Employees born and working in Italy, on payroll during the month of November of each year (row frequencies in parentheses). Total employment is different in the two panels because of missing information on the region of work for workers temporarily not assigned to any branch. The figures for total employment in the panel by region of birth are the ones that describe correctly the complete cross-sectional and time series structure of the dataset.

Table 2: Raw frequencies of misconduct by region of work and birth

|                | work north | work centre | work south | marginal freq. |
|----------------|------------|-------------|------------|----------------|
| born north     | 0.006      | 0.009       | 0.015      | 0.007          |
| born centre    | 0.006      | 0.011       | 0.013      | 0.011          |
| born south     | 0.009      | 0.015       | 0.016      | 0.014          |
| marginal freq. | 0.007      | 0.012       | 0.016      | 0.009          |

Note: Cells in rows ( $i$ ) and columns ( $j$ ) 1 to 3 contain the raw frequency of a misconduct episode concerning a worker born in region  $i$  and working in region  $j$ . The last column (row) contains the marginal frequency of a misconduct episode concerning a worker born (working) in region  $i$  ( $j$ ). The bottom-right cell contains the average frequency over the entire sample. The denominator of these frequencies is the number worker-year observations in each regional cell; the numerator is instead the number of misconduct episodes recorded and punished by the personnel office for each regional cell.

Table 3: Effect of the region of work and birth on the probability of misconduct

| Model :             | 1               | 2               | 3               | 4               | 5               | 6               |
|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| # obs :             | 370457          | 373781          | 370457          | 370457          | 370193          | 370193          |
| work center         | 1.74*<br>(0.07) |                 | 1.71*<br>(0.12) | 1.69*<br>(0.12) | 1.75*<br>(0.12) | 1.71*<br>(0.12) |
| work south          | 2.40*<br>(0.10) |                 | 1.87*<br>(0.12) | 1.84*<br>(0.12) | 1.85*<br>(0.12) | 1.78*<br>(0.12) |
| birth center        |                 | 1.66*<br>(0.07) | 1.02<br>(0.07)  | 1.02<br>(0.07)  | 0.99<br>(0.07)  | 0.99<br>(0.07)  |
| birth south         |                 | 2.08*<br>(0.08) | 1.35*<br>(0.08) | 1.36*<br>(0.08) | 1.33*<br>(0.08) | 1.34*<br>(0.08) |
| spline 7579         |                 |                 |                 | 0.99<br>(0.03)  | 0.99<br>(0.03)  | 1.00<br>(0.03)  |
| spline 8084         |                 |                 |                 | 1.17*<br>(0.02) | 1.17*<br>(0.02) | 1.18*<br>(0.02) |
| spline 8589         |                 |                 |                 | 0.95*<br>(0.01) | 0.96*<br>(0.01) | 0.97§<br>(0.01) |
| spline 9095         |                 |                 |                 | 1.01<br>(0.01)  | 1.02<br>(0.01)  | 0.99<br>(0.01)  |
| female              |                 |                 |                 |                 | 0.51*<br>(0.03) | 0.47*<br>(0.03) |
| school years        |                 |                 |                 |                 | 0.95*<br>(0.01) | 0.95*<br>(0.01) |
| tenure              |                 |                 |                 |                 | 0.99*<br>(0.00) | 1.00<br>(0.00)  |
| white collars       |                 |                 |                 |                 | 0.86*<br>(0.05) | 0.69*<br>(0.05) |
| low service wkr.    |                 |                 |                 |                 | 0.81§<br>(0.08) | 0.59*<br>(0.06) |
| previous experience |                 |                 |                 |                 | 0.98*<br>(0.00) | 0.98*<br>(0.00) |
| n. prev. promotions |                 |                 |                 |                 |                 | 0.14*<br>(0.04) |
| n. levels jumped    |                 |                 |                 |                 |                 | 2.01*<br>(0.33) |
| n. prev. branches   |                 |                 |                 |                 |                 | 0.81<br>(0.14)  |
| n. prev wage incr.  |                 |                 |                 |                 |                 | 0.01*<br>(0.01) |
| n. prev. illnesses  |                 |                 |                 |                 |                 | 1.53*<br>(0.06) |

Note: Odds ratios computed from logit models of the probability of misconduct episodes. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year; the dependent variable takes value 1 when a misconduct episode is recorded and punished during the outcome period by the personnel office. The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.



