WORK ENVIRONMENT AND INDIVIDUAL BACKGROUND: EXPLAINING REGIONAL SHIRKING DIFFERENTIALS IN A LARGE ITALIAN FIRM*

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The prevalence of shirking within a large Italian bank appears to be characterized by significant regional differentials. In particular, absenteeism and misconduct episodes are substantially more prevalent in the south. We consider a number of potential explanations for this fact: different individual backgrounds; group-interaction effects; sorting of workers across regions; differences in local attributes; different hiring policies; and discrimination against southern workers. Our analysis suggests that individual backgrounds, group-interaction effects, and sorting effects contribute to explaining the north-south shirking differential. None of the other explanations appears to be of first-order importance.

I. INTRODUCTION

Whether individual behavior is determined by group interactions or by individual background is undoubtedly a fundamental question for the social sciences. This question presented itself forcefully when we stumbled onto the following piece of evidence: there appear to be significant regional differentials in the prevalence of shirking among the employees of a large Italian bank. In particular, absenteeism and misconduct episodes are considerably more frequent in the southern branches of the bank.

In this paper we examine several potential explanations for this fact. First, individual preferences for shirking versus working may differ according to one's region of birth. We will refer to this hypothesis as one of different "individual backgrounds." The second possibility is one of locational sorting: low-shirking types may tend to migrate to the north, high-shirking types may tend to migrate to the south, or both. Third, the northern and southern

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branches of the firm may differ in local attributes in a way that makes the incentive to shirk higher in the south (these local attributes may include local-area variables, such as the unemployment rate, and branch-specific variables, such as the fraction and quality of managers in the branch). Fourth, shirking behavior may be characterized by group-interaction effects, in the sense that a worker's incentive to shirk is stronger when his coworkers shirk more.

We examine these potential explanations using both data on absenteeism and on misconducts. Since the key qualitative findings are similar, we summarize them without distinguishing between the two samples. The analysis proceeds in two stages. First, we make use of our full sample of workers to examine the role of individual background in determining shirking behavior. The key finding is that, controlling for the work environment, employees born in the south shirk significantly more than employees born in the north (this is true also controlling for observable individual characteristics). This suggests that differences in individual background play an important role in explaining the north-south shirking differential. We also find a strong work-environment effect in the data: for given individual characteristics, employees shirk significantly more when they work in the south than when they work in the north. This finding prompts us to examine more closely the role of the work environment in determining the shirking differentials.

In the second stage of the analysis, we try to disentangle the three possible causes of the work-environment effect (namely, group-interaction effects, sorting, and differences in local attributes), by focusing on workers who move between branches. We identify group-interaction effects and local-attribute effects by estimating the structural relationship that determines individual shirking behavior. Group-interaction effects appear to be significant: there is a clear positive relationship between a mover's shirking level and the average shirking level of his coworkers. Local attributes, which include time-varying local characteristics and local fixed effects, are significant determinants of individual shirking behavior. However, they do not on the whole contribute to explaining the north-south *differential*. Here the qualifier "as a whole" is important: we find that most of the local effects push toward higher shirking in the south, but some, most notably the unemployment rate, push in the opposite direction.

We then examine sorting effects for on-the-job movers. We

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find that the average on-the-job mover has a lower propensity to shirk than the average stayer in the branch of departure. This is true both for north-south movers and for south-north movers. However, the sorting effect is stronger for south-north movers, and there are many more movers in this group. Thus, *on net* sorting effects contribute to explaining the north-south shirking differential.

A difficult question is whether multiple equilibria contribute to explaining regional shirking differentials. Simple multiple-equilibrium stories tend to imply that the distribution of mean shirking rates by branch should have two or more peaks. However, in our case this distribution is unimodal. Also, when we allow for a nonlinearity in the relationship between individual shirking and group shirking, this relationship appears to be linear to slightly concave, and in our model this is inconsistent with the presence of multiple equilibria. At any rate, we note that our key structural estimations would be valid even in the presence of multiple equilibria.

Finally, we attempt to quantify the relative importance of individual background, sorting, group effects, and local attributes in explaining the north-south shirking differential. The exact numbers should be taken with a grain of salt because they are based on potentially restrictive assumptions, but a clear qualitative pattern emerges: individual background seems to be quantitatively the most important factor; group-interaction and sorting effects both play a significant role, although not so important as that of individual background; and local attributes do not on the whole contribute to explaining the regional differential.

Our conclusions are consistent with those reached by Putnam [1993] in his book on the performance of the Italian *regioni* (the regional administrative bodies). He relates the observed differentials of performance to the different degrees of *civic-ness* which characterize social interactions in the north and in the south. Putnam traces the different degrees of civic-ness in the two regions back to their medieval history. Our paper can be viewed as trying to disentangle two components of civic-ness: one that is incorporated in individuals' preferences, and one that originates in group-interaction effects.

Our paper is related to a growing body of literature on group-interaction effects as determinants of individual behavior. For example, Glaeser, Sacerdote, and Scheinkman [1996] estimate the strength of neighborhood effects for criminal behavior in

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U. S. cities, finding that such effects are stronger for less serious crimes. Case and Katz [1991] find significant group-interaction effects in the determination of crime levels among youths living in low-income Boston neighborhoods.[1] Our paper differs from the ones just mentioned not only in the substantive issue, but also in methodology. Of particular importance is the fact that we have information on movers. This, we believe, mitigates the identification problems that arise when studying the social determinants of individual behavior (see, for example, Manski [1993]). If we did not have information on movers, we would not be able to identify group-interaction effects, local-attribute effects, and sorting effects.[2]

The paper is organized as follows. In Section II we describe the setting in which our firm operates and the basic facts we seek to explain. In Section III we discuss informally a number of potential explanations for the north-south shirking differential. In Section IV we present a stylized theoretical model that nests the four main candidate hypotheses. In Section V we present our analysis of the full sample of workers. In Section VI we present the analysis based on the subsample of movers. In Section VII we examine two more hypotheses that could in principle explain the observed shirking differentials, namely, the presence of discrimination against southern employees and differences in hiring policies between northern and southern branches. Section VIII concludes.

II. The Basic Facts

We begin by providing some basic information about the firm under consideration and the setting in which it operates, and we describe the facts that we seek to explain.

1. Other examples in this literature are Van den Berg et al. [1998], Wilson [1987], Crane [1991], Topa [1997], Bertrand, Luttmer, and Mullainathan [1998], and Encinosa, Gaynor, and Rebitzer [1998]. See also the literature based on the classic Hawthorne experiments on the role of social interactions in the determination of worker effort (e.g., Whitehead [1938] and Jones [1990]).

2. A paper that employs a similar methodology is Aaronson [1998]. He uses a sample of multichild families (whose children are separated in age by at least three years) that move between locations, to estimate the impact of neighborhood effects on the children's educational outcomes controlling for family background effects. However, given the nature of the issue and of the data, he is not able to separate peer-group effects from local-attribute effects. Also, he does not analyze sorting effects.

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TABLE I
REGIONAL DISTRIBUTION OF EMPLOYMENT—SELECTED YEARS

Year	Percent work north	Percent work south	Percent born north	Percent born south	Total
1975	75.22	24.78	68.36	31.64	15045
1979	74.45	25.55	67.08	32.92	17040
1983	73.80	26.20	66.19	33.81	19029
1987	73.16	26.84	66.18	33.82	18553
1991	72.76	27.24	65.72	34.28	18039
1995	71.72	28.28	64.82	35.18	17911
Total	73.51	26.49	66.34	33.66	373493

Only employees born and working in Italy are considered. The north is defined as the geographic area covered by the following administrative regions: Piemonte, Valle d'Aosta, Liguria, Lombardia, Veneto, Trentino, Friuli, Emilia Romagna, Toscana, Umbria, and Marche. The south includes Lazio, Sardegna, Abruzzi, Molise, Puglie, Basilicata, Campania, Calabria, and Sicilia.

II.1. The Firm under Consideration

The firm studied in this paper is a large bank with many branches disseminated all over Italy and with an almost century-long tradition of activity at the heart of the Italian financial system. Between 1975 and 1995, 28,642 employees worked at this bank, in 442 different branches.[3] Table I reports the employment level and its regional distribution in selected years. Looking at the distribution by region of work in the top panel, approximately 73 percent of total employment is concentrated in the north,[4] where the headquarters of the firm are located, but the presence of the firm in the south has always been significant and increasing over time.

Employment by region of birth is more uniform, as one would expect given the migration flows that characterized the Italian labor market during the 1950s and 1960s. Table II reports the distribution of birth origin by region of work. Employees work predominantly in the region in which they are born, but there are also a large number of employees who work elsewhere: out of the 28,642 employees for whom we have data, 3,304 migrated at least

3. The number of branches varies over these years, reaching a maximum of 389 in 1995.

4. The north is defined as composed of the following regions: Piemonte, Valle d'Aosta, Liguria, Lombardia, Veneto, Trentino, Friuli, Emilia Romagna, Toscana, Umbria, and Marche. The south includes Lazio, Sardegna, Abruzzi, Molise, Puglie, Basilicata, Campania, Calabria, and Sicilia. Note that official statistics sometimes classify Lazio (which includes Rome) in the north. We include it in the south because we believe that this region is sociologically and economically closer to the south than to the north. At any rate, the main findings do not change if it is included in the north.

