Socio-Cultural Variables and Economic Success: Evidence from Italian Provinces 1951-1991

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Abstract

Italy makes for an interesting case-study of the impact of socio-cultural variables on economic performance: under a common institutional framework differences in socio-cultural attitudes across Italian provinces correspond to large differences in their economic success. We analyze the effects of social variables on long-run provincial economic performance during Italy's era of economic take-off (1951-1991). Since socio-cultural traits in Italy are deeply rooted in local history and traditions, we argue that their persistence produces an (at least partly) exogenous determinant of economic prosperity. While we find rather weak evidence that civic involvement (Social Capital as defined in Putnam, 1993) fosters economic success, we do find strong evidence that the presence of organized crime (proxied by murder rates at the beginning of the period) is associated with low economic development, even after controlling for other economic and geographic factors.

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1   Introduction

Large and persistent disparities in economic development between regions within the same country often elude economic explanation. While recent growth studies look at institutional (Acemoglu et al., 2004) or geographic (Sachs, 2000) differences to explain income disparities across countries, such differences typically do not exist within a country. Some models (e.g. Krugman, 1991; Krugman and Venables, 1995 and Fujita et al., 1999) may help to explain regional disparities by showing that freer trade promotes self-reinforcing agglomeration economies and virtuous development cycles, thus concentrating economic activity in certain regions. On the other hand, however, we should expect forces such as technological diffusion to promote the development and eventual convergence of backward regions (see for instance Chapter 7 of Baldwin et al., 2003).

Granted that differences in economic development between regions within a country are not as spectacular as cross-country differences, they are nevertheless substantial (particularly in certain countries). *"The European Union is one of the most prosperous economic areas in the world"* is stated at the very beginning of the document on Regional Policies by the European Commission (2004) *"but the disparities between its .. various 250 regions... are striking"*. Italy, in particular, is an interesting example of large and persistent regional disparities. In 1991 income per capita in Agrigento, the poorest province, was one third of the income per capita in Milano, the richest province. This income gap is as large as the difference in income per capita (adjusted for Purchasing Power Parity) between Mexico and Japan or between Argentina and the United States in year 2000.

Socio-cultural factors may play an important role in regional growth. Since these factors change slowly over time, regions better endowed with "good" social characteristics may have a significant and persistent economic advantage over other regions. In particular we consider the degree of civic involvement of citizens (the "social capital" as defined and measured at the regional level by Putnam, 1993) and the presence of violent criminal organizations as relevant social characteristics. Several cross-country analyses include socio-cultural variables as determinants of development (Knack and Keefer, 1997; Coleman, 1988; Temple and Johnson, 1998) and recognize the negative role of violence and crime on economic activity, mainly through their impact on political instability (Alesina and Perotti, 1992; Barro, 1991; Mauro 1993). However, these country-level studies cannot easily distinguish the direct impact of socio-cultural variables on output from their indirect effects through the shaping of general institutions and policies. This paper is a case-study inquiring into the socio-cultural determinants of economic development. We look at the economic development of 95 Italian provinces during the post World War II (1951-1991) era. Three facts make our case-study interesting. First, because Italy was previously comprised of many independent polities right until the end of the nineteenth century, socio-cultural characteristics across present-day Italian provinces vary widely.

Second, in spite of common policies, common institutions and the free mobility of goods within the country, economic performance across provinces during the period 1951-1991 were very different. Third, during the considered period Italy transformed from a largely rural and still developing country to the sixth largest economy in the world. This was the period of Italian economic take off and different provinces took advantage of this opportunity to very different extents. By 1991 Italian GDP per capita reached about 75% of the U.S. level (beginning in 1951 at around 25%) and since then has changed relatively little. Understanding the transitional growth during these forty years is key to understanding the relative current prosperity of Italian provinces.

Measuring economic activity at the provincial level is not a trivial task. In our study we mostly use employment rates and employment growth as indices of economic activity. Employment data are accurate, available for a long time period and come with great sectorial detail. Previous influential studies (such as Gleaser et al., 1992 and Henderson et al., 1995) argue that, because of labor mobility, productivity differences across localities within a country translate into different employment densities and, in transition, into different employment growth rates. We argue that this scenario applies to Italy which, although had low labor mobility after 1970, also had unionized labor and common wage-setting procedures. We discuss several models that imply a positive relation, in equilibrium, between employment rates and productivity (we spell out the formal assumptions of these models in Appendix A). To further validate our use of employment rates as a measure of economic activity we calculate the correlation between employment rates and value added per capita across provinces for the period (1971-1991) for which data is available. That correlation is positive and very large.

In our empirical analysis we also control for two sets of factors which are potential candidates to explain differences in long-run economic performance. The first set includes agglomeration-urbanization economies at the beginning of the period, such as the initial concentration of industries, the initial degree of industrial diversity, and the initial degree of competition. The second set includes the purely geographical characteristics of a province, such as its coastal position, its distance from the European core and its location within the country. Our main finding is that the presence of organized crime, as measured by murder rates, had a significantly negative effect on economic activity. This effect remains robust with the inclusion of our economic and geographic controls and with the use of predetermined measures of murder rates (which should reduce any potential endogeneity bias). The effect of civic spirit, on the other hand, is weakly positive but not robustly significant across specifications. We consider our finding compatible with the idea that the presence of historically rooted criminal organizations, imperfectly measured by provincial murder rates, was a major hurdle to economic success in some Italian provinces.

The rest of the paper is organized as follows. Section 2 presents the empirical model and provides justifications for using employment growth as our measure

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of economic activity. Section 3 presents and discusses the social variables, their measurement and the assumptions made to identify their impact on long-run economic success. Section 4 presents some preliminary correlations between our cross-sectional measures of social variables and economic performance. Section 5 performs the econometric analysis using data both at the industry-specific provincial level and the aggregate provincial level. Section 6 concludes the paper.

2   The Empirical Model

In our empirical investigation of the Italian provinces (indexed by $i = 1, ...95$) we rely on a key relationship between equilibrium employment rate[1], e_i, and labor productivity, a_i, that can be written in a general logarithmic form as:

$$\ln e_i = f(X_i, \ln a_i(S_i)) \qquad (1)$$
$$+$$

where function f is a monotonically increasing function of the variable $\ln a_i(S_i)$ (as indicated by the plus sign below the variable). The term a_i represents the productivity of the first unit of labor (simply called "labor productivity" from now on) in province i and depends on total factor productivity, A_i, and on the capital stock K_i. The term X_i captures other variables affecting the employment rate in province i. By notating labor productivity as $a_i(S_i)$ we stress that social variables, S_i, indirectly shape a_i by directly affecting A_i and K_i. We leave the discussion of the channels through which social variables affect total factor productivity and capital accumulation to the next section. Here we justify as reasonable the property that employment rates are positively related to labor productivity across provinces. This property allows us to use employment rates and employment growth rates as proxies for levels and growth rates of labor productivity.

Two very broad classes of models produce a positive relationship between employment (rates) and labor productivity across provinces. The first class includes those models in which labor demand is downward sloping and sensitive to province-specific labor productivity, while labor supply is horizontal and common across provinces. The second class of models are those in which a downward sloping labor demand is more sensitive to province-specific labor productivity than the upward sloping labor supply.

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[1]The employment rate is defined as the number of employed people divided by the total working age population.