Table 4: Estimated probability of misconduct by region of birth and work

|              | Only<br>born<br>north | Only<br>born<br>centre | Only<br>born<br>south | Only<br>work<br>north | Only<br>work<br>centre | Only<br>work<br>south |
|--------------|-----------------------|------------------------|-----------------------|-----------------------|------------------------|-----------------------|
| # obs :      | 214956                | 71078                  | 84423                 | 248532                | 70301                  | 51624                 |
| work center  | 1.39§<br>(0.22)       | 1.98*<br>(0.24)        | 1.66*<br>(0.18)       |                       |                        |                       |
| work south   | 2.38*<br>(0.49)       | 2.29*<br>(0.59)        | 1.80*<br>(0.13)       |                       |                        |                       |
| birth center |                       |                        |                       | 0.89<br>(0.11)        | 1.27<br>(0.21)         | 0.85<br>(0.26)        |
| birth south  |                       |                        |                       | 1.39*<br>(0.10)       | 1.66*<br>(0.30)        | 1.05<br>(0.22)        |

Note: Odds ratios from logit models of the probability of misconduct episodes. Each model is estimated on different subsamples for each region of work and birth. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year; the dependent variable takes value 1 when a misconduct episode is recorded and punished during the outcome period by the personnel office.

Table 5: Types of sanction and their distribution

| Type of sanction                | Freq. | Percent | Cum.   |
|---------------------------------|-------|---------|--------|
| Verbal reproach 1               | 39    | 1.15    | 1.15   |
| Verbal reproach 2               | 22    | 0.65    | 1.79   |
| Verbal reproach 3               | 676   | 19.86   | 21.65  |
| Verbal reproach 4               | 73    | 2.14    | 23.80  |
| Verbal reproach 5               | 851   | 25.00   | 48.80  |
| Written reproach of local sup.  | 248   | 7.29    | 56.08  |
| Written reproach of head quart. | 649   | 19.07   | 75.15  |
| 1 day of suspension from pay    | 95    | 2.79    | 77.94  |
| 2 days of suspension from pay   | 100   | 2.94    | 80.88  |
| 3 days of suspension from pay   | 73    | 2.14    | 83.02  |
| 4 days of suspension from pay   | 3     | 0.09    | 83.11  |
| 5 days of suspension from pay   | 91    | 2.67    | 85.78  |
| 6 days of suspension from pay   | 3     | 0.09    | 85.87  |
| 7 days of suspension from pay   | 3     | 0.09    | 85.96  |
| 8 days of suspension from pay   | 7     | 0.21    | 86.16  |
| 10 days of suspension from pay  | 93    | 2.73    | 88.90  |
| Firing or induced quit          | 378   | 11.10   | 100.00 |
| Total                           | 3404  | 100.00  |        |

Note: The number characterizing verbal reproaches indicates increasing gravity of the reproach, not subsequent reproaches.

Table 6: Distribution of types of misconduct episodes

| Misconduct type                     | Freq. | Percent | Cum.   |
|-------------------------------------|-------|---------|--------|
| Absence and late arrival episodes   | 283   | 15.22   | 15.22  |
| External violations                 | 576   | 30.98   | 46.21  |
| Internal violations                 | 827   | 44.49   | 90.69  |
| Incorrect behavior on the workplace | 173   | 9.31    | 100.00 |
| Total                               | 1859  | 100.00  |        |

Note: For the definition of the four types of misconduct episodes, see section 4.2.

Table 7: Types of misconduct and regions of work and birth

| Type of misconduct                   | Region       | Odds ratio | St. err. |
|--------------------------------------|--------------|------------|----------|
| Delays and late arrivals             | work center  | 2.06*      | 0.43     |
|                                      | work south   | 0.72       | 0.18     |
|                                      | birth center | 1.31       | 0.30     |
|                                      | birth south  | 1.59§      | 0.31     |
| External violations                  | work center  | 2.73*      | 0.42     |
|                                      | work south   | 1.94*      | 0.28     |
|                                      | birth center | 1.02       | 0.18     |
|                                      | birth south  | 2.17*      | 0.31     |
| Internal violations                  | work center  | 1.87*      | 0.27     |
|                                      | work south   | 2.84*      | 0.39     |
|                                      | birth center | 0.92       | 0.14     |
|                                      | birth south  | 0.95       | 0.12     |
| Incorrect behaviour in the workplace | work center  | 1.54       | 0.46     |
|                                      | work south   | 1.28       | 0.35     |
|                                      | birth center | 0.85       | 0.27     |
|                                      | birth south  | 1.59       | 0.39     |

Note: Odds ratios from multinomial logit models of the probability of misconduct type. The omitted reference category is no misconduct. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year; The analysis is restricted to the 1980-1994 period for which information on type of misconduct is available.