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TABLE II
DISTRIBUTION OF BIRTH ORIGIN BY REGION OF WORK

	Work north	Work south
Born north	0.87	0.08
Born south	0.13	0.92
Total	1.00	1.00

Shares of employees born in each region, for given region of work.

once from south to north, and 934 migrated in the opposite direction between the year of birth and the year in which they are observed on the job. There is also a significant fraction of employees (41 percent) who moved at least once between branches while working at the bank. We will use information on these movers when we examine the competing explanations of the shirking differentials in Section VI.

II.2. The Fact We Seek to Explain

From the Personnel Office of this bank, we received information on all the relevant events characterizing the history of each employee. We construct our indicators of shirking from the information that the data set contains on the episodes of absenteeism and misconduct.

Focusing on absenteeism first, for each employee we have information on the absence episodes officially classified as "due to illness" for the period 1993–1995.[5] For each employee-year observation we use the yearly number of absence episodes as the index of absenteeism. The average number of absence episodes is 1.90 per year in the north and 2.91 in the south; the difference is highly statistically significant.

Coming to our data on misconducts, for each employee on the payroll between 1975 and 1995, we have a misconduct indicator that takes value one when, in a given year, at least one misconduct

5. Since absence episodes shorter that fifteen days are dropped from the records of the Personnel Office after three years, before 1993 we have only information on longer absence episodes. From the viewpoint of this paper the most informative type of episodes are the short ones, and therefore, for the analysis of absenteeism, we chose to focus on the 1993–1995 sample (which contains both long- and short-absence episodes). Some descriptive statistics based on this sample for variables that will be used later in the analysis of absenteeism are given in Appendix 1.

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episode is recorded and punished by the Personnel Office.[6] Possible punishments are chosen from a grid of sanctions that range from verbal reproaches to firing.[7] The average value of the misconduct indicator is .007 in the north and .015 in the south. This difference is highly statistically significant. The north-south differences in the incidence of absenteeism and misconduct are the facts we seek to explain.[8]

II.3. North-South Economic Differences in Italy, 1975–1995

The regional shirking differentials in our bank should be understood in the context of the more general economic differences between the north and the south of Italy. Since Italian reunification, in 1861, fundamental economic differences have characterized the two regions, giving rise to the well-known "Italian Mezzogiorno" problem.

Table III provides a snapshot of some of these economic differences for the period covered by our analysis. The regions included in the northern aggregate account for a larger fraction of the Italian population (for example, in 1995 the north had 36 million versus 21 million in the south), but while population in the south grew by 2 million during the period of observation, it did not change in the north. These different growth rates prevailed in spite of the postwar migration flows from south to north. These flows were largest in the 1950s and 1960s, and gradually declined thereafter.

In recent decades there has been a growing economic disparity between north and south. In 1975 per capita GDP in the south was 35 percent lower than in the north. This gap has subsequently increased, reaching 44 percent in 1995. The gap in terms of private consumption per capita is instead smaller and roughly

6. The cases in which an employee is involved in more than one misconduct episode in the same year are very few. Hence, there is no real gain from using the yearly number of misconducts as an indicator of shirking. Some descriptive statistics for the variables that will be used later in the analysis of misconducts are given in Appendix 2.

7. These episodes involve unjustified absences and late arrivals, violations of the internal regulations of the bank, inappropriate behavior inside the workplace, and wrongful actions taken outside the relationship with the bank but potentially relevant for the latter (e.g., fraud, theft, etc.).

8. We checked the robustness of these findings in various ways. The difference for absenteeism remains large and significant if we topcode the number of absence episodes at the ninety-fifth percentile to control for outliers, and if we use the number of days of absenteism instead of the number of episodes. Similarly, the difference for misconducts remains significant when we take into account the severity of the episodes. We also performed these robustness checks on all the subsqeuent results of this paper. All the qualitative findings were confirmed.

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TABLE III
MACROECONOMIC INDICATORS OF NORTH-SOUTH DIFFERENCES

	North	South
Population (in millions)		
1975	36	19
1985	36	20
1995	36	21
Percent migration balance		
1975	0.14	−0.26
1985	0.08	−0.15
1995	0.08	−0.15
GDP per capita		
1975	100	65
1985	100	60
1995	100	56
Private consumption per capita		
1975	100	70
1985	100	71
1995	100	70
Dependent labor income		
1975	100	77
1985	100	80
1995	100	87
Percent activity rate		
1975	40	33
1985	43	37
1995	43	35
Percent unemployment rate		
1975	4.8	8.2
1985	8.6	14.7
1995	7.6	19.2

The source for the first four variables in the table is the "Data-base on Italian Regions" (version: September 1998) constructed by the Center for North-South Economic Research (CRENoS) at the University of Cagliari; see Paci and Saba [1998]. The source for the figures on dependent labor income is the National Income Accounting System; see Istituto Nazionale di Statistica (ISTAT), Contabilità Nazionale, Tomo 3—Conti Economici Regionali, various years. The figures for the last two variables are constructed from the National Labor Force Statistics; see ISTAT, Forze di lavoro, various years. The percent migration balance is equal to the difference between immigrants and emigrants divided by the population. Dependent labor income is defined as the wage bill for nonself-employed workers divided by their number. GDP per capita, private consumption per capita, and dependent labor income are normalized relative to the North in each year. In this table, which is constructed from official sources, the region *Lazio* is included in the north, while in our analysis it is included in the south (see footnote 4).

constant over the entire period (per capita consumption in the south is 30 percent lower than in the north). This smaller gap is probably due to the large interregional redistribution of income through public transfers. Even smaller, and decreasing over time,

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is the gap in terms of dependent labor incomes:[9] in 1975 workers in the south earned on average 23 percent less than workers in the north, while in 1995 the gap was only 13 percent.[10] This regional convergence of wages is often blamed as one of the causes of the poorer occupational performance in the south relative to the north. Table III shows that while the activity rate in the north grows from 40 to 43 percent between 1975 and 1995, in the south it stagnates around 35 percent. The different performance of the two regions is even more dramatic in terms of unemployment rates: the gap between north and south grows from 3.4 percent points in 1975 to 11.6 percent points in 1995.

The north and the south of Italy are characterized by important differences not only at the economic level, but also in terms of sociological and cultural (as well as environmental) characteristics. These characteristics are hard to measure, but potentially very important for the explanation of workers' behavior [Putnam 1993].

III. Potential Explanations of the Shirking Differentials

In this section we discuss informally a number of potential explanations for the north-south shirking differentials within our bank.

1. South-born and north-born employees may have different preferences with regard to working versus shirking. We will refer to this hypothesis as one of different "individual backgrounds." We have in mind two possible reasons for this. First, the birth environment may affect individual preferences through a variety of social and familial influences. Second, the distribution of worker "types" in this firm may differ by region of birth for a more indirect reason: it is possible that shirking preferences are correlated with individual characteristics (such as sex, age, or education), and that the characteristics associated with high shirking are more frequent among southern employees.

2. Sorting effects are an alternative explanation: low-shirking

9. The figures on labor incomes in Table III come from national accounting statistics, since reliable information on actual wages are currently not available (see the note to the table).

10. This compression is believed to be caused by the egalitarian wage policy imposed by national unions at the bargaining table, where contractual minima are set uniformly for all regions, and to the high inflation of the 1980s, through the wage indexation clause that prevailed in Italy from 1976 until 1992. See Erickson and Ichino [1994] for further elaboration on this point.

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individuals may tend to migrate to the north, or high-shirking individuals may tend to migrate to the south, or both. This can happen by the individual's choice, or, if the individual is very young, by his parents' choice. Sorting may also occur by management's choice: since the headquarters of the bank are in the north management may have an incentive to allocate the more efficient workers to the north.

3. The northern and southern branches might be characterized by different local attributes, in a way that induces higher shirking in the south. Local attributes may include environmental amenities, such as sun and beaches, the willingness of local doctors to sign fake medical certificates,[11] or branch-specific characteristics, such as the fraction and quality of managers in the branch, or the size of the branch.[12] Also efficiency-wage effects à la Shapiro and Stiglitz [1984] can be seen as local-attribute effects: the idea is that the propensity to shirk should be lower where local unemployment is higher and where the firm's wage premium relative to local wages is higher.[13]

4. Shirking behavior may be characterized by group-interaction effects, in the sense that an individual's shirking level increases with his coworkers' average shirking level. This may happen for several reasons. One possibility is a peer-monitoring mechanism: if the majority of employees shirk, a single employee is less likely to be reported for shirking; hence his expected penalty for shirking is lower. There may also be more subtle psychosociological effects at work: if one is surrounded by a group that works very hard, shirking may induce a stronger stigma from the group and a sharper feeling of guilt. Another possible reason is related to monitoring by management: if management has limited monitoring resources, the likelihood of getting caught shirking is lower when more employees shirk because management has to "chase" more employees. Group-interaction effects may give rise to multiple equilibria, which can be an autonomous source of

11. In Italy, typically, an employee must produce a medical certificate to justify an absence from work.

12. Shirking levels can also be influenced by explicit contractual schemes or by implicit incentive mechanisms, such as the promise of faster promotions if the worker performs well. However, explicit contractual incentives are uncommon in our bank, and career incentives do not appear to differ between northern and southern branches (see Section VII for a north-south comparison of promotions and earnings). Therefore, these are not candidate explanations of the north-south shirking differential.