Figure 1

Panel A: Downward Sloping Labor Demand and Horizontal Labor Supply

Low Productivity Province **High Productivity Province**
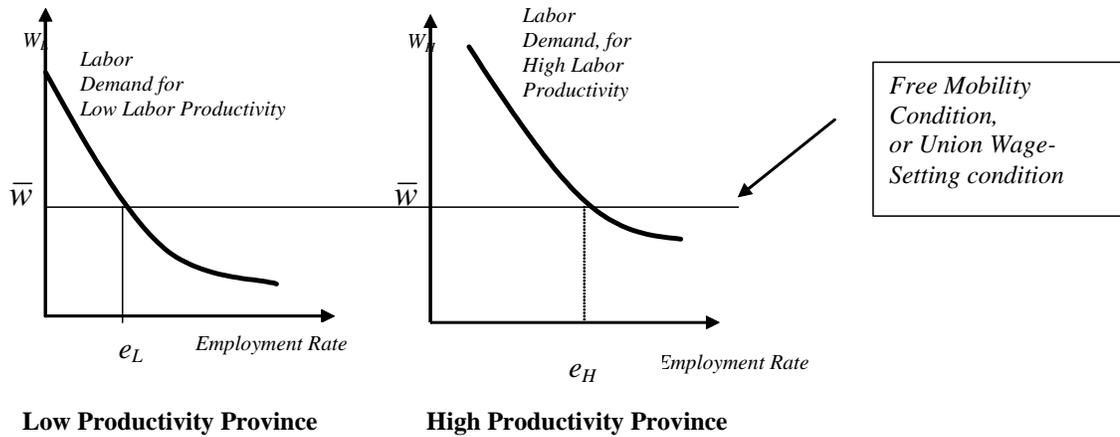
Panel B: Downward sloping Labor Demand (Job-Creation) and upward Sloping Labor Supply (Wage-Setting)

**Low Productivity Province** **High Productivity Province**
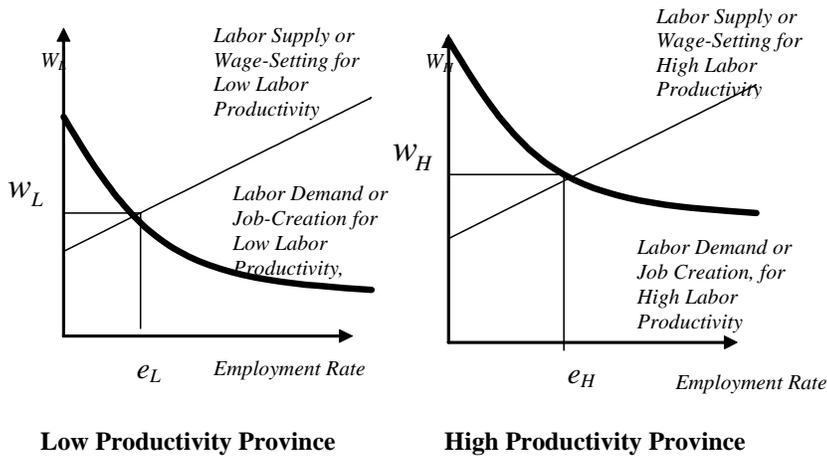
Figure 1 summarizes the equilibria for these two classes of models. Panel A illustrates the equilibrium for two provinces within the first class of models. Panel

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B presents the equilibrium within the second class. In panel A higher labor productivity in province H (right diagram) relative to province L (left diagram) implies a higher labor demand and, provided that the non-employed cannot migrate across provinces, higher employment rates ($e_H > e_L$). Any labor demand curve based on price-taking competitive firms and decreasing marginal productivity of labor has the features required above. Details on the derivation of such a demand curve are provided in Appendix A. The horizontal labor supply condition illustrated in Panel A may arise from two different scenarios. If workers are mobile they will equalize their wages across provinces. A free mobility condition would therefore imply $w_i = \overline{w}$ where $\overline{w}$ is the average national wage. This case is analyzed in Appendix A.2. An alternative scenario that would deliver a common horizontal supply curve is one with no mobility of workers, but where a national union bargains and sets the same wage across provinces. Firms then can only decide how many workers to hire at that wage. Such a centralized wage-setting scheme is appropriate to describe the Italian labor markets during the seventies, a period of low worker mobility and potent union power. More details on this model are provided in Appendix A.3. Alternatively, Panel B illustrates a model with classic labor supply curve, based on labor-leisure choices arising from individual preferences, and the standard labor demand curve based on province-specific labor productivity. This constitutes an example of the second class of models which would also justify equation 1.

Perhaps most interestingly, we describe in Appendix A.4 a search model of bilateral bargaining between firms and workers. Such a model substantially departs from the classic framework but still implies the relationship in (1). In this framework there is no aggregate labor demand or supply, as non-employed workers look for jobs and firms look to fill vacancies in a de-centralized fashion. We can, however, still represent the condition of job-creation by firms as a negative relationship between wages and employment rates. A rising employment rate implies a "tighter" labor market: as it becomes more costly to search for a new worker, firms reduce the wages they are willing to pay to recoup such costs. Moreover, higher productivity makes firms willing to create jobs for higher wages so that the job-creating condition shifts one-for-one with labor productivity. On the workers' side we can summarize their search and bargaining process using a wage-setting equation. While workers wish to appropriate the surplus created by the match with a firm, the bargaining power of the firms prevent them from appropriating the entire surplus. Therefore the wage setting condition depends on labor productivity, but less than one-for-one. Panel B shows that the wage setting and job creation curves are higher in province H than in province L, since H enjoys a higher productivity level. However, due to the greater sensitivity of the labor-creation curve to province productivity, the equilibrium wage and employment rate are both higher in province H than in province L.

Equation (1) can be seen as a reduced form relationship arising from a large group of models. Assuming that provinces are converging to the their steady state

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employment rate, the growth rate of employed labor, $\ln(L_{i,t+1}/L_{i,t})$, once we control for the growth rate of the population of working age, $\ln(Pop_{i,t+1}/Pop_{i,t})$, should depend negatively on the initial employment rate, $\ln e_{i,t}$ and positively on the steady state employment rate which, according to (1), depends positively on $\ln a_i(S_i)$ and on X_{it}. Therefore the reduced-form equation that we estimate is:

$$\ln(L_{i,t+1}/L_{i,t}) = b_0 + b_1 \ln e_{i,t} + b_2 \ln(Pop_{i,t+1}/Pop_{i,t}) + b_3 \ln a_i(S_{i,t}) + b_4 X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $b_0 - b_4$ are parameters and $\varepsilon_{i,t}$ is a zero mean i.i.d. random noise. In our empirical implementation we measure L as total employment in the private sector. This is a better proxy for productivity than total employment. During the period 1951-1991, in fact, the central government created public jobs in poor provinces as a form of inter-regional transfers. Far from mirroring local productivity, creation of public jobs was often the result of political decisions. Including those jobs would heavily distort the correlation between productivity and employment.

Finally we should be aware of another, very different, channel that could result in the correlation between social variables and employment rates. If areas with poor social characteristics are those in which the "underground" economy is larger, then official statistics on employment may underestimate the actual employment rates. This effect would induce the measured correlation between employment rates and social variables even without any effect on productivity. The underground economy, however, does not contribute to the tax base and is sometimes involved in illegal activities so that it is not clear, from our perspective, that we should include it as part of "economic development" of a province. Reducing the employment rate in the "official" economy could be "per se" the disruptive effect of poor social variables. We argue in the empirical section that while the size of the hidden economy may be large and hard to quantify, the census data (as opposed to labor force surveys or national accounts) should be the most accurate in covering the "grey" area of the Italian economy minimizing the impact of the underground economy on labor statistics. We discuss this issue further in Section 4.