Table 8: Distribution misconduct episodes by level of gravity

| Misconduct gravity | Freq. | Percent | Cum.   |
|--------------------|-------|---------|--------|
| level 1            | 92    | 4.95    | 4.95   |
| level 2            | 531   | 28.56   | 33.51  |
| level 3            | 455   | 24.48   | 57.99  |
| level 4            | 209   | 11.24   | 69.23  |
| level 5            | 248   | 13.34   | 82.57  |
| level 6            | 118   | 6.35    | 88.92  |
| level 7            | 106   | 5.70    | 94.62  |
| level 8            | 100   | 5.38    | 100.00 |
| Total              | 1859  | 100.00  |        |

Table 9: Effect of the region of work and birth on the probability of higher misconduct gravity

| Model :             | 1               | 2               | 3               | 4               | 5                | 6                |
|---------------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| # obs :             | 1826            | 1859            | 1826            | 1826            | 1825             | 1825             |
| work center         | -0.15<br>(0.10) |                 | -0.25<br>(0.17) | -0.25<br>(0.17) | -0.20<br>(0.17)  | -0.16<br>(0.17)  |
| work south          | 0.31*<br>(0.10) |                 | 0.44*<br>(0.15) | 0.45*<br>(0.15) | 0.33§<br>(0.15)  | 0.37§<br>(0.16)  |
| birth center        |                 | -0.08<br>(0.10) | 0.13<br>(0.18)  | 0.13<br>(0.18)  | 0.12<br>(0.18)   | 0.09<br>(0.18)   |
| birth south         |                 | 0.11<br>(0.10)  | -0.16<br>(0.14) | -0.16<br>(0.14) | -0.05<br>(0.15)  | -0.09<br>(0.15)  |
| spline 8084         |                 |                 |                 | 0.07<br>(0.05)  | 0.10<br>(0.05)   | 0.08<br>(0.05)   |
| spline 8589         |                 |                 |                 | -0.04<br>(0.03) | -0.07§<br>(0.03) | -0.07§<br>(0.03) |
| spline 9095         |                 |                 |                 | 0.00<br>(0.03)  | -0.01<br>(0.03)  | -0.03<br>(0.03)  |
| female              |                 |                 |                 |                 | -0.82*<br>(0.15) | -0.78*<br>(0.16) |
| school years        |                 |                 |                 |                 | -0.04§<br>(0.02) | -0.04§<br>(0.02) |
| tenure              |                 |                 |                 |                 | -0.01<br>(0.01)  | -0.01<br>(0.01)  |
| white collars       |                 |                 |                 |                 | -1.12*<br>(0.14) | -0.82*<br>(0.20) |
| low service wkr.    |                 |                 |                 |                 | -1.52*<br>(0.23) | -1.11*<br>(0.28) |
| previous experience |                 |                 |                 |                 | -0.02§<br>(0.01) | -0.03§<br>(0.01) |
| n. prev. promotions |                 |                 |                 |                 |                  | 1.34<br>(0.96)   |
| n. levels jumped    |                 |                 |                 |                 |                  | -0.14<br>(0.60)  |
| n. prev. branches   |                 |                 |                 |                 |                  | 0.91<br>(0.44)   |
| n. prev wage incr.  |                 |                 |                 |                 |                  | 3.20<br>(1.46)   |
| n. prev. illnesses  |                 |                 |                 |                 |                  | 0.11<br>(0.10)   |

Note: Coefficients of ordered logit models of the probability of increasing misconduct gravity. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a misconduct episode; the dependent variable is the ordinal measure of misconduct gravity described in table 8. The analysis is restricted to the 1980-1994 period for which information on gravity of misconduct is available. The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.