13. The reader may wonder whether it is legitimate to think of the wage premium as a local attribute. As we remark later in the paper, wages in our firm are constant over all of Italy. Thus, the only source of regional variation in the firm's wage premium is the variation in local outside wages.

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regional shirking differentials. However, even in the absence of multiple equilibria, group-interaction effects can contribute to explaining shirking differentials, because they can amplify the effect of cross-branch differences in the distribution of worker types or in local attributes.

The four hypotheses just mentioned will be the focus of our econometric investigation. In addition to these, we can think of two additional hypotheses that could in principle explain the observed shirking differentials. We will examine these hypotheses outside our econometric framework, by using auxiliary pieces of evidence.

5. In principle, the observed north-south differentials could be due to discrimination against southern employees in the implementation of personnel policies. The headquarters of the firm are located in the north, and expressions of antisouthern sentiments are not infrequent in this region. Discrimination could work through two channels. The first is through disciplinary proceedings. The Personnel Office, which is responsible for discovering and punishing misconduct cases, is located in the north. Thus, the higher frequency of misconduct episodes punished in the south could conceivably be the result of discriminatory behavior within the Personnel Office. Second, if a worker's effort is rewarded through promotions and wage raises, and southern employees are discriminated against in terms of career path, they might have a lower incentive to work than northern employees, and consequently shirk more.

6. Finally, different hiring policies in the two regions might potentially contribute to explaining the shirking differential. The idea is that the abler and more motivated managers might be the ones located in the north, where the headquarters are. If hiring were based on local decisions, this could imply that the hiring process is more selective in the north, leading to a higher-quality workforce in the north.

IV. A Simple Theoretical Framework

In this section we present a stylized model that nests the first four hypotheses discussed in the previous section, and will serve as the basis of our econometric analysis.

Consider a firm with two branches, "north" and "south." The index $e \in \{N, S\}$ will indicate the location of the branch. Each branch employs north-born and south-born workers. We let σ_b^e denote the share of branch e's employees who are born in region $b \in \{N, S\}$. We

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take the parameters σ_b^e as given. We could have written a two-stage model in which workers can choose to migrate at some cost in the first period, and then shirking decisions are made given workers' location. Since we focus here on the determination of shirking behavior conditional on workers' location, we take location as given.

Employee i chooses his level of shirking, denoted by $S_i \in [0, S^{\max}]$. The gain from shirking is given by $G(S_i, Y^e, \theta_i)$, with $G_1 > 0$ and $G_{11} < 0$, where θ_i is a preference parameter (the worker's "type") and Y^e is a branch-specific vector that captures exogenous attributes of the branch. A higher value of θ_i indicates a worker with a higher marginal gain from shirking. This amounts to assuming that $G_{13} > 0$. We assume for simplicity that there are only two types: $\theta \in [\theta^L, \theta^H]$, with $\theta^H > \theta^L$. The distribution of worker types can differ according to the region of birth: we let q_b denote the frequency of θ^H types in the population of employees born in region b.

To capture the possibility of locational sorting, we let q_b^e denote the frequency of θ^H types in the subpopulation of employees born in region b and working in region e. For example, if south-born employees who work in the north are on average more hardworking than south-born employees who work in the south, we will have $q_S^N < q_S^S$. Using the definitions just introduced, we can calculate the frequency of θ^H types in the population of employees working in branch e: $p^e = \sigma_N^e q_N^e + \sigma_S^e q_S^e$.

The expected penalty for shirking is given by $L(S_i, \overline{S}^e)$, where $\overline{S}^e$ is the average shirking in the local branch. We assume that $L_{12} \leq 0$, meaning that the marginal expected penalty from shirking is lower when the average local shirking level is higher. We refer the reader to the discussion in the previous section for the possible reasons why the expected penalty for shirking may be decreasing in $\overline{S}^e$.

Assume that workers choose shirking levels simultaneously. Let us characterize the Nash equilibria of this game. The first step is to derive an individual employee's optimal choice given the other employees' choices. Each worker chooses S_i to maximize her expected utility,

$$EU^i = G(S_i, Y^e, \theta_i) - L(S_i, \overline{S}^e).$$

Therefore, the optimal shirking level will be a function of θ_i, Y^e, and $\overline{S}^e$.

$$S_i = g(\overline{S}^e, Y^e, \theta_i). \tag{1}$$

Given our assumptions, we have $\partial S_i / \partial \overline{S}^e \geq 0$ and $\partial S_i / \partial \theta_i > 0$.

Equation (1) is a structural condition because $\overline{S}^e$ is endogenous. We will later estimate this equation, but at this stage we

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need to determine the equilibrium shirking levels. Using (1), we can write

$$\bar{S}^e = g(\bar{S}^e, Y^e, \theta^H)p^e + g(\bar{S}^e, Y^e, \theta^L)(1 - p^e). \tag{2}$$

The solutions of this equation in $\bar{S}^e$ represent the equilibrium average shirking levels. Note that, if g is linear, there is a unique equilibrium, but if g is nonlinear, multiple equilibria are possible. We will denote the solution(s) to equation (2) by

$$\bar{S}^e = h(Y^e, p^e) = h(Y^e, \sigma_N^e q_N^e + \sigma_S^e q_S^e), \tag{3}$$

where h is a vector of functions if there are multiple equilibria.

We are now ready to formulate the alternative hypotheses for the explanation of the north-south shirking differential. We will formulate them as mutually nonexclusive hypotheses.

1. Individual-Background Hypothesis. The type distribution differs by region of birth, in particular $q_N < q_S$.
2. Sorting Hypothesis. For given region of birth, employees working in the north are on average characterized by a lower θ: $q_b^N < q_b^S$, $b = N, S$.
3. Local-Attributes Hypothesis. The north and south branches differ in the vector of exogenous local attributes: $Y^N \neq Y^S$.
4. Group-Interaction/Multiple-Equilibria Hypothesis. There are positive group-interaction effects ($\partial S_i / \partial \bar{S}^e > 0$), possibly generating multiple equilibria.

Before proceeding, we need to clarify the relationship between group-interaction effects and multiple equilibria. From the model it is clear that group-interaction effects may or may not generate multiple equilibria. Multiple equilibria can of course explain shirking differentials between otherwise identical branches. However, even if group-interaction effects do not generate multiple equilibria, they can still contribute to explaining shirking differentials, provided that branches differ in local attributes or in the distribution of worker types because they amplify the effects of such differences.[14]

14. A similar idea is present in Glaeser, Sacerdote, and Scheinkman's [1996] work on crime in U. S. cities. In their model there is a unique Nash equilibrium, and the group-interaction mechanism magnifies the effect of exogenous differences between cities, thus contributing to explaining crime differentials.

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TABLE IV
AVERAGE NUMBER OF ABSENCE EPISODES BY REGION OF WORK AND BIRTH

	Work north	Work south	South − North
Born north	1.90	2.65	0.75
	(0.01)	(0.10)	(0.08)
Born south	1.89	2.93	1.04
	(0.04)	(0.03)	(0.06)
South − North	−0.01	0.28	
	(0.04)	(0.12)	

Average number of absence episodes for the employee-year observations in each regional cell. The last column and row report the corresponding differences between southern and northern cells. The figures refer to the period 1993–1995. Standard errors are reported in parentheses.

V. INDIVIDUAL-BACKGROUND AND WORK-ENVIRONMENT EFFECTS

In this section we focus on the full sample of employees, with two main objectives in mind. First, we want to examine the impact of individual background on the propensity to shirk, controlling for the work environment. Second, we want to examine how the propensity to shirk depends on the work environment, controlling for observable individual characteristics. This will lead to the subsequent step of the analysis, where we focus on the subsample of movers to understand whether the work-environment effect is due to sorting, differences in local attributes, or group-interaction effects.

We take a preliminary look at the individual-background and work-environment effects by examining the incidence of shirking by region of birth and region of work. Tables IV and V report (respectively) the average number of absence episodes and the frequency of misconducts by region of birth and region of work. Overall, employees born in the south appear to shirk more than employees born in the north, within each region of work. And working in the south implies a higher shirking level, for each region of birth. All differences are statistically significant (with the only exception of absenteeism in the northern working region, where the region of birth makes no significant difference).