3   Social Variables and Productivity

3.1   Identifying Assumptions

We analyze the effects of two social variables on economic activity. The first is closely related to the idea of "social capital" defined in Putnam (1993) and can be called "civic involvement." Participation in local networks, involvement in local organizations and the general degree of commitment and civic "awareness" among citizens all constitute imperfect measures of this variable. The second variable captures the presence of violent organized crime (associated with the nefarious activities of the Mafia or similar organizations) as proxied by provincial murder rates. These two

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variables may affect productivity through two distinct and complementary channels. First, low social capital and high crime imply that some resources must be spent (wasted) to insure and appropriate the returns on investments (by monitoring or protecting investment projects). This would effectively act as a tax $\tau(S_i)$ on returns to physical capital, and would result in lower capital accumulation and thus lower stock of capital. Such tax is higher for regions with low S_i (i.e. with low civic involvement and/or high organized crime) so that $\partial\tau/\partial S_i < 0$. This channel is emphasized in the recent analysis of Guiso et al. (2004) that focuses on social capital and financial markets in Italy. Second, a better social environment may facilitate learning interactions outside of firms, hence inducing urbanization and agglomeration economies external to the firm but internal to the province. In particular Marshallian externalities from "local knowledge spillovers" may grow stronger when agents interact frequently in a more trusting local environment. This mechanism would increase total factor productivity as a function of social capital, so that $\partial A/\partial S_i > 0$. The working of these two channels is illustrated more formally in Appendix A. Labor productivity a_i is, therefore, a function of total factor productivity and capital accumulation so that $a_i = a_i(A(S_i), 1 - \tau(S_i))$ and ultimately $a_i = a_i(S_i)$. While we cannot distinguish between the two channels here we need only identify the total effect of S_i on labor productivity proxied by employment rates.

It is important to note that social variables can change in response to economic development. That is, the economic success of a province may contribute to low crime rates and high civic involvement. We are well aware of this potential endogeneity problem which would tend to upwardly bias our estimated effects of social variables on economic performances, and thus we exercise caution in interpreting the correlations obtained by estimating (2). Our empirical analysis relies on two strategies and certain features of the data that should limit the severity of such a bias. First, while social variables may be endogenous to the process of economic development, they seem to change slowly over time. Staying within our limited time-frame should mitigate the potential "feedback" of economic success shaping social variables. Putnam (1993) discusses (pages 148-152) how measures of civic spirit across regions for the period 1860-1920 (captured by membership in mutual aid societies, cooperatives and mass parties) are highly correlated to recent measures of civic spirit (the correlation coefficient is found to be 0.92). Furthermore, studies on death rates in the late 1800's in Italian regions (such as ISTAT, 1958) show Sicilia, Calabria and Campania leading the list for murder rates just as they did in 1991. Second, we use predetermined values for the social variables whenever possible (i.e. we measure them at the beginning of the period or earlier) in analyzing their effects on growth rates. Third, in section 5.1 we use employment growth at the sectorial-provincial level as the dependent variable. As employment changes within a sector are likely too small to affect significantly the social characteristics of an entire province this choice should further reduce the endogeneity problem. None of these remedies alone can solve the endogeneity problem. However, the consis-

tent and robust finding of a strong negative effect of criminal activity on growth in each and every specification is compatible with the interpretation that the long-established presence of organized crime in some provinces acted as a major hurdle to economic development.

3.2   Civic Involvement

Much qualitative literature on the economic success of industrial districts in Italy has analyzed concepts of social cooperation and social networks at the local level (see for instance Brusco, 1982; Leonardi and Nanetti, 1990 and 1994). Becattini (1987) emphasizes the role of local networks along with specialization and local competition as determinants of the success of the Italian industrial districts. More recently Forni and Paba (2000) analyze the effect of industrial and social variables on productivity growth in Italian provinces, finding an important role for some of these such as labor conflict and electoral participation.

We analyze whether past economic success in Italian provinces has depended upon civic involvement of its citizenry. The variables used to measure civic involvement are similar to those proposed by Putnam (1993) but here we exploit further the local and diversified socio-cultural traditions in Italy by collecting data at a lower aggregation level. Historically determined local identities in Italy are often centered in cities rather than regions, and thus the extent of civic interactions and involvement is probably better captured at the provincial level. Therefore, we use 95 provinces, corresponding (mostly) to one main city and its surroundings. Three variables are used to identify civic involvement, all of which have been collected by updating the sources of Putnam's data (details on the data are contained in Appendix B and C). First, we measure the density of associations relative to the population (i.e. the number of associations per 1,000 inhabitants) as counted by a census of all Italian associations in the early eighties. This variable ($AssociationDensity$) captures the propensity of citizens to gather in recreational, cultural, artistic, sport, environmental or any other kind of non-profit association. Second, we measure the electoral turnout of the referendum on the legalization of divorce, held in 1974 ($Turnout74$). This referendum sparked a heated debate among the Italian citizenry, and galvanized its more civic-minded members to the polls. Hence the resulting cross-province differences in voter turnout offer us another proxy to disparities in the degree of civic involvement. Finally, Putnam (1993) notes that a society inclined to read newspapers regularly tends, naturally, to be civically involved and socially aware. Thus, our final proxy for civic involvement is the share of citizenry that read non-sport newspapers for year 1974 ($Newspaper$), the earliest year for which these figures are available. Of course, each of these three indicators is an imperfect proxy for the unobservable variable "Civic Involvement". To maximize their explanatory power we combine them into the index $CIVIC$, which is the first principal component of the three variables and captures most of their common variance.

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3.3   Violent Crime

Economists have studied the determinants and consequences of crime since the early work of Gary Becker (1968). Most empirical work in this area has focused on the socio-economic determinants of crime, (see Gould et al., 2000; Grogger, 1998; Lederman et al., 2002; Lochner and Moretti, 2004; Machin and Meghir, 2001). Recent theoretical work posits that an individual's choice to either commit a crime or do something productive is simultaneously determined with everyone else's choice (Murphy et al., 1993; Sah, 1991). Specifically, the presence of criminals introduces a negative externality on productive people (as they are more easily victimized) and a positive externality on other criminals (as they are less likely to be caught). This mechanism may induce multiple equilibria in which economies with similar fundamentals end up with very different levels of crime. Thus, in this context, it does not make sense to ask whether criminal activity affects or is affected by productivity, as the two are simultaneously determined. This explanation is often invoked in order to account for the large variation of crime rates over time and across localities (mainly in the U.S.) with similar economic conditions (e.g. Glaeser, Sacerdote and Scheinkman, 1996).

In our work, however, we find that murder rates across Italian provinces have been quite stable over time, particularly at the "high end" of the distribution. Part of the reason for this is that high murder rates have largely been the expression of powerful criminal organizations, such as the Mafia and Camorra, historically rooted and geographically grounded. We focus only on the most extreme form of violent crime, namely the murder rate per 10,000 inhabitants (*Murder*). This measure captures the maximally disruptive aspect of violent crime on economic activity perpetrated by established criminal organizations. While criminal organizations generate a whole array of illegal activities, most of them are hard to measure precisely because of the systematic tendency to under-report misdeeds in high-crime areas. In a recent study Soares (2004) compares victimization surveys and official statistics and finds that the extent of under-reporting crimes such as thefts, burglaries and assault crimes in less developed countries is up to ten times larger than in more developed ones. He finds, though, no significant under-reporting for homicides, primarily because once the "violent" cause of death is ascertained, the judiciary authority is automatically notified.