Table 10: Severity of punishment controlling for misconduct type and gravity

| Model :             | 1      | 2      | 3      | 4      | 5      | 6      |
|---------------------|--------|--------|--------|--------|--------|--------|
| # obs :             | 1826   | 1826   | 1859   | 1859   | 1826   | 1826   |
| misconduct gravity  | 0.81*  |        | 0.82*  |        | 0.82*  |        |
|                     | (0.03) |        | (0.03) |        | (0.03) |        |
| external violations | -0.20  |        | -0.23  |        | -0.20  |        |
|                     | (0.19) |        | (0.19) |        | (0.19) |        |
| internal violations | 0.64*  |        | 0.62*  |        | 0.64*  |        |
|                     | (0.18) |        | (0.17) |        | (0.18) |        |
| insubordination     | -0.28  |        | -0.27  |        | -0.27  |        |
|                     | (0.16) |        | (0.16) |        | (0.16) |        |
| work center         | -0.17  | -0.16  |        |        | -0.10  | -0.14  |
|                     | (0.11) | (0.10) |        |        | (0.19) | (0.18) |
| work south          | 0.14   | 0.34*  |        |        | 0.05   | 0.27   |
|                     | (0.11) | (0.10) |        |        | (0.17) | (0.15) |
| birth center        |        |        | -0.11  | -0.10  | -0.09  | -0.02  |
|                     |        |        | (0.12) | (0.11) | (0.20) | (0.19) |
| birth south         |        |        | 0.14   | 0.27*  | 0.11   | 0.10   |
|                     |        |        | (0.11) | (0.10) | (0.16) | (0.15) |

Note: Coefficients of ordered logit models of the probability of more severe sanctions. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . The dependent variable is the ordinal indicator of sanction severity described in section 4.3. An observation is a misconduct episode. The analysis is restricted to the 1980-1994 period for which information on gravity and type of misconduct is available.

Table 11: Internal hierarchy and regions of work and birth

| category            | Region       | Odds ratio | St. err. |
|---------------------|--------------|------------|----------|
| managers            | work center  | 0.64*      | .012     |
|                     | work south   | 0.72*      | .013     |
|                     | birth center | 1.55*      | .028     |
|                     | birth south  | 1.47*      | .022     |
| low service workers | work center  | 1.00§      | .02      |
|                     | work south   | 0.69*      | .01      |
|                     | birth center | 1.08*      | .02      |
|                     | birth south  | 1.47*      | .02      |

Note: Odds ratios from a multinomial logit model of the probability that an employee is a low service worker or a manager. The omitted reference category is white collar worker. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year.

Table 12: Determinants of promotions between hierarchical levels

| Model :             | 1               | 2               | 3               | 4               | 5               | 6                |
|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| # obs :             | 365853          | 369141          | 365853          | 365853          | 365830          | 365552           |
| work center         | 0.94*<br>(0.01) |                 | 0.93*<br>(0.02) | 0.93*<br>(0.02) | 0.91*<br>(0.02) | 0.92*<br>(0.02)  |
| work south          | 0.97§<br>(0.01) |                 | 0.98<br>(0.02)  | 0.98<br>(0.02)  | 0.95*<br>(0.02) | 0.96<br>(0.02)   |
| birth center        |                 | 0.96*<br>(0.01) | 1.02<br>(0.02)  | 1.02<br>(0.02)  | 1.04<br>(0.02)  | 1.04<br>(0.02)   |
| birth south         |                 | 0.97§<br>(0.01) | 0.99<br>(0.02)  | 0.99<br>(0.02)  | 0.99<br>(0.02)  | 0.99<br>(0.02)   |
| spline 7579         |                 |                 |                 | 0.88*<br>(0.01) | 0.88*<br>(0.01) | 0.92*<br>(0.01)  |
| spline 8084         |                 |                 |                 | 0.97*<br>(0.00) | 0.97*<br>(0.00) | 0.95*<br>(0.00)  |
| spline 8589         |                 |                 |                 | 1.09*<br>(0.00) | 1.09*<br>(0.00) | 1.10*<br>(0.00)  |
| spline 9095         |                 |                 |                 | 0.92*<br>(0.00) | 0.93*<br>(0.00) | 0.95*<br>(0.00)  |
| female              |                 |                 |                 |                 | 0.82*<br>(0.01) | 0.79*<br>(0.01)  |
| school years        |                 |                 |                 |                 | 1.03*<br>(0.00) | 1.05*<br>(0.00)  |
| tenure              |                 |                 |                 |                 | 0.99*<br>(0.00) | 1.03*<br>(0.00)  |
| white collars       |                 |                 |                 |                 | 2.23*<br>(0.04) |                  |
| low service wkr.    |                 |                 |                 |                 | 2.68*<br>(0.08) |                  |
| previous experience |                 |                 |                 |                 | 0.98*<br>(0.00) | 0.97*<br>(0.00)  |
| n. prev. promotions |                 |                 |                 |                 |                 | 0.07*<br>(0.01)  |
| n. levels jumped    |                 |                 |                 |                 |                 | 2.95*<br>(0.17)  |
| n. prev. branches   |                 |                 |                 |                 |                 | 1.62*<br>(0.07)  |
| n. prev wage incr.  |                 |                 |                 |                 |                 | 19.75*<br>(2.29) |
| n. prev. illnesses  |                 |                 |                 |                 |                 | 0.73*<br>(0.02)  |
| level dummies       |                 |                 |                 |                 |                 | YES              |