Next we take a closer look at the effect of individual background. A natural question is why do we find an impact of the region of birth on the shirking level. We have in mind two possibilities. The first one is that the birth environment directly affects individual preferences, through familial and social influences. The second one is that the propensity to shirk is a function

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TABLE V
FREQUENCY OF MISCONDUCT EPISODES BY REGION OF WORK AND BIRTH

	Work north	Work south	South − North
Born north	0.007	0.013	0.006
	(0.0001)	(0.0012)	(0.0009)
Born south	0.009	0.015	0.006
	(0.0005)	(0.0004)	(0.0007)
South − North	0.002	0.002	
	(0.0005)	(0.0014)	

In each regional cell the numerator of the frequency is the number of employee-year observations for which at least one misconduct episode is recorded, while the denominator is the total number of employee-year observations. The last column and row report the corresponding differences between southern and northern cells. The figures refer to the period 1975–1995. Standard errors are reported in parentheses.

of other individual characteristics, and these characteristics are more frequent among south-born employees. Among the individual characteristics that lend themselves naturally to this possibility are gender, age, level and type of education, tenure, rate of promotions, and existence of precompany experience. We try to discriminate between the two possibilities by controlling for the above-mentioned individual characteristics in our analysis. We also control for the employees' hierarchical position (there are fourteen hierarchical levels), since employees of different levels may face different incentives to shirk. Note that, since wages are closely tied to hierarchical levels, we are also effectively controlling for wages.[15]

For both absenteeism and misconducts, we find that most of these individual characteristics have a statistically significant effect on the level of shirking,[16] but they do not subtract significance from the region-of-birth effect. Panel A of Table VI (first and third entry) shows that the coefficients of the region-of-birth dummy are high and significant even in the presence of individual controls.[17] We can actually say that individual characteristics are

15. Results do not change when we also include yearly wages in the regressions.

16. Females, older workers, workers with less education and lower promotion rates, workers with longer tenure, and workers with more precompany experience are more prone to absenteeism (one possible explanation for the effect of precompany experience is that on some occasions our bank has been forced by the government to hire employees of other bankrupt banks. According to the Personnel Office, these employees on average performed less well than the ones hired freely on the market). The same is true for misconducts, except that females, older workers, and workers with longer tenure are *less* prone to misconducts.

17. For absenteeism, Table VI reports the results of Poisson regressions in which the dependent variable is the number of absence episodes. The coefficients

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TABLE VI
INDIVIDUAL BACKGROUND AND WORK ENVIRONMENT EFFECTS

	Absenteeism	Absenteeism	Misconducts	Misconducts
Panel A				
Born = south	1.39*	1.11*	1.88*	1.33*
	(0.02)	(0.03)	(0.08)	(0.08)
Panel B				
Work = south	1.50*	1.18*	2.08*	1.51*
	(0.03)	(0.05)	(0.09)	(0.12)
Panel C				
Born = south; Work = north	1.08*	1.07~	1.32*	1.32*
	(0.03)	(0.03)	(0.10)	(0.10)
Born = north; Work = south	1.39*	1.05	2.02*	1.59*
	(0.08)	(0.07)	(0.26)	(0.23)
Born = south; Work = south	1.52*	1.20*	2.19*	1.57*
	(0.03)	(0.05)	(0.10)	(0.13)
Individual characteristics	yes	yes	yes	yes
Local characteristics	no	yes	no	yes
N. obs.	53,921	53,921	373,493	373,493

Absenteeism: incidence rate ratios estimated with Poisson regressions in which the dependent variable is the number of absence episodes for each employee-year observation. Misconducts: odds ratios estimated with logit models of the probability of misconduct; the dependent variable takes value 1 when at least one misconduct episode is recorded for an employee-year observation. A ratio greater than 1 indicates that workers in the corresponding regional cell are more prone to absenteeism than workers in the reference cell, and vice versa. The individual characteristics are sex, age, age squared, five educational degree dummies, six educational field dummies, dummy for precompany experience, tenure, tenure squared, previous rate of promotions, and fourteen hierarchical level dummies. The local characteristics are (a) computed at the branch level: branch size, fraction of females, average age, average years of education, fraction of workers with prebank experience, fraction of newly arrived workers, fraction of managers, current and previous rates of promotion for managers and for white collars; (b) computed at the province level: yearly rainfall, average yearly temperature, unemployment rate, crime rate, hospital beds per capita, doctors per capita (the last two only for absenteeism). We also include all year dummies. Robust standard errors, adjusted for individual serial correlation, are reported in parentheses with $p < 0.01$ = * and with $p < 0.05$ = ~.

a confounding factor for the effect of the region of birth, because when we take them out of the regression, the coefficient of the born-south dummy *decreases* (this result is not reported in the table).

are reported in the form of incidence ratios. A ratio greater than 1 indicates that workers born in the south are more prone to absenteeism than workers born in the north. For example, a ratio of 1.39 means that absenteeism is 39 percent higher for south-born workers. For the case of misconducts, we estimated a logit model of the probability of misconduct in which the dependent variable takes the value 1 when at least one misconduct episode is recorded in the given year. Coefficients are reported in the form of odds ratios. A ratio greater than 1 indicates that the odds of misconduct for workers born in the south are higher than those for workers born in the north. For example, a ratio of 1.88 means that the odds of misconduct are 88 percent higher for workers born in the south.

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We then look at the region-of-birth effect controlling also for the characteristics of the work environment. When we include a set of observable local characteristics (listed in the note to Table VI), the effect of being born in the south remains positive and significant (second and fourth entries of Panel A). We also tried to control for the work environment in the finest possible way, namely by including all branch dummies, time dummies, and observable local characteristics, as well as all individual characteristics. The region-of-birth effect remains highly significant (this result is not reported in the table).

Next we focus on the effect of the work environment on the propensity to shirk. Panel B of Table VI reports the estimates of the region-of-work effect in the presence of individual controls: working in the south has a positive and significant effect, for both absenteeism and misconducts. This effect remains significant even if one controls for observable local characteristics. Thus, the effect of the working region is not entirely explained by these local characteristics. Our data also provide a way to examine whether employees change their shirking level gradually according to the time spent in their region of work. We do this by including an interaction between the "work-south" dummy and the duration of the employee's residence in the south. This interaction has a positive and significant coefficient, which suggests that shirking increases gradually as one spends more time in the south.

Finally, in Panel C we take the group of employees born and working in the north as the reference group, and include three dummies for the remaining groups, as well as the whole set of individual and local characteristics. This allows one to compare the four groups of employees in the presence of all controls. Being born in the south generally increases the propensity to shirk conditional on each region of work, and working in the south increases the propensity to shirk conditional on each region of birth.

A key issue that arises when interpreting these results in terms of shirking behavior is the presence of a potentially serious measurement error in the dependent variable, particularly for the data on absenteeism. The problem is that we cannot distinguish between absences due to a true state of illness and absences that can be interpreted as shirking. One then has to worry about whether this measurement error is correlated with the region of work or the region of birth. In particular, if the incidence of illness were higher for employees born (or working) in the south, we would be overestimating the impact of the region of birth (or

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work). However, there is evidence that this is not the case. Official statistics (from ISTAT, Annuario Statistico Italiano) indicate that rates of death due to illness are higher in the north: for example, in 1993 the number of deaths due to illness per 1000 inhabitants per year was 10.2 in the north and 8.3 in the south. Assuming that these rates are proxies for the true frequency of illness, this appears if anything larger in the north. We also looked at death rates by region of birth and work among the employees of our bank, controlling for demographic characteristics such as gender and age, and we found no difference between the north and the south.[18] Another piece of evidence is that life expectancy does not differ much between north and south: for example, for the 1987–1991 cohort, life expectancy was about 73.5 years for men and 80 years for women in both regions.

The next step will be to focus on the subsample of branch-to-branch movers, to examine the determinants of the work-environment effect. Before doing so, however, we want to get a sense of how important are branch-specific determinants of shirking, overall and within the north and south. We examined how much of the total variance in shirking levels is explained by the variance in branch*year mean shirking levels, for the whole country and within each region. For the case of absenteeism, branch effects explain roughly 9 percent of the total variance for the whole country, 8.7 percent within the south, and 5 percent within the north (the results for misconducts are qualitatively similar). Thus, there is significant cross-branch variation even within each region.[19] This suggests that the appropriate level of analysis is the level of the branch, and encourages us to make use of our information on branch-to-branch movers.

VI. Looking Inside the Work-Environment Effect

In this section we try to discriminate between the possible determinants of the work-environment effect, namely, group-interaction effects, local attributes, and sorting.

18. Balzi et al. [1997] looked at mortality rates for cancer cases in the whole country, and found that, even controlling for demographic characteristics, mortality rates are substantially higher in the north.

19. We have also performed this exercise on the residuals after controlling for observable individual characteristics (listed in the note to Table VI). Branch effects explain 7.5 percent of the total residuals' variance for the whole country, 7 percent within the south, and 4.1 percent within the north.

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VI.1. Group Interactions and Local Attributes

Our objective here is to estimate the structural relationship that determines individual shirking behavior as a function of local average shirking, individual characteristics, and local attributes. We start from a linear version of equation (1), to which we add a time subscript for each variable and an error term:

$$S_{it} = \theta_{it} + \beta \overline{S}_{it} + Y_{it} + \epsilon_{it}, \tag{4}$$

where S_{it} is the shirking level of worker i at time t, θ_{it} incorporates the individual effects for employee i at time t, $\overline{S}_{it}$ is the average shirking level in the branch of worker i (excluding worker i from the average), Y_{it} incorporates the local-attribute effects of the branch where employee i works, and ϵ_{it} is an i.i.d. error term. We then assume that θ_{it} and Y_{it} are each composed of an unobservable fixed effect and an observable part, as follows:[20]

$$S_{it} = \alpha_i + \delta t X_i + \beta \overline{S}_{it} + \sum_j \zeta_j D_{ijt} + \gamma Z_{it} + \epsilon_{it}, \tag{5}$$

where α_i is the unobserved fixed effect for individual i, X_i are worker i's observable characteristics, D_{ijt} is a dummy that is equal to one if worker i is in branch j at time t (so that ζ_j incorporates all time-invariant unobservable characteristics of the branch), and Z_{it} is a vector of observable local characteristics. The reason we include the term $\delta t X_i$ in (5) is to allow for an effect of time-invariant individual characteristics on the change in shirking. The vector Z_{it} includes (a) a set of branch-level variables: branch size, fraction of managers, rates of promotion for managers and for white collars, fraction of newly arrived workers, fraction of females, average age, average years of education, average number of workers with prebank labor market experience; and (b) a set of province-level variables: yearly rainfall, yearly average temperature, unemployment rate, crime rate, hospital beds per capita, doctors per capita (the last two are included only for absenteeism), plus year dummies. Some of these local variables are included because they may affect the incentive to shirk, others because they may be potentially linked to the incidence of true illness in the local area.