We use criminal statistics and statistics on "causes of death" to measure the murder rates in 1991, 1971 and 1951. The correlation coefficients of murder rates across decades are high (0.61 between 1990 and 1970 and 0.72 between 1950 and 1970). Some provinces such as Palermo, Caltanissetta, Catania (in Sicily), Napoli and Reggio Calabria (in the South) are consistently among those with both the highest murder rates and the strongest known presence of organized crime. Moreover murder rates vary substantially across provinces. For instance in 1991 many provinces experienced less than one murder per million inhabitants while other provinces had more than 20 murders per million. We should emphasize again that murder rates are

interpreted in this article as an imperfect index capturing the presence of powerful criminal organizations rather than as a generic index of desultory violence.

4 Economic Success and Social Variables: Preliminary Evidence

We first establish some correlations between social variables and economic performance across 95 Italian Provinces. Summary statistics and extreme values for all the variables used in the article are reported in Table 1.

Table 1:
Summary Statistics and Extreme Values for the Data

Unit of Observation: Province	Average	Standard Deviation	Min.	Max.
Annual growth rate of private employment: 1951-1991	2.0%	0.8%	-0.1%	+4.0%
Annual growth rate of private employment: 1951-1971	2.4%	1.1%	0.2%	5.8%
Annual growth rate of private employment: 1971-1991	1.7%	0.9%	-0.5%	3.8%
Annual growth rate of income per capita: 1971-1991	2.4%	0.6%	0.7%	4.4%
Employment rate, 1991	0.36	0.13	0.16	0.75
Income per capita, 1991 (Thousands of Lire)	15,530	3,810	8,800	26,000
Murder1991, (Homicides per 10,000 persons)	0.03	0.04	0.00	0.34
Murder1971 , (Homicides per 10,000 persons)	0.06	0.06	0.00	0.45
Murder 1951, (Homicides per 10,000 persons)	0.14	0.11	0.07	0.48
CIVIC	0	1	-2.2	2.6
Share with Secondary Education, 1991	0.34	0.03	0.17	0.44
Share with Tertiary Education , 1991	0.07	0.03	0.03	0.29
Turnout74 (Turnout at the 1974 Referendum)	87%	7%	67%	96%
Association Density (Association per 1,000 persons, 1981)	0.21	0.18	0.03	1.57
Newspaper (share of people reading newspapers, 1974)	0.64	0.11	0.35	0.80
Distance from Bruxelles (Thousands Kilometers)	1.093	0.363	0.61	2.143
Unit of Observation: Province –Industry	Average	Standard Deviation	Min.	Max.
Annual growth rate of employment: 1951-1991	0.5%	2.9%	-16%	+8%
Concentration	0.1	0.9	0.01	0.70
Diversity.	0.8	0.06	0.44	0.94
Competition	1.7	1.8	0.02	13
Share of Manufacturing	0.41	0.11	0.18	0.71

Notes:
The Sources and Exact Definition of the Variables are in the Text and in the Appendices.

We consider the cross-section of Italian provinces for 1991 to illustrate the large variation in economic performance and socio-cultural indicators. We focus on employment rates in the private sector as a proxy for economic activity although, since data on provincial gross income per capita is also available for the year 1991, we analyze this more direct indicator of productivity as well. Employment rates are calculated as the number of employees working in the industry and service sectors (excluding public employees) divided by the working age population (ages 16-64)

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for each province. The source of employment and population data is the Census of Industry and Services conducted by ISTAT every ten years (further details are reported in the Appendix). As remarked in section 2 official statistics on employment may be affected by the presence of the underground economy, which is likely to be larger in provinces where crime is larger. Census data, however, are certainly the most reliable in this respect. Census officials compile the complete list of establishments to be surveyed based on income reports, registry of commercial enterprises as well as non-household utility bills and previous sectorial studies. Therefore, as long as there is a physical location of production that is not also a family residence, the establishment should be included in the Census. It is unlikely that some productive activity is completely missed unless it operates in family residences. Income per capita is calculated as the value added produced in the province, expressed in thousands of Italian Liras, divided by total population. The source of income data is Istituto Tagliacarne (2004). These data are compiled based on national accounts and surveys so that their source is completely different from Census data. Their measurement error due to the presence of the underground economy should be very different from that contained in employment data. The use of two independent sources, given that results obtained using either employment or income data are similar, makes us believe that "mismeasurement" due to the underground economy, while certainly present, is not driving our results. Finally available estimates for Italy as a whole reveal that the sector in which the underground economy is largest, accounting for about 33% of all underground economy, is agriculture. Our study does not consider agricultural jobs and so avoids this part of the problem[2].

We observe remarkable variation in both income per capita and employment rates across provinces. The richest province (Milano) had an income per capita three times larger than the poorest (Agrigento) in 1991. Similarly, private employment rates spanned a range from as low as 0.16 (Agrigento) to as high as 0.75 (Forli'). Correlation between employment rates and log of per capita income across provinces was as high as 0.81. A simple OLS regression reveals that 65% of the variance in log GDP per capita can be explained by the variance of employment rates. These two measures, therefore, seem to capture the same underlying phenomenon of provincial economic development. This becomes even more evident when we look at Figures 2 and 3.

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[2]We are not able to pursue the issue of the underground economy much further. While some studies have produced approximate estimates of the size of the underground economy for Italy as a whole (ISTAT, 2000)or for macro-regions (Censis, 2003) no estimate of its incidence exist by region or by province.

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Figure 2:
Violent Crime and Economic Success, Italian Provinces 1991

Panel A: Violent Crime and Private employment rate

Panel B: Violent Crime and GDP per capita
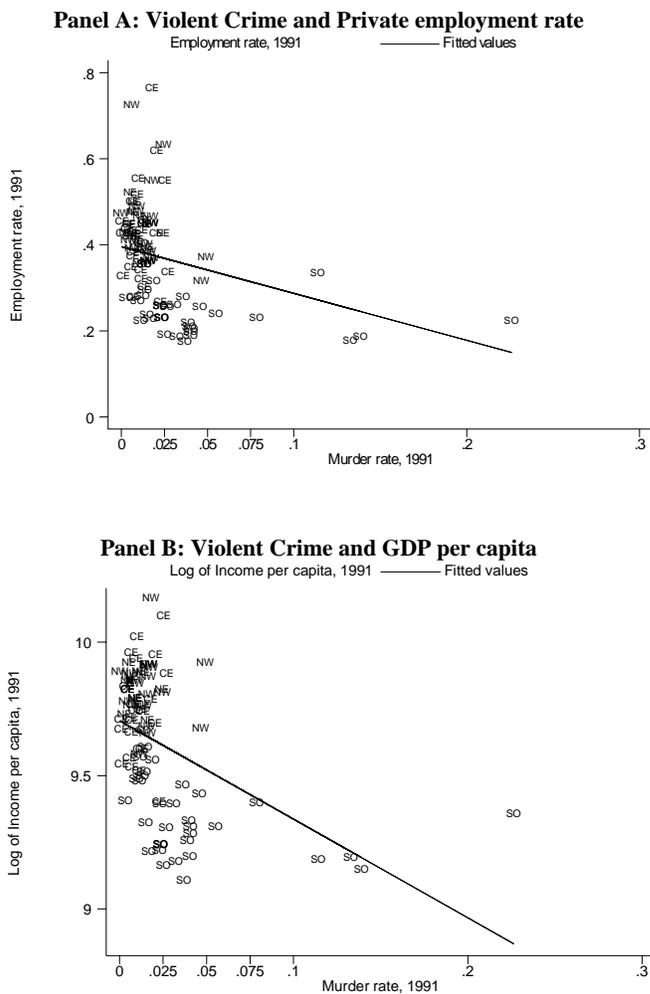
Figure 2, Panel A plots the employment rate in the private sector against the murder rate (murders per 10,000 inhabitants) for Italian provinces in the year 1991. Panel B of the same figure plots the logarithm of income per capita against the murder rate. Each province is denoted with an identifier which can equal "SO" (South), "CE" (Center), "NE" (North-East) or "NW" (North West) depending on the location of the province. The two figures show strikingly similar patterns, confirming the idea that employment rates and income per capita are highly correlated indicators of the economic performance of a province.