Note: Odds ratios from logit models of the probability that a worker is promoted during the outcome period. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year. The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.

Table 13: Determinants of log earnings

| Model :             | 1                | 2               | 3                | 4                | 5                | 6                |
|---------------------|------------------|-----------------|------------------|------------------|------------------|------------------|
| # obs :             | 17717            | 17887           | 17717            | 17717            | 17717            | 17717            |
| work center         | -0.03*<br>(0.01) |                 | -0.08*<br>(0.01) | -0.02*<br>(0.00) | -0.01*<br>(0.00) | -0.01<br>(0.00)  |
| work south          | -0.03*<br>(0.01) |                 | -0.10*<br>(0.01) | -0.02*<br>(0.00) | -0.01*<br>(0.00) | 0.00<br>(0.00)   |
| birth center        |                  | 0.00<br>(0.01)  | 0.07*<br>(0.01)  | 0.01*<br>(0.00)  | 0.01*<br>(0.00)  | 0.01*<br>(0.00)  |
| birth south         |                  | 0.02*<br>(0.01) | 0.08*<br>(0.01)  | 0.01§<br>(0.00)  | 0.01§<br>(0.00)  | 0.01§<br>(0.00)  |
| female              |                  |                 |                  | -0.10*<br>(0.00) | -0.08*<br>(0.00) | -0.07*<br>(0.00) |
| school years        |                  |                 |                  | 0.01*<br>(0.00)  | 0.01*<br>(0.00)  | 0.00*<br>(0.00)  |
| tenure              |                  |                 |                  | 0.01*<br>(0.00)  | 0.01*<br>(0.00)  | 0.01*<br>(0.00)  |
| white collars       |                  |                 |                  | -0.57*<br>(0.00) | -0.49*<br>(0.00) |                  |
| low service wkr.    |                  |                 |                  | -0.72*<br>(0.01) | -0.59*<br>(0.01) |                  |
| previous experience |                  |                 |                  | 0.00<br>(0.00)   | 0.00<br>(0.00)   | 0.00*<br>(0.00)  |
| n. prev. promotions |                  |                 |                  |                  | 0.27*<br>(0.02)  | 0.02<br>(0.02)   |
| n. levels jumped    |                  |                 |                  |                  | 0.13*<br>(0.01)  | -0.06*<br>(0.01) |
| n. prev. branches   |                  |                 |                  |                  | 0.08*<br>(0.01)  | 0.05*<br>(0.01)  |
| n. prev wage incr.  |                  |                 |                  |                  | 0.41*<br>(0.02)  | 0.22*<br>(0.01)  |
| n. prev. illnesses  |                  |                 |                  |                  | -0.01*<br>(0.00) | -0.01*<br>(0.00) |
| level dummies       |                  |                 |                  |                  |                  | YES              |

Note: Coefficients from OLS regressions in which the dependent variable is the log of the wage in November 1994. The sample is therefore given by the cross section of workers on payroll in November 1994. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.