Several problems make the estimation of equation (5) difficult, but we minimize these problems by focusing on the sub-

20. There could also be time-varying unobservable effects. We discuss the problems associated with their presence later in the section.

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sample of movers and estimating the equation in first differences.[21] The focus on movers allows us to identify group-interaction effects and local-attribute effects. Estimating the equation in first differences allows us to control for the individual fixed effects α_i, which is important because α_i will be correlated with $\overline{S}_{it}$ if individuals with similar characteristics happen to be geographically concentrated. Our estimating equation is

$$(6)\quad S_{it} - S_{it-1} = \delta X_i + \beta(\overline{S}_{it} - \overline{S}_{it-1}) + \sum_j (D_{ijt} - D_{ijt-1})\zeta_j + \gamma(Z_{it} - Z_{it-1}) + \epsilon_{it} - \epsilon_{it-1}.$$

Note that for movers we have that $\overline{S}_{it} \neq \overline{S}_{it-1}$ and $Z_{it} \neq Z_{it-1}$ not only because they are computed in two different periods but also because they are computed in two different branches. Thus, an additional advantage of using data on movers is that they provide much greater variation in the independent variables $\overline{S}_{it}$ and Z_{it}. Also note that the branch fixed effects ζ_j are identified because $\overline{S}_{it}$ and Z_{it} vary by branch and year, not only by branch. In the analysis based on absenteeism, however, the time period for which we have data (1993–1995) is too short to allow for a reliable identification of the almost four hundred branch fixed effects. Hence, in this case, we use 91 fixed effects for the administrative provinces in which Italy is divided. We believe that, given the small size of these provinces, the corresponding fixed effects control reasonably well for the relevant local time-invariant characteristics.

We focus first on the case of absenteeism. There are 3963 movement episodes during the 1993–1995 period; descriptive statistics for this subsample are given in Appendix 1. Our first step is to estimate equation (6) using OLS (correcting the standard errors using the White formula). The results are reported in the top panel of Table VII. When we include all individual and local controls, the estimated value of β is 0.156, with a *p*-value smaller than 0.01. The interpretation is that an employee makes one more day of absenteeism if his average coworker makes

21. The empirical strategy we pursue here is similar in spirit to the one employed by Krueger and Summers [1988] and Gibbons and Katz [1992] for the analysis of the causes of interindustry wage differentials. They focus on workers who move across industries, and regress the mover's wage on a vector of industry dummies using a first-difference specification to control for individual fixed effects.

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TABLE VII
GROUP-INTERACTION EFFECT FOR MOVERS BETWEEN BRANCHES

PANEL A			
Local average absenteeism	0.148*	0.181*	0.156*
	(0.035)	(0.048)	(0.055)
N. obs.	3963	3963	3963
PANEL B			
Local frequency of misconducts	0.436*	0.435*	0.359*
	(0.067)	(0.068)	(0.069)
N. obs.	23,110	23,110	23,110
Individual characteristics	yes	yes	yes
Local characteristics	no	yes	yes
Local fixed effects	no	no	yes

This table reports OLS estimates of the parameter β based on equation (6) for the samples of movers between branches in the period 1993–1995 (absenteeism) and in the period 1975–1995 (misconducts). The dependent variable ($S_{it} - S_{it-1}$) is the change in the shirking indicator for a worker who changes branch between consecutive years. The individual characteristics are sex, age, age squared, five educational degree dummies, six educational field dummies, dummy for precompany experience, tenure, tenure squared, previous rate of promotions, and fourteen hierarchical level dummies. Time-varying individual characteristics are measured at the time when the move takes place. The local characteristics are (the first differences of) (a) computed at the branch level: branch size, fraction of females, average age, average years of education, fraction of workers with prebank experience, fraction of newly arrived workers, fraction of managers, and current and previous rates of promotion for managers and for white collars; (b) computed at the province level: yearly rainfall, average yearly temperature, unemployment rate, crime rate, hospital beds per capita, doctors per capita (the last two only for absenteeism). For absenteeism the local fixed effects are 91 province dummies. For misconducts they are 442 branch dummies. We also include year dummies. Robust standard errors are reported in parentheses with $p < 0.01 = *$.

(roughly) six more days of absenteeism. The local controls (Z_{it} and the province dummies) are jointly significant.[22]

Next we need to discuss three possible sources of bias in the estimation of β: (a) the stayers' mean shirking level $\overline{S}_{it}$ is endogenous to the dependent variable, even though it does not include the mover's shirking level, because there can be peer-group effects from the mover to the stayers. (b) If there are unobservable local time-varying effects (or unobservable local time-invariant effects that vary across branches within the same province[23]), these will affect both the stayers' and the mover's behavior, thus biasing $\hat{\beta}$ upward. (c) The presence of a measure-

22. In addition to the robustness checks described in footnote 8, we reran regression (6) using differences between the year after the move and the year before the move, instead of differences between adjacent years. This was motivated by the fact that an employee is assigned to branch j in year t if she is in branch j at the beginning of year t, and this introduces a measurement error whenever an employee moves before the end of the year. With this alternative procedure we found a slightly higher value of β (0.190).

23. Note that this problem cannot arise in our analysis of misconducts, where we are able to control for a full set of branch fixed effects.

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ment error in $\overline{S}_{it}$ tends to bias $\hat{\beta}$ downward, and the problem is likely to be exacerbated by the estimation in first differences. Note that the overall effect of these three sources of bias is a priori unclear.

We can think of two ways to mitigate these problems. The first is to replace $\overline{S}_{it}$ with its lagged value $\overline{S}_{it-1}$. This should eliminate problem (a) and reduce problem (b), although it does not take care of the measurement problem. An alternative approach is to perform an IV estimation, using $\overline{S}_{it-1}$ or the set of lagged local variables, Z_{it-1}, as instruments. These variables presumably affect the stayers' current behavior without directly affecting the mover's current behavior. Thus, they seem reasonable instruments for $\overline{S}_{it}$. This should reduce all three problems, although it may sacrifice efficiency of the estimation. We experimented with both instruments but eventually settled for $\overline{S}_{it-1}$ because this generated a more precise estimate of β.[24] The results (which we do not report in the tables to save space) are reassuring: the IV and "lagged-OLS" estimates of β are both statistically significant and higher than the basic OLS estimate. In this perspective, the basic OLS estimate of β appears to be a rather conservative one, and we choose it as our preferred estimate.

There is another possible way of looking for true group-interaction effects, avoiding the problems of unobservable local effects and endogenous stayers' behavior. Group-interaction effects imply that the arrival of a good worker and the departure of a bad worker will improve the behavior of the stayers. To check whether this effect is present, we consider the following equation for the change in stayers' behavior:

$$\overline{S}_{jt}^{[t-1,t]} - \overline{S}_{jt-1}^{[t-1,t]} = \beta^A \overline{S}_{jt}^A + \beta^D \overline{S}_{jt-1}^D + \tilde{\gamma}(Z_{jt} - Z_{jt-1}), \tag{7}$$

where $\overline{S}_{j\tau}^{[t-1,t]}$ is the mean shirking level at time τ of the employees who work in branch j both at time $t-1$ and at time t (i.e., the "stayers"); $\overline{S}_{jt}^A$ is the mean shirking level of the employees who work in branch j at time t but not at time $t-1$ (i.e., the newly arrived workers); $\overline{S}_{jt-1}^D$ is the mean shirking of the employees who work in the branch at time $t-1$ but not at time t (i.e., the departing workers); and Z_{jt} is the vector of observable local characteristics. We expect β^A to be positive and β^D to be negative.

Of course, $\overline{S}_{jt}^A$ and $\overline{S}_{jt-1}^D$ are endogenous to the dependent

24. We note that the point estimates of β when using the lagged local variables Z_{it-1} as instruments were generally higher than the corresponding ones when using $\overline{S}_{it-1}$ as instrument.

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variable. To deal with this problem, we estimate a slightly different version of equation (7): we replace the shirking level of an arriving employee with his shirking level in the previous year, and the shirking level of a departing employee with his shirking level in the following year. Note that this procedure does not allow the estimation of the structural parameter β. In fact, we expect the parameters β^A and β^D to have a much smaller value than β because movers are in small numbers relative to stayers. Note also that the group-interaction hypothesis implies that β^A and β^D should be higher for smaller branches.

The OLS estimates of β^A and β^D have the right sign, although they are not statistically significant. When we select only branches with less than 50 employees, the estimates of β^A and β^D become slightly higher.[25] We regard these results as fairly supportive of the group-interaction hypothesis, also in consideration of the measurement error in our shirking measure, which tends to bias downward the estimates of β^A and β^D.