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Three other facts can also be learned from inspection of Figure 2. First, a large negative and statistically significant correlation exists between murder rates and employment rates (or log income per capita). The OLS regression lines reported on the graphs have coefficients equal to -1.62 (standard error 0.42) in Panel A and -3.72 (standard error 1.07) in Panel B. The variance of murder rates explain 18% of the variance of the employment rates and 20% of the variance of income per capita. A murder rate lower by one murder in 100,000 people is associated with a 16 percentage points higher employment rate and a 37 percentage points higher income per capita. Second, the association between murder rates and employment rates appears to be non-linear. While low levels of murder rates (say below 0.5 murders per 10,000 people) are associated with a wide range of possible employment rates (and incomes per capita), high murder rates (above 0.5) are systematically associated with low employment rates (and incomes per capita). This feature of the data reinforces our interpretation that murder rates above a certain threshold reveal the presence of organized crime detrimental to economic activity. On the other hand, small differences at low murder rate levels may simply reflect random domestic or personal violence unrelated to economic variables. We will consider more systematically the possibility of a non-linear relationship between murder rates and economic success in our empirical analysis. Finally, looking at the area identifiers, we discover large variations in crime rates and economic performances even within each of the four areas. The South, for instance, is not a homogeneously high crime area, with murder rates varying markedly across provinces while still demonstrating a significantly negative correlation with employment rates and per capita incomes. Considering the South alone, the OLS regression coefficients on crime rates are -0.35 (std. error 0.16) for employment rates and -1.20 with (std. error 0.60) for incomes per capita.

Figure 3 shows the correlation between our second variable of interest (civic involvement) and economic performance as captured by employment rates (Panel A) and logged incomes per capita (Panel B).

Figure 3:
Civic Involvement and Economic Success, Italian Provinces 1991

Panel A: Civic Involvement and Private Employment

Panel B: Civic Involvement and GDP per Capita
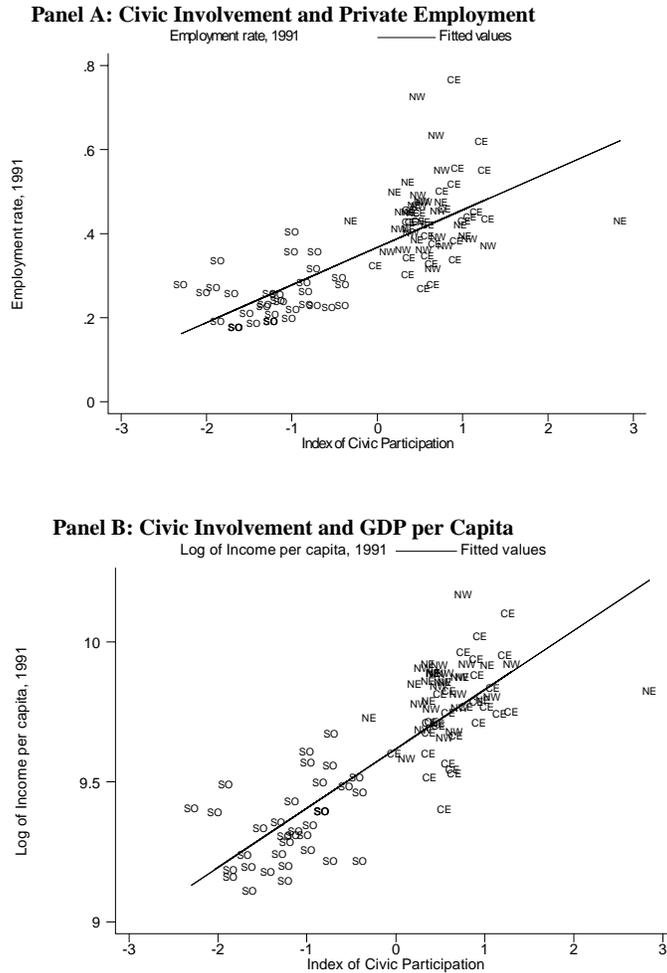
The index of civic participation ($CIVIC$) is the first principal component of the three variables $AssociationDensity$, $Turnout74$ and $Newspaper$ defined in section 3.2. The first principal component is the linear combination that explains the largest share of common variance of the three variables. The index "$CIVIC$" is defined as:

$$CIVIC = 0.89(Turnout74) + 0.88(Newspaper) + 0.63(AssociationDensity) \quad (3)$$

For convenience we standardize $CIVIC$ to have a zero mean and standard deviation of one. The variable $CIVIC$ explains 44% of the variance of $AssociationDensity$,

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65% of the variance of *Newspaper* and 70% of the variance of *Turnout*74. Figure 3 illustrates the remarkable positive correlations between *CIVIC* and measures of economic performance, with very similar effects on employment rates and incomes per capita. The coefficient of the OLS regression line is 0.08 (std. error 0.01) in Panel A and 0.21 (std. error 0.02) in Panel B. The *CIVIC* index explains almost 50% of the variation in private employment rates and 67% of the variation in per capita incomes. However, a cursory look at Figure 3 makes clear that all southern provinces (denoted "SO") have both low *CIVIC* indices and low employment rates/income per capita relative to all other provinces. In fact we observe that most of the correlation is driven by the sharp divide between the South and the Center-North. If we consider southern provinces only, the OLS coefficient on the index *CIVIC* falls to statistically insignificant values of 0.02 (std. error 0.02) for employment rates and 0.12 (std. error 0.07) for logged incomes per capita.

In Table 2 we present some preliminary results that illustrate the robustness of these partial correlations between social variables and economic performance to certain controls. Specification 1 in Table 2 shows the least-squares coefficients of employment rates in 1991 regressed on social variables (*Murder*1991 and *CIVIC*), the share of the population with a secondary school degree (*Secondary*), the share with a higher education degree (*Tertiary*) and macro-area dummies for the North-East, North-West and Center (leaving out the South dummy). Specification 2 explicitly includes the three variables *Turnout*74, *AssociationDensity* and *Newspaper* entered separately rather than combined within the index *CIVIC*. Specification 3 runs the same regression as specification 1, but replacing employment rates with 1991 per capita incomes for the dependent variable. The coefficient on *Murder*1991 is significant at the 5% confidence level in each specification. Its magnitude implies a 4 percentage points increase in the employment rate and a 7 percentage points increase in income per capita for a decrease in crime rate by one murder per 100,000 people. The coefficient on *CIVIC* implies a much smaller effect significant at the 5% confidence level on income per capita, and an effect on employment rates only significant at 10% confidence level. When we include the three proxies for civic participation separately only the percentage turnout at 1974 referendum (*Turnout*74) enters with a significant positive sign, while the other two variables enter insignificantly. This is a first warning that the effect of civic involvement on economic performance is not particularly robust, and the choice of the proxy variable or other included controls may affect the strength of the results.