Table 14: Determinants of supervisors evaluations

| # obs :             | 14327            | 14469            | 14327            | 14327            | 14327            | 14327            |
|---------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| work center         | 0.05<br>(0.04)   |                  | 0.18*<br>(0.07)  | 0.16§<br>(0.07)  | 0.32*<br>(0.07)  | 0.30*<br>(0.07)  |
| work south          | -0.37*<br>(0.04) |                  | -0.36*<br>(0.07) | -0.19*<br>(0.07) | -0.02<br>(0.07)  | -0.10<br>(0.07)  |
| birth center        |                  | -0.01<br>(0.04)  | -0.17§<br>(0.07) | -0.10<br>(0.07)  | -0.13<br>(0.08)  | -0.08<br>(0.08)  |
| birth south         |                  | -0.23*<br>(0.04) | -0.01<br>(0.06)  | -0.03<br>(0.06)  | -0.05<br>(0.06)  | 0.04<br>(0.06)   |
| female              |                  |                  |                  | 0.10§<br>(0.04)  | 0.38*<br>(0.04)  | 0.47*<br>(0.04)  |
| school years        |                  |                  |                  | -0.01<br>(0.01)  | -0.04*<br>(0.01) | -0.10*<br>(0.01) |
| tenure              |                  |                  |                  | 0.10*<br>(0.00)  | 0.08*<br>(0.00)  | 0.05*<br>(0.00)  |
| previous experience |                  |                  |                  | -0.01<br>(0.00)  | -0.01§<br>(0.01) | 0.01<br>(0.01)   |
| n. prev wage incr.  |                  |                  |                  |                  | 10.26*<br>(0.54) | 6.92*<br>(0.54)  |
| n. prev. illnesses  |                  |                  |                  |                  | -0.62*<br>(0.03) | -0.52*<br>(0.03) |
| level dummies       |                  |                  |                  |                  |                  | YES              |

Note: Coefficients from ordered logit models of the probability that a worker receives more favourable evaluations from supervisors. The sample is restricted to the cross section of non managerial workers on payroll in November 1994, for which supervisor's evaluations are available. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.

Table 15: Raw indicators of morbidity by region of birth and work

|        | Work  |       | Birth |       |
|--------|-------|-------|-------|-------|
|        | 1     | 2     | 3     | 4     |
| North  | 0.187 | 2.038 | 0.188 | 2.056 |
| Center | 0.223 | 2.508 | 0.211 | 2.431 |
| South  | 0.209 | 2.539 | 0.206 | 2.367 |

Note: Columns 1 and 3 report the frequencies of observations with at least one episodes of absence due to illness during the outcome period respectively by region of birth and work. Columns 2 and 4 report the average number of episodes for the observations with at least one episode.

Table 16: Raw indicators of morbidity for each combination of birth and working region

|             | work north     | work centre    | work south     |
|-------------|----------------|----------------|----------------|
| born north  | 0.187<br>2.046 | 0.213<br>2.317 | 0.203<br>2.597 |
| born centre | 0.167<br>1.938 | 0.223<br>2.544 | 0.158<br>2.144 |
| born south  | 0.193<br>2.016 | 0.226<br>2.379 | 0.210<br>2.546 |

Note: The top figure in each cell is the frequency of observations with at least on episode of absence due to illness during the outcome period; the bottom figure is the average number of episodes for observations with at least one episode.

Table 17: Death rates by region and type of illness in the Italian population

| Type of disease          | North-Center | South |
|--------------------------|--------------|-------|
| Infectious diseases      | 4.2          | 2.5   |
| Cancer                   | 301.8        | 172.9 |
| Mental diseases          | 29.9         | 16.6  |
| Cardiovascular diseases  | 431.3        | 350.8 |
| Respiratory diseases     | 63.1         | 57.7  |
| Digestive tract diseases | 51.7         | 46.8  |
| Traumatic diseases       | 56.2         | 38.1  |
| Unclear symptoms         | 20.8         | 23.2  |
| Others                   | 63.3         | 70.2  |
| Total                    | 1022.3       | 778.8 |

Note: The table reports death rates per 100000 inhabitants for the year 1990. Source: ISTAT, *Annuario Statistico Italiano*, 1990, Table 3.21.