Another issue that needs to be addressed is the possible endogeneity of moves. This can potentially bias our estimation of β, if workers whose behavior is improving over time (due to changes in their unobservable characteristics) move to low-shirking branches. This possibility seems more likely for workers who move by choice of the central office than for workers who move for personal reasons. If there is a systematic pattern of this kind, it will tend to bias our estimate of β upward.

To investigate this issue, we followed two strategies. First, we obtained information from the bank on the reasons for moves. The bank classifies movers in two groups: those who move by their own choice ("voluntary" movers), and those who move by choice of the central office ("commanded" movers); a commanded move is often associated with a promotion. We then reestimated our key equation separately on these two subsamples. When focusing on commanded movers, results closely resemble those of our base regressions. When focusing on voluntary moves, results are generally similar to those of our base regression, except when we include all controls and province fixed effects, in which case the estimate of β is a bit lower (by about one-third). If one is willing to assume that voluntary moves are not affected by the endogeneity problem described above, these results are fairly encouraging.

25. The inclusion of the $(Z_{jt} - Z_{jt-1})$ controls makes virtually no difference in the results.

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We then performed a second check. We looked for correlation between a mover's *change* in shirking in the two years before moving and the average level of shirking in the arrival branch (evaluated in the year before the move, to avoid peer-effect contamination from the mover). If there were a systematic pattern of worker relocation of the kind that we are worried about, we should find that this correlation is positive. However, we find no correlation at all. In light of these results, we are inclined to believe that our identification of group-interaction effects is not driven by the endogeneity of moves.[26]

As we remarked in the theoretical section, group-interaction effects may or may not generate multiple equilibria. A hard empirical question is whether multiple equilibria are present. This question will not be settled here, but we present two bits of evidence that are not very supportive of the multiple-equilibrium hypothesis. First, in our model multiple equilibria would likely (although not necessarily) generate a bimodal or multimodal distribution of mean branch shirking rates. However, in our sample this distribution is clearly unimodal. Second, in our model multiple equilibria can arise only if the structural relationship $g(\cdot)$ is convex (given that its intercept is positive). We tried estimating equation (6) adding the (difference of the) square of $\overline{S}_{it}$ on the right-hand side. The estimated coefficient of this term is always between $-.04$ and zero (depending on the estimation technique and on the set of controls), and never significant, whereas the coefficient of the linear term is always higher than .25 and significant. Thus, the structural relationship $g(\cdot)$ appears to be linear to slightly concave, which in our model is inconsistent with the presence of multiple equilibria.

We replicated all the steps of the analysis described above for the case of misconducts. In the interest of space, we report the results only for our base regression, which we estimate on the basis of 23,110 movement episodes over the 1975–1995 period. Descriptive statistics for this subsample are given in Appendix 2.

26. One might also be concerned that movers are not representative of the general population of employees, and may be characterized by a different β than the average employee. As we will see in the next section, movers are on average "better" than stayers: the average number of absences is 1.7 for movers and 2.6 for stayers. There is clearly a selection bias. However, this need not weaken our results because it seems unlikely that "better" workers have a higher β. To address this issue econometrically, we tried estimating β after cutting off (asymmetric) tails of the distribution of movers in such a way that the remaining part of the distribution has a mean equal to the mean of the general population (2.2 absences a year). Results did not change much.

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TABLE VIII
ABSENTEEISM OF MOVERS AND STAYERS IN THE DEPARTURE REGION

From south:	Movers to north	Movers to south	Stayers
Number of absence episodes	1.27	2.12	3.42
Standard error	(0.23)	(0.08)	(0.05)
P-value	—	0.0074	0.0000
Number of observations:	76	1089	6732
From north:	Movers to south	Movers to north	Stayers
Number of absence episodes	1.60	1.54	2.13
Standard error	(0.21)	(0.04)	(0.02)
P-value	—	0.7656	0.0033
Number of observations:	112	2686	13,549

The columns for "movers" report statistics based on the subsamples of workers who move between or within regions in the period 1993–1995. The column for "stayers" reports the analogous statistics for the employees who work in the region that the movers depart from and who never move. In all cases, the number of absence episodes refers to the year before the movement takes place. Each *P*-value refers to the test for the difference with respect to the corresponding entry in the first column.

Thanks to the longer period of observation, we can control for all the 442 branch fixed effects. The lower panel of Table VII reports OLS estimates of equation (6) with the usual sets of controls. Group interaction effects are again estimated to be positive and statistically significant. When we include all individual and local controls, the estimated value of β is 0.356, and statistically significant. The interpretation is that an employee's probability of committing a misconduct increases by 0.356 if his average coworker commits one additional misconduct episode. The local time-varying effects and the branch fixed effects are jointly significant.

VI.2. Sorting Effects

Our evidence on sorting effects is limited because we can examine only workers who moved during their tenure at the bank, and not workers who moved before being hired. Conditional on this disclaimer, the data on movers offer interesting information about sorting.

In Table VIII we report the incidence of absenteeism for between-region movers, within-region movers, and stayers, for the period 1993–1995. Let us focus first on the groups of south-to-north movers, south-to-south movers, and stayers in the south.

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TABLE IX
MISCONDUCTS OF MOVERS AND STAYERS IN THE DEPARTURE REGION

From south:	Movers to north	Movers to south	Stayers
Frequency of misconducts	0.004	0.016	0.014
Standard error	(0.003)	(0.002)	(0.0005)
P-value	—	0.0172	0.0324
Number of observations:	670	4257	50,989
From north:	Movers to south	Movers to north	Stayers
Frequency of misconducts	0.003	0.006	0.008
Standard error	(0.002)	(0.000)	(0.000)
P-value	—	0.2771	0.1487
Number of observations:	873	17,310	105,261

The columns for "movers" report statistics based on the subsamples of workers who move between or within regions in the period 1975–1995. The column for "stayers" reports the analogous statistics for the employees who work in the region that the movers depart from and who never move. In all cases, the frequency of misconducts refers to the year before the movement takes place. Each *P*-value refers to the test for the difference with respect to the corresponding entry in the first column.

The average number of absence episodes per year is, respectively, 1.27, 2.12, and 3.42 for the three groups (for movers, the average refers to the year before moving), and all differences are statistically significant. This suggests that movers from the south are less prone to absenteeism than stayers, with long-range movers being more disciplined than short-range movers. As far as movers from the north are concerned, they are also significantly less prone to absenteeism than stayers, but there is no statistical difference between north-to-south and within-north movers.[27]

In addition to sorting by region, we can also examine sorting by branch. For the case of absenteeism, the clear pattern is that "better" workers tend to move to "better" branches: we find a positive and significant correlation between a mover's shirking level (evaluated in the year before moving) and the average shirking of the arrival branch (also evaluated in the year before the move takes place, to avoid peer-effect contamination).

The qualitative results for the case of misconducts are similar. Table IX presents the key findings on regional sorting.

27. We computed the statistics contained in Table VIII also on the residuals obtained after controlling for observable individual characteristics. The differences between movers and stayers remain qualitatively similar, suggesting that sorting based on observable characteristics and sorting based on unobservable characteristics follow a similar pattern.

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The frequency of misbehavior is always lower for across-region movers than for stayers (0.004 versus 0.014 from the south, which is also statistically significant, and 0.003 versus 0.008 from the north), but now the differences between within-region movers and stayers are not significant.

Understanding the mechanics of sorting is interesting in its own right, but we have not yet addressed our main question, can sorting contribute to explaining the north-south shirking differential. The answer is not obvious: the sorting effect for south-to-north movers contributes to explaining the differential, but the sorting effect for north-to-south movers pushes in the opposite direction. Quantitatively, however, the former effect is stronger than the latter (both for absenteeism and for misconducts). Thus, sorting effects *on net* seem to play a role in determining the north-south differential. This will be confirmed in the next section, where we quantify the importance of the four effects (individual background, sorting, local attributes, and group interactions) in explaining the regional differential.

VI.3. Decomposing the North-South Shirking Differential

If one is willing to assume that the group of movers is representative of the general population of employees, in the sense of being characterized by the same behavioral parameters, one can quantify the relative importance of the various local and individual effects in explaining the north-south shirking differential.

We start with the case of absenteeism. The basis for our decomposition is equation (4). Using this equation, one can write the average shirking level in region $e \in \{N, S\}$ as $\overline{S}^e = \overline{\theta}^e + \beta\overline{S}^e + \overline{Y}^e$, where an overbar with superscript e denotes the average of a variable (across individuals and years) for region e. The shirking differential between south and north is then

$$(8) \qquad \overline{S}^S - \overline{S}^N = (\overline{\theta}^S - \overline{\theta}^N) + \beta(\overline{S}^S - \overline{S}^N) + (\overline{Y}^S - \overline{Y}^N).$$

We do not solve (8) in $\overline{S}^S - \overline{S}^N$ because, in this form, it provides an additive decomposition in which $\beta(\overline{S}^S - \overline{S}^N)$ is the part of the shirking differential explained by group-interaction effects. To perform the decomposition, our strategy will be to estimate the part explained by local effects, $\beta(\overline{S}^S - \overline{S}^N) + (\overline{Y}^S - \overline{Y}^N)$, and calculate the part explained by the average worker "types," $(\overline{\theta}^S - \overline{\theta}^N)$, as a residual. Note that this latter differential may be

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due to differences in "individual background" (i.e., differences in types between south-born and north-born workers) or to sorting effects. We will take our parameter estimates from the OLS estimation of equation (6) with complete individual and local controls. As discussed earlier, we believe that the OLS estimate of the group-interaction effect is on the conservative side, and OLS is more efficient than the other procedures we tried. Circumflexes will denote estimated parameters.