Table 2
Economic Indicators and Social Variables, 95 Italian Provinces, year 1991

Specification	*1*	*2*	*3*	*4*	*5*
Dependent Variable	**Private Employment Rate, 1991**	**Private Employment Rate, 1991**	**Natural Logarithm of per-capita income, 1991**	**Private Employment Rate, 1991**	**Natural Logarithm of per-capita income, 1991**
Method of Estimation	**Ordinary Least Squares**			**Two Stage Least Squares**	
Murder1991	-0.44**	-0.39**	-0.71**	-1.29*	-3.22**
	(0.20)	(0.20)	(0.21)	(0.74)	(1.61)
CIVIC	0.033*		0.11*	0.031*	0.14**
	(0.017)		(0.04)	(0.019)	(0.03)
Secondary	0.12	0.23	0.65**	0.13	0.56
	(0.41)	(0.40)	(0.31)	(0.39)	(0.53)
Tertiary	0.41*	0.33	1.05**	0.58	0.92**
	(0.23)	(0.20)	(0.40)	(0.44)	(0.40)
Turnout74		0.005**			
		(0.001)			
Association Density		0.05			
		(0.05)			
Newspaper		0.008			
		(0.01)			
Macro-Region Dummies	Yes	Yes	Yes	Yes	Yes
R^2	0.59	0.61	0.80	0.55	0.50
Observations (Provinces)	95	95	95	95	95
Instrument				*Murder1951*	*Murder1951*
Partial R^2 of first stage Estimation				0.10	0.10

Notes:
Dependent Variable in Specification 1, 2 and 4 is Private Sector Employment Rate in 1991 calculated as number of Employees in the private sector of the economy relative to the population 16-64 years of age.
Dependent Variable in Specification 3 and 5, is the natural logarithm of per capita value added in 1991.
Heteroskedasticity Robust Standard Errors are reported in parentheses.
** =significant at 5%, *= significant at 10%.
Murder 1991: Murders per 10,000 inhabitants in year 1991.
Murder 1951: Murders per 10,000 inhabitants in year 1951, data are available at the regional level only.
CIVIC: First principal component of the variables Turnout74, Association Density, Newspaper. The equation defining CIVIC is (3) in the text.
Secondary: Share of the population with a secondary school degree, year 1991
Tertiary: Share of the population with a tertiary degree (College), year 1991
Macro-Region Dummies: Three dummies corresponding to North-East, North-West, and Center of the Country (dummy South is omitted)
Turnout74: Percentage of participants to the Referendum on Divorce Law, in 1974
Association Density: Number of association per 1,000 people, 1981
Newspaper: Percentage of people reading non-sport newspaper, 1974

From Italian historical statistics on crime we are able to measure murder rates in regions (rather than provinces) in 1951, which we denote $Murder1951$. In specifications 4 and 5 we use $Murder1951$ as an instrument for $Murder1991$ in order to isolate the presence of violent crime that existed before the period of rapid economic growth. The variable $Murder1951$ has correlation of 0.56 with $Murder1991$; however, once we control for the other regressors the partial R^2 of the first stage regression (reported in the last row of Table 2) is only 0.10. This may raise some worries of weak instrument bias in the 2SLS estimator. We therefore perform, as a check, the Limited Information Maximum Likelihood (LIML) estimation and the

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Fuller-Modified LIML estimation[3] to produce estimates more robust to weak instrument bias. In so doing we find the coefficient estimates on the variable $Murder1991$ (not reported) quite close to the 2SLS estimates. The 2SLS estimates of the effect of murder rates on employment rates and incomes per capita are larger in absolute value than the OLS estimates. This suggests that the positive effect found using OLS estimates is not driven by reverse causality (which would upwardly bias the absolute value of OLS estimates). While standard errors of the 2SLS coefficient on $Murder1991$ are larger, due to instrument weakness, the estimates remain significant at the 10% confidence level in specification 4 and at the 5% level in specification 5. $Murder1951$ is likely a better measure for detecting the presence of organized crime across provinces than its more recent equivalent $Murder1991$. Italian criminal organizations have historical roots dating back to the nineteenth century (as discussed in LoSchiavo, 1962) and criminal organizations no doubt accounted for the larger share of murders in pre-industrial society while occasional urban violence might have increased in the period of economic development. Thus the greater measurement error in $Murder1991$ as a proxy for organized crime compared with $Murder1951$ may help explain the downward bias of our OLS estimates.

5   Local Characteristics and Growth

A large part of the economic success (or failure) of an Italian province in 1991 can be accounted for by the growth (or stagnation) occurred in the decades following the Second World War. Industrial and general economic take-off within a province often relied on the existence of a dynamic center which could attract footloose firms and generate rising employment. It is therefore very instructive to also focus on the productivity and growth of manufacturing industries. Moreover, by analyzing single industries across provinces, we can control for an entire group of sector-specific determinants of growth and further reduce potential issues of endogeneity and omitted variables.

In section 5.1 we estimate the following equation:

$$\ln(L_{i,j,t}/L_{i,j,0}) = b_0 D_j + b_1 \ln(L_{i,0}) + b_2 \ln(Pop_{i,t}/Pop_{i,0}) + b_3(Social_{i,0}) +$$
$$b_4(Agglomeration_{i,j,0}) + b_5(Geography_{i,0}) + \varepsilon_{i,j} \tag{4}$$

The dependent variable is the growth rate of private employment in sector j in province i between periods 0 (either 1951 or 1971) and t (1991). Our data on employment comes from the Italian Census of Manufacturing and Services performed every ten years. The fifteen manufacturing industries for which we can reconstruct comparable data between 1951 and 1991 (listed in the Appendix B) for 95 provinces grant us 1,425 potential observations. However, as growth rates of very small sectors

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[3]See Stock et al. (2002) and Hahn and Hausman (2002).

are often very noisy, we only include those industries which accounted for at least 1% of the manufacturing employment of a province in 1951. This leaves us with 921 observations. D_j is a sector fixed-effect, and captures the change in employment arising from common factors such as national wages and sector-specific technologies. $ln(L_{i0})$ is the total manufacturing employment in province i at the beginning of the period: this controls for the initial size of the province. The term $\ln(Pop_{i,t}/Pop_{i,0})$ controls for population growth in province i.

The term $Social_{i0}$ represents the set of social variables in province i, measured, whenever possible, at the beginning of the period. As discussed above it includes the variable $Murder_{i0}$ and $CIVIC_{i0}$. The term $Agglomeration_{ij0}$ represents a set of measures capturing some important determinants of agglomeration and urbanization economies for sector j in province i at the beginning of the period. We include in this term the index $Concentration_{ji0}$, a measure of the relative employment concentration of sector j in province i, calculated as $ln(L_{ji0}/L_{i0})$. The coefficient on this term, as emphasized in Combes (2000), identifies the strength of the Marshall-Arrow-Romer (MAR) externalities, net of within sector congestion effects. A positive effect of the concentration variable is a sign that the growth of a sector benefits from its initial relative size, implying that learning externalities within the sector encourage growth. A negative sign implies that sector congestion effects outweigh MAR externalities. The second index included among the agglomeration variables is $Diversity_{ji0}$ which measures diversity in the manufacturing sector. It is calculated as $1 - \sum_{(k \neq j)}(sh_{ki0})^2$, where sh_{ki0} is the share of manufacturing workers of province i employed in sector k. The index, sometimes called the "index of fractionalization", captures the degree of sectorial diversity within province i that is faced by industry j. Its value is bounded between 0 and 1 with higher values corresponding to higher diversity. Intuitively, diversity of the manufacturing composition may promote urbanization externalities from beneficial interactions among different industries. The effects of diversity on productivity are often called "Jacobs Externality" since Jane Jacobs (1969) and (1985) identified the crucial role of diversity and of cross-fertilization of ideas in the emergence of cities as economic and social engine of development. Finally we include as an agglomeration factor the variable $Competition_{j,i,0}$ which measures the initial degree of local competition among the firms of industry j in province i. The index is calculated as the inverse of the employment size of a firm in province i and sector j relative to the inverse of average firms's size at the national level for sector j. The smaller is the size of the average firm in province i and sector j the larger is the variable $Competition_{j,i,0}$. While the average firm's size may not be a perfect measure of competition it surely offers a reasonable approximation, and has been used in studies such as Glaeser et al. (1992). Intuitively, local competition may promote product and process innovation and thereby constitute another important source of agglomeration externalities. The work of Porter (1990) has developed, through several case-studies, the idea that local competition can generate higher intensities of innovation and techno-