Table 18: Estimated incidence of illness episodes

| Model :             | 1      | 2      | 3      | 4      | 5      | 6      |
|---------------------|--------|--------|--------|--------|--------|--------|
| # obs :             | 370457 | 373781 | 370457 | 370457 | 370193 | 370193 |
| work center         | 1.47*  |        | 1.52*  | 1.44*  | 1.34*  | 1.31*  |
|                     | (0.01) |        | (0.01) | (0.01) | (0.01) | (0.01) |
| work south          | 1.39*  |        | 1.38*  | 1.23*  | 1.23*  | 1.20*  |
|                     | (0.01) |        | (0.01) | (0.01) | (0.01) | (0.01) |
| birth center        |        | 1.32*  | 0.96*  | 0.97§  | 1.05*  | 1.06*  |
|                     |        | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| birth south         |        | 1.26*  | 1.00   | 1.04*  | 1.13*  | 1.13*  |
|                     |        | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| spline 7579         |        |        |        | 0.99   | 1.00   | 1.01   |
|                     |        |        |        | (0.01) | (0.01) | (0.01) |
| spline 8084         |        |        |        | 0.97*  | 0.97*  | 0.96*  |
|                     |        |        |        | (0.00) | (0.00) | (0.00) |
| spline 8589         |        |        |        | 0.96*  | 0.95*  | 0.97*  |
|                     |        |        |        | (0.00) | (0.00) | (0.00) |
| spline 9095         |        |        |        | 1.77*  | 1.77*  | 1.72*  |
|                     |        |        |        | (0.00) | (0.00) | (0.00) |
| female              |        |        |        |        | 1.71*  | 1.60*  |
|                     |        |        |        |        | (0.01) | (0.01) |
| school years        |        |        |        |        | 0.99*  | 0.99*  |
|                     |        |        |        |        | (0.00) | (0.00) |
| tenure              |        |        |        |        | 1.02*  | 1.02*  |
|                     |        |        |        |        | (0.00) | (0.00) |
| white collars       |        |        |        |        | 2.02*  | 1.78*  |
|                     |        |        |        |        | (0.02) | (0.02) |
| low service wkr.    |        |        |        |        | 2.84*  | 2.39*  |
|                     |        |        |        |        | (0.04) | (0.04) |
| previous experience |        |        |        |        | 1.01*  | 1.01*  |
|                     |        |        |        |        | (0.00) | (0.00) |
| n. prev. promotions |        |        |        |        |        | 0.68*  |
|                     |        |        |        |        |        | (0.04) |
| n. levels jumped    |        |        |        |        |        | 0.99   |
|                     |        |        |        |        |        | (0.04) |
| n. prev. branches   |        |        |        |        |        | 0.96   |
|                     |        |        |        |        |        | (0.02) |
| n. prev wage incr.  |        |        |        |        |        | 0.22*  |
|                     |        |        |        |        |        | (0.02) |
| n. prev. illnesses  |        |        |        |        |        | 1.22*  |
|                     |        |        |        |        |        | (0.00) |

Note: Incidence rates estimated from Poisson regressions in which the dependent variable is the number of illness episodes during the 12 months of the outcome period. The number of episodes ranges from 0 to 76 per outcome period with an average of 0.43. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year; The numbers of events like promotions, wage increases, changes of branches etc. are divided by tenure.

Table 19: Incidence of illness episodes by region of birth and region of work

|              | Only<br>born<br>north | Only<br>born<br>centre | Only<br>born<br>south | Only<br>work<br>north | Only<br>work<br>centre | Only<br>work<br>south |
|--------------|-----------------------|------------------------|-----------------------|-----------------------|------------------------|-----------------------|
| # obs :      | 214956                | 71078                  | 84423                 | 248532                | 70301                  | 51624                 |
| work center  | 1.29*<br>(0.03)       | 1.76*<br>(0.03)        | 1.38*<br>(0.02)       |                       |                        |                       |
| work south   | 1.38*<br>(0.05)       | 1.05<br>(0.05)         | 1.37*<br>(0.02)       |                       |                        |                       |
| birth center |                       |                        |                       | 0.84*<br>(0.01)       | 1.15*<br>(0.03)        | 0.64*<br>(0.04)       |
| birth south  |                       |                        |                       | 1.02<br>(0.01)        | 1.09*<br>(0.03)        | 1.01<br>(0.04)        |

Note: Odds ratios from logit models of the probability of an illness episode. Each model is estimated on different subsamples for each region of work and birth. Standard errors are reported in parentheses with  $p < 0.05 = \S$ ,  $p < 0.01 = *$ . An observation is a worker in a given year; the dependent variable takes value 1 when an illness episode is recorded during the outcome period.