The left-hand side of (8), i.e., the differential to be explained, is roughly equal to one absence episode per year. To estimate the part explained by group-interaction effects, $\beta(\overline{S}^S - \overline{S}^N)$, we only need the estimate of β. Since $\hat{\beta}$ is about 0.16, group-interaction effects explain roughly 16 percent of the shirking differential between south and north.

To estimate the part explained by local-attribute effects, we posit, as in equation (5), $Y_{it} = \gamma Z_{it} + \Sigma_j \zeta_j D_{ijt}$. Note that γ and ζ_j are estimated, while Z_{it} is observed. We can then estimate the difference $(\overline{Y}^S - \overline{Y}^N)$ as $\hat{\gamma}(\overline{Z}^S - \overline{Z}^N) + (\hat{\zeta}^S - \hat{\zeta}^N)$, where $\hat{\zeta}^e$ $(e = N, S)$ denotes the average of $\Sigma_j \hat{\zeta}_j D_{ijt}$ (across individuals and years) for region e. The estimated value of $(\overline{Y}^S - \overline{Y}^N)$ is about -0.07. Thus, local-attribute effects *on the whole* do not contribute to explaining the shirking differential between south and north. It is important to note, however, that this number hides large and opposite forces. In particular, if we separate the unemployment rate from all other local effects, we find that the shirking differential predicted by the unemployment rate is -0.58,[28] while the shirking differential predicted by the remaining local effects is 0.51.[29]

Next, $\overline{\theta}^S - \overline{\theta}^N$ is estimated residually to be about 0.91. The last step is to decompose this number into a part explained by differences in "individual background" and one explained by sorting effects. For each employee we can estimate θ_{it} residually as $\theta_{it} = S_{it} - \hat{\beta}\overline{S}_{it} - \hat{\gamma} Z_{it} - \Sigma_j \hat{\zeta}_j D_{ijt}$. We can then calculate the average θ for the employees born in region b, which we denote $\overline{\theta}_b$. We interpret $\overline{\theta}_S - \overline{\theta}_N$ as the part of the shirking differential explained by differences in individual background, and the remaining part,

28. This number is so high because the estimated coefficient of the unemployment rate is high, but even more because there is a big difference in unemployment between north and south.

29. Interestingly, we find no evidence that the fraction of managers and the promotion rates for managers contribute to explaining the north-south differential. These variables are on average higher in the north, but their coefficients are insignificant and with the "wrong" sign.

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$(\bar{\theta}^S - \bar{\theta}^N) - (\bar{\theta}_S - \bar{\theta}_N)$, as that explained by sorting.[30] These parts are estimated to be, respectively, 0.68 and 0.23. To summarize: individual background, sorting, and group interactions account for, respectively, 68 percent, 23 percent, and 16 percent of the absenteeism differential between south and north. The sum of these figures exceeds 100 by 7 percent. This is the effect of local attributes, which tend to make shirking higher in the north.

When we replicate the exercise for misconducts, we estimate that individual background, sorting, and group interactions account for, respectively, 73 percent, 36 percent, and 25 percent of the shirking differential between south and north. The sum of these figures again exceeds 100 (by 34 percent) because local attributes as a whole tend to make misconducts more frequent in the north. Also for misconducts the overall effect of local attributes hides large and opposing forces: in particular, the unemployment rate and the size of branches[31] push toward lower shirking in the south while the remaining variables push in the opposite direction.

One should keep in mind two limitations of this exercise. One is that many of the parameters in γ and ζ_j are imprecisely estimated (although local attributes are always jointly significant). Thus, the numbers presented here should be interpreted with caution. What we believe to be robust is the broad qualitative pattern: individual background seems to be the most important determinant of the north-south differential; group-interaction and sorting effects appear significant, but less important; and local-attribute effects as a whole do not contribute to explaining the differential. The other limitation of our procedure is that, since θ_{it} is estimated residually, it picks up any unobservable local time-varying effects. Thus, we may be overestimating the overall magnitude of individual effects. However, this does not necessarily imply that we are overestimating the role of individual effects in explaining the north-south *differential*; the direction of this bias is a priori unclear.

Before moving to the next section, we comment here on the issue of efficiency-wage effects. Efficiency-wage theories propose that shirking in a firm should be lower (i) when there is higher local unemployment, and (ii) when the firm pays a higher wage

30. To understand this intuitively, consider the extreme case in which all employees work in the region where they were born; in this case we have $(\bar{\theta}^S - \bar{\theta}^N) = (\bar{\theta}_S - \bar{\theta}_N)$, that is, zero sorting effect.

31. Larger branches seem to imply fewer misconducts, and branches are on average larger in the south.

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premium relative to local firms.[32] As we saw earlier in this section, our econometric findings are consistent with part (i) of the efficiency-wage story. As far as part (ii) is concerned, we do not have the data to test this hypothesis econometrically. However, we have enough information to assert that neither of these two effects can contribute to explaining the north-south shirking *differential*. First, unemployment is substantially higher in the south.[33] Second, the wages paid by our bank entail higher wage premiums in the south. As shown in Table III, looking at the entire working population, an average employee working in the south earns 13 to 23 percent less than the average employee working in the north. On the other hand, within our bank the average wage in the south is the same as in the north (see point (3) in the next section).

VII. Additional Hypotheses

In this section we present some evidence on the last two hypotheses that we considered in Section III as potential explanations of the regional shirking differentials, namely those of discrimination and different hiring policies.

In principle, the evidence on shirking differentials could be due to discrimination against employees born or working in the south. As we mentioned earlier, this kind of discrimination could operate in two ways. First, the Personnel Office could be harsher with southern employees when investigating and punishing misconduct cases. Second, if the firm uses the implicit promise of promotions and wage raises as an incentive device to elicit more effort, and southern employees get less favorable treatment in terms of career path, they may have a lower incentive to work.

The possible presence of discrimination in this firm is the subject of Ichino and Ichino [1998], who use our same data set. They show that (1) the procedure by which misconduct episodes are reported to the Personnel Office and the frequency of inspections do not appear to differ between northern and southern

32. Cappelli and Chauvin [1991] test these two predictions by comparing misconduct rates in plants located in different regions of the United States. They find a lower frequency of misconduct where wage premiums relative to local average wages are higher and where the local unemployment rate is higher. They conclude that their evidence supports the Shapiro-Stiglitz efficiency-wage theory. However, see Leonard [1987] and Hirsch and Hausman [1983] for evidence that somewhat contradicts the efficiency-wage hypothesis.

33. During the period of observation, the average unemployment rate was 14 percent in the south and 6 percent in the north.

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branches. (2) For given gravity and type of misconduct there is no evidence that employees working or born in the south are punished more severely. (3) Controlling for individual observable characteristics (including the hierarchical level), there is no evidence of discrimination against southern employees in terms of annual earnings. Employees working in the south earn on average the same as employees working in the north. Employees born in the south earn on average 1 percent more than those born in the north, and the difference is statistically significant. As far as career paths are concerned, there are no significant regional differences in the odds of promotion. These findings suggest strongly that discrimination plays no part in explaining regional shirking differentials.

Finally, it is possible that different hiring policies in the two regions might contribute to explaining the shirking differential. If the abler and more motivated managers were located in the north, where the headquarters are, and hiring were based on local decisions, this could imply a more selective hiring process in the north, leading to a higher-quality workforce in the north. This hypothesis, however, is inconsistent with the fact that the hiring process is completely centralized at the headquarters. Local managers may only suggest a list of potential candidates, but choices are then based on written and oral exams taken at the headquarters. Thus, the hypothesis of different hiring policies does not seem to have strong explanatory power for our purposes.

VIII. Conclusion

This paper has documented the existence of striking regional shirking differentials within a large Italian bank with branches distributed over the entire country. In particular, absenteeism and misconduct episodes are substantially more frequent in the south.

We have considered several potential explanations for this fact, including differences in workers' individual backgrounds; group-interaction effects, possibly leading to multiple equilibria; locational sorting effects; differences in local attributes; discrimination against southern employees, and differences in hiring policies.

Our analysis suggests that individual backgrounds, group-

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interaction effects, and sorting effects all contribute to explaining the north-south shirking differential, with individual backgrounds being quantitatively the most important factor. Local attributes as a whole appear to push in the opposite direction, that is, toward higher shirking in the north. However, this overall effect is driven by a few local variables (most notably, local unemployment and the size of branches), while most of the local effects push strongly toward higher shirking in the south. None of the other explanations that we considered seems to play a significant role.