logical spillovers within a local industry. Finally we include some purely geographic controls ($Geography_{i,0}$) in equation (4). At the industrial-provincial level (section 5.1) we include 20 regional dummies that fully control for geographical locations within Italy while at the aggregate-provincial level (section 5.2) we include macro-area dummies, distances from the EU core and coastal locations. The summary statistics for all these variables can be found in Table 1.

5.1 Agglomeration Economies, Geography and Social Variables: Effects on Provincial-Sectorial Growth

Tables 3 and 4 report the estimated coefficients for regression (4). We first present the estimates omitting the social variables in Table 3. Once we establish that agglomeration effects on employment growth are consistent with what has been found in previous studies, we present evidence on the effects of social variables on employment growth in Table 4. Columns 1 and 2 in Table 3 report the estimated effects of agglomeration economies on average annual growth rates of employment for the period 1951-1991, while columns 3 and 4 report the effects for the more recent sub-period 1971-1991. Columns 1 and 3 report results without controlling for the twenty regional dummies, while columns 2 and 4 control for these. We find that the estimated effects are rather precise and stable across periods and specifications. Controlling for initial employment and population growth, we find a consistently positive effect of initial diversity and initial competition on employment growth and a consistently negative effect of initial concentration on employment growth. The positive effect of $Diversity_{j,i,0}$ and $Competition_{j,i,0}$ is statistically significant and quantitatively large in each specification. Adopting the estimates in specification 2, an increase in local competition by one standard deviation (1.8) increases employment growth at the industrial-provincial level by 0.65 percentage points per year. Increasing the diversity of the manufacturing sector by one standard deviation (0.11) increases employment growth by 0.40 percentage points per year[4]. The average annual growth rate of employment for the period 1951-1991 within all selected sectors was around 0.5 percentage points (with standard deviation equal to 2.9%), so that the estimated effects are sizeable. Interestingly, our estimates of these two effects closely correspond with the findings of Glaeser et al. (1992). In their analysis of U.S. city-industries, they find positive and large effects of competition and diversity on the growth of employment. A positive effect of diversity on employment growth was also found by Henderson et al. (1995) for high-tech industries in the U.S.

The effect of the initial concentration of employment ($Concentration_{ji0}$) is consistently negative on the growth rate of the sector, suggesting that crowding effects are stronger than MAR externalities. Sectorial concentration (within a province)

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[4]As the variable $Competition_{ji0}$ takes some very large extreme values (see Table 1) we also estimated its coefficient after eliminating observations with the highest 1% or 2% values. The estimated coefficients did not change significantly.

twice as large as the national average implies slower annual growth by 0.8 percentage points. The negative effect of relative concentration is also consistent with the findings of several past studies such as Combes (2000) and Glaeser et al. (1992). We should note, incidentally, that the small coefficient on population growth rates (0.11-0.19) reveals that employment growth of the average manufacturing sector correlates weakly with population growth in the province.

Table 3
Agglomeration Economies and Employment Growth

Specification	*1*	*2*	*3*	*4*
Period	1951-1991		1971-1991	
$ln(L_{i0})$	-0.37**	-0.31**	-0.38*	-0.29*
	(0.15)	(0.12)	(0.15)	(0.15)
Growth Rate of population in Working Age	0.16**	0.11**	0.19**	0.11*
	(0.06)	(0.03)	(0.09)	(0.06)
Concentration$_{ji0}$	-0.86**	-0.83*	-0.65**	-0.67**
	(0.13)	(0.12)	(0.18)	(0.19)
Diversity$_{ji0}$	6.60**	3.59**	8.20**	4.20**
	(1.30)	(1.30)	(1.70)	(1.61)
Competition$_{ji0}$	0.36**	0.31*	0.28**	0.26**
	(0.07)	(0.07)	(0.12)	(0.13)
(Share of Manufacturing)$_{i0}$	4.10**	3.70**	2.1	2.3
	(1.30)	(1.30)	(1.4)	(1.3)
15 Sector-Dummies	Yes	Yes	Yes	Yes
20 Regional Dummies	No	Yes	No	Yes
Observations	921	921	921	921
R^2	0.58	0.64	0.50	0.56

Notes:
Dependent variable, Column 1 and 2: Average annual growth rate of private employment in the sector-province, 1951-91 period.
Dependent variable, Column 3 and 4: Average annual growth rate of employment in the sector-province, 1971-91 period.
Heteroskedasticity-robust standard errors are reported in Parentheses. Standard errors are clustered by province.
*= significant at 10%, **=significant at 5%
L_{i0}, Total employment in Manufacturing in province i measured at the beginning of the period.
Agglomeration Variables:
Concentration$_{ji0}$: natural logarithm of Employment in Sector j province i (L_{ji0}) relative to total employment in manufacturing in province i (L_{i0}) measured at the beginning of the period.
Diversity$_{ji0}$: Index of Sector-Diversity within manufacturing: $1- \sum_{k \neq j} (sh_{ki0})^2$ where sh_{ki0} is the

share of employment in sector k for the manufacturing sector of province i measured at the beginning of the period.
Competition$_{ji0}$: Index of local Competition measured as the average number of firms per employee in the sector-province relative to the average number of firms per employee in the national sector measured at the beginning of the period.

Table 4 reports the estimates when we include the social indices as explanatory variables. Columns 1-3 show the effects of the explanatory variables on annual growth rates of employment in the period 1951-1991. Columns 4-6 show the effects on growth rates of employment in the sub-period 1971-1991. The specifications across columns are identical except for the way in which murder rates are measured.

Table 4
Social Variables, Agglomeration Economies, Geography and Employment Growth

Specification	1	2	3	4	5	6
Period		1951-1991			1971-1991	
$ln(L_p,)$	-0.11	-0.11	-0.06	-0.15	-0.19	-0.14
	(0.10)	(0.07)	(0.12)	(0.13)	(0.14)	(0.14)
Growth Rate of population in Working Age	0.12**	0.12*	0.10*	0.15**	0.09*	0.07
	(0.03)	(0.10)	(0.03)	(0.07)	(0.05)	(0.06)
$Concentration_{ip}$	-0.72**	-0.82**	-0.77**	-0.65**	-0.70*	-0.65**
	(0.12)	(0.13)	(0.12)	(0.19)	(0.18)	(0.19)
$Diversity_p$	2.00*	5.40**	2.20*	3.22**	7.40*	2.94*
	(1.20)	(1.50)	(1.20)	(1.55)	(1.44)	(1.60)
$Competition_{ip}$	0.34**	0.34**	0.31**	0.26**	0.22*	0.24*
	(0.07)	(0.07)	(0.07)	(0.13)	(0.12)	(0.12)
CIVIC	0.11	0.10	0.13	0.30	0.20	0.40
	(0.26)	(0.16)	(0.20)	(0.26)	(0.18)	(0.28)
Murder1971	-4.50**			-3.66**		
	(1.70)			(1.71)		
Murder1951		-2.30*			-2.70*	
		(1.30)			(1.50)	
Medium Murder (0.03-0.044)			-0.49**			-0.72**
			(0.21)			(0.26)
High Murder (0.044-0.07)			-0.98**			-0.82**
			(0.25)			(0.28)
Very High Murder (>0.07)			-1.40**			-1.55**
			(0.31)			(0.35)
Sector-Dummies	Yes	Yes	Yes	Yes	Yes	Yes
20 Regional Dummies	Yes	No	Yes	Yes	No	Yes
Observations	921	921	921	921	921	921
R^2	0.63	0.56	0.65	0.55	0.50	0.56