APPENDIX 1: DATA FOR THE ANALYSIS OF ABSENTEEISM: 1993–1995

	Full sample		Movers sample	
Variable	Mean	St. dev.	Mean	St. dev.
Absence episodes per year	2.18	2.86		
Change of individual absenteeism			0.15	1.97
Change of local absenteeism			0.09	0.94
Dummy for female	0.20	0.40	0.17	0.38
Age	40.39	8.96	38.08	8.33
School years	13.09	3.26	14.01	3.15
Primary school	0.02	0.15	0.01	0.11
Junior high school	0.14	0.35	0.08	0.27
Vocational high school	0.02	0.14	0.01	0.11
High school	0.60	0.49	0.58	0.49
College	0.21	0.41	0.31	0.46
Humanistic field	0.10	0.30	0.10	0.29
Scientific field	0.06	0.24	0.06	0.24
Technical field	0.08	0.28	0.05	0.22
Economics field	0.53	0.50	0.59	0.49
Law field	0.07	0.26	0.10	0.30
No specialization	0.15	0.36	0.09	0.29
Dummy for precompany experience	0.54	0.50	0.48	0.50
Tenure at the bank	16.55	8.90	14.27	8.38
Average hierarchical level	6.40	2.47	6.96	2.78
Local unemployment rate	9.68	5.41	10.50	5.99
Local crime rate	5.33	2.31	5.21	2.30
Local rain precipitation	66.72	16.96	67.08	18.73
Local temperature	14.31	2.47	14.45	2.94
Local hospital beds	6.62	1.27	6.46	1.28
Local doctors	2.12	0.66	2.14	0.71

Statistics for the 53,921 employee-year observations used for the full sample analysis and for the 3,963 movement episodes used for the movers' sample analysis. The source for the local unemployment rate is Istituto Nazionale di Statistica (ISTAT), Le regioni in cifre, various years. The local crime rate has been constructed by Marselli et al. [1998] from ISTAT, Annuario delle Statistiche Giudiziarie, various years. The two meteorological variables have been constructed by the Fondazione ENI Enrico Mattei (FEEM) from ISTAT, Statistiche Meteorologiche, various years and from the Ufficio Centrale di Ecologia Agraria (UCEA) at the Ministero per le Politiche Agricole. The source for the two public health variables is ISTAT, Statistiche della Sanità, various years. The local unemployment rate, crime rate, rain precipitation, and temperature are recorded for each year and each of the twenty administrative regions. The public health variables are recorded for each year and each of the 91 administrative provinces. These latter two variables and the number of crimes are measured per 1000 inhabitants. The rain precipitation is measured as the total yearly quantity in millimeters. The temperature is measured as the yearly average in degrees Celsius.

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APPENDIX 2: DATA FOR THE ANALYSIS OF MISCONDUCTS: 1975–1995

	Full sample		Movers sample	
Variable	Mean	St. dev.	Mean	St. dev.
Indicator of individual misconduct	0.01	0.09		
Change of individual misconduct			0	0.13
Change of local misconduct			0	0.03
Dummy for female	0.16	0.36	0.15	0.36
Age	37.91	9.96	35.76	8.35
School years	12.72	3.42	13.8	3.12
Primary school	0.05	0.21	0.02	0.13
Junior high school	0.14	0.35	0.08	0.28
Vocational high school	0.02	0.15	0.01	0.11
High school	0.60	0.49	0.61	0.49
College	0.18	0.39	0.28	0.45
Humanistic field	0.11	0.32	0.11	0.32
Scientific field	0.06	0.23	0.07	0.25
Technical field	0.10	0.29	0.06	0.23
Economics field	0.49	0.50	0.57	0.50
Law field	0.07	0.26	0.10	0.30
No specialization	0.17	0.38	0.10	0.30
Dummy for precompany experience	0.56	0.50	0.50	0.50
Tenure at the bank	13.96	9.53	12.06	8.34
Average hierarchical level	5.62	2.46	6.39	2.86
Local unemployment rate	8.42	4.45	8.55	4.83
Local crime rate	4.19	1.51	4.40	1.70
Local rain precipitation	71.7	17.6	70.13	14.88
Local temperature	13.59	1.96	13.51	2.07

Statistics for the 373,493 employee-year observations used in the full sample analysis and for the 23,110 movement episodes used for the movers' sample analysis. The source for the local unemployment rate is Istituto Nazionale di Statistica (ISTAT), Le regioni in cifre, various years. The local crime rate has been constructed by Marselli et al. [1998] from ISTAT, Annuario delle Statistiche Giudiziarie, various years. The two meteorological variables have been constructed by the Fondazione ENI Enrico Mattei (FEEM) from ISTAT, Statistiche Meteorologiche, various years and from the Ufficio Centrale di Ecologia Agraria (UCEA) at the Ministero per le Politiche Agricole. The local unemployment rate, crime rate, rain precipitation, and temperature are recorded for each year and each of the twenty administrative regions. The number of crimes is measured per 1000 inhabitants. The rain precipitation is measured as the total yearly quantity in millimeters. The temperature is measured as the yearly average in degrees Celsius.

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REFERENCES

Aaronson, Daniel, "Using Sibling Data to Estimate the Impact of Neighborhoods on Children's Educational Outcomes," *Journal of Human Resources*, XXIII (1998), 915–946.

Balzi, Daniela, Ettore Bidoli, Silvia Franceschi, Stefania Arniani, Paola Pisani, and Marco Geddes, "Stima dell'incidenza e mortalità per tumore nelle Regioni Italiane," Associazione Italiana Registri Tumori, 1997.

Downloaded from http://qje.oxfordjournals.org/ at Princeton University on July 13, 2015

Bertrand, Marianne, Erzo F. P. Luttmer, and Sendhil Mullainathan, "Network Effects and Welfare Cultures," NBER Working Paper No. 6832, 1998.
Cappelli, Peter, and Keith Chauvin, "An Interplant Test of the Efficiency Wage Hypothesis," *Quarterly Journal of Economics*, CVI (1991), 769–787.
Case, Anne, and Lawrence Katz, "The Company You Keep: The Effect of Family and Neighborhood on Disadvantaged Youth," NBER Working Paper No. 3705, 1991.
Crane, Jonathan, "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping out and Teenage Childbearing," *American Journal of Sociology*, XCVI (1991), 1226–1259.
Encinosa, William E., Martin Gaynor, and James B. Rebitzer, "The Sociology of Groups and the Economics of Incentives: Theory and Evidence on Compensation Systems," Case Western Reserve University, 1998.
Erickson, Chris, and Andrea Ichino, "Wage Differentials in Italy: Market Forces, Institutions and Inflation," in *Differences and Changes in the Wage Structure*, Richard Freeman, and Lawrence Katz, eds. (Chicago, IL: NBER and University of Chicago Press, 1994).
Gibbons, Robert, and Lawrence Katz, "Does Unmeasured Ability Explain Inter-Industry Wage Differentials?" *Review of Economic Studies*, LIX (1992), 515–535.
Glaeser, Edward L., Bruce Sacerdote, and Jośe A. Scheinkman, "Crime and Social Interactions," *Quarterly Journal of Economics*, CXI (1996), 507–548.
Hirsch, Barry T., and William J. Hausman, "Labour Productivity in the British and South Wales Coal Industry," *Economica*, L (1983), 145–157.
Ichino, Andrea, and Pietro Ichino, "Discrimination or Individual Effort? Regional Productivity Differentials in a Large Italian Firm," European University Institute Working Paper ECO 98/9, 1998.
Jones, Stephen R. G., "Worker Interdependence and Output: The Hawthorne Studies Reevaluated," *American Sociological Review*, LV (1990), 176–190.
Krueger, Alan, and Lawrence Summers, "Efficiency Wages and the Inter-industry Wage Structure," *Econometrica*, LVI (1988), 259–293.
Leonard, Jonathan S., "Carrots and Sticks: Pay, Supervision and Turnover," *Journal of Labor Economics*, V (1987), 136–153.
Manski, Charles F., "Identification of Endogenous Social Effects: The Reflection Problem," *Review of Economic Studies*, LX (1993), 531–542.
Marselli, Riccardo, Antonio Merlo, and Marco Vannini, "Intervento pubblico, delitto e castigo: un'analisi economica della crescita della criminalità," in *Liberalizzazione dei mercati e privatizzazioni*, Francesco Giavazzi, Alessandro Penati, and Guido Tabellini, eds. (Bologna, Italy: Il Mulino Studi e Richerche, 1998).
Paci, Raffaele, and Andrea Saba, "The Empirics of Regional Economic Growth in Italy, 1951–1993," *Rivista Internazionale di Scienze Economiche e Commerciali*, XLV (1998), 515–542.
Putnam, Robert, *Making Democracy Work. Civic Traditions in Modern Italy* (Princeton, NJ: Princeton University Press, 1993).
Shapiro, Carl, and Joseph Stiglitz, "Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review*, LXXIV (1984), 433–444.
Topa, Giorgio, "Social Interactions, Local Spillovers and Unemployment," Working Paper, New York University, 1997.
Van den Berg, Gerard, Bas Van der Klaauw, and Jan van Ours, "The Effect of Neighborhood Characteristics on the Labor Supply of Welfare Recipients," CentER, Tilburg University, mimeo, 1998.
Whitehead, Thomas N., *The Industrial Worker: A Statistical Study of Human Relations in a Group of Manual Workers* (Cambridge, MA: Harvard University Press, 1938).
Wilson, William J., *The Truly Disadvantaged* (Chicago, IL: The University of Chicago Press, 1987).

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