Notes:
Dependent variable: Average annual growth rate of employment in the sector-province, in percentage points.
Heteroskedasticity Robust Standard Errors are reported in parentheses. Standard errors are clustered by province, except in Column 2 and 5 where they are clustered by region.
Agglomeration Variables: defined as in Table 3.
Significant at 10%, ** significant at 5%
Social Variables:
CIVIC: First principal component of the variables Turnout74, Association Density, Newspaper (defined below). The equation defining CIVIC is (3) in the text.
Murder1971: Number of Murders per 10,000 inhabitants, year 1971
Murder1951: Number of Murders per 10,000 inhabitants, data at the regional level, year 1951.
Medium Murder: Dummy is equal to one in provinces whose murder rate (Murder 1971) is between 0.03 and 0.044.
High Murder: Dummy is equal to one in provinces whose murder rate (Murder 1971) is between 0.044 and 0.07.
Very High Murder: Dummy is equal to one in provinces with murder rate (Murder 1971) larger than 0.07.

Specifications 1 and 4 use provincial murder rates measured in 1971, a variable potentially afflicted with endogeneity. Accordingly, specifications 2 and 5 use regional murder rates measured in 1951 and thus fully pre-determined. Finally specification 3 and 6 allow for the effect of murder rates to be non linear. Specifically we enter three dummies based on the murder rates in 1971, defined as *Medium Murder*

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for provincial murder rates between 0.03 and 0.044 per 10,000 people, $High\ Murder$ for murder rates between 0.044 and 0.07 and $Very\ High\ Murder$ for murder rates higher than 0.07. We omit the dummy for murder rates below 0.03. In each specification we control for initial employment, agglomeration economies, the growth rate of the working age population, sector dummies and twenty regional dummies. We also include the index $CIVIC$ in each regression.

The estimated coefficients on the agglomeration variables and on the other controls in Table 4 are similar to those in Table 3. As for the social variables, murder rates consistently and significantly appear to induce a negative effect on employment growth. The measure of civic involvement, on the other hand, exhibits a positive but insignificant effect. The difference in the estimated coefficients using either $Murder1971$ or $Murder1951$ arises primarily for the greater variance of $Murder1951$. An increase in murder rate by one standard deviation (equal to 0.06 in 1971 and to 0.11 in 1951) is associated with lower employment growth of between 0.22 and 0.26 percentage points per year, depending on which estimate we choose. Even more dramatically, using the estimates either in specification 3 or 6, we obtain that, "ceteris paribus", a province with a very high murder rate (such as Catania or Agrigento) will suffer a 1.4-1.5% lower growth of employment in its average manufacturing sector than a low murder rate province (such as Verona or Venezia). Clearly this constitutes a very sizeable effect and, considered over a period of forty years, could account for large differences in employment rates. In contrast, the effect of the variable $CIVIC$ is positive but never significant. Even when we include each of the variables $Turnout74$, $AssociationDensity$ and $Newspaper$ in the regression (not reported) we obtain insignificant coefficients on each of them (except for a positive, borderline significant effect of $Turnout74$ in specification 2).

We conclude this section by noting that the regressions of Table 4 represent an extremely conservative test of the effects of social variables on employment growth. Because we control for sectorial and regional dummies, agglomeration determinants, initial employment and population growth, we fully account for technological, geographical and administrative differences across provinces. The fact that predetermined murder rates remain negatively correlated with employment growth make plausible the conjecture that organized criminal activity tends to stifle economic development.

5.2 Geography and Social Variables: Effects on Province Aggregate Growth

We now return our focus on aggregate provincial data in order to confirm the impact of social variables on aggregate growth. As mentioned in section 4, we possess measures of per capita incomes across provinces for the years 1971-1991, allowing us to augment our analysis with a more direct proxy of economic activity for this sub-period. Specifications 1 and 2 in Table 5 estimate the effects of social variables and other controls on annual growth rates of provincial private employment for the

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period 1951-1991. Specifications 3-4 do the same for the sub-period 1951-1971 and specifications 5-6 for the sub-period 1971-1991. Specifications 7-8 analyze the effect of the same explanatory variables on growth rates of income per capita for the period 1971-1991.

Table 5
Social Variables, Geography and Growth

Specification **Dependent Variable**	*1* **Annual employment growth**	*2*	*3* **Annual employment growth**	*4*	*5* **Annual employment growth**	*6*	*7* **Annual income per capita growth**	*8*
period	1951-1991		1951-1971		1971-1991		1971-1991	
ln(Employment rate) *Beginning of Period*	-0.32* (0.06)	-0.27* (0.07)	-0.24* (0.11)	-0.20* (0.11)	-0.38* (0.06)	-0.32* (0.06)		
ln(GDP per capita) *Beginning of the Period*							-2.70** (0.41)	-2.69** (0.47)
Growth Rate of population in Working Age	0.08* (0.04)	0.08* (0.04)	0.14** (0.05)	0.14** (0.05)	0.03 (0.04)	0.04 (0.04)		
CIVIC	0.02 (0.15)	0.02 (0.14)	0.33 (0.27)	0.33 (0.24)	0.25 (0.20)	0.25 (0.18)	0.12 (0.14)	0.11 (0.14)
Murder (beginning of Period)	-2.40** (0.60)		-2.98** (1.44)		-2.77** (0.98)		-2.03** (0.80)	
Medium Murder		-0.28 (0.19)		-0.41 (0.28)		-0.13 (0.19)		-0.04 (0.11)
High Murder		-0.30 (0.20)		-0.48 (0.37)		-0.20 (0.19)		-0.18 (0.13)
Very High Murder		-0.74** (0.20)		-0.91** (0.36)		-0.66** (0.22)		-0.41** (0.17)
Coastal Location	0.22 (0.21)	0.24 (0.18)	0.42* (0.22)	0.42* (0.22)	0.10 (0.15)	0.08 (0.10)	0.21 (0.17)	0.21 (0.17)
Distance from Bruxelles	-0.52** (0.26)	-0.57** (0.25)	-0.79* (0.46)	-0.81** (0.40)	-0.22 (0.30)	-0.33 (0.30)	-0.80** (0.21)	-0.80** (0.17)
Macro-Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	95	95	95	95	95	95	95	95
R^2	0.47	0.50	0.32	0.42	0.55	0.57	0.45	0.47

Notes:
Dependent variable: Specification 1-6: Average annual growth rate of employment in the province, in percentage points.
Dependent variable: Specification 7-8: Average annual growth rate of real GDP per capita in the province, in percentage points
In parentheses: heteroskedasticity-robust standard errors. Errors are clustered by province.
*significant at 10%, ** significant at 5%
Social Variables: defined as in Table 3.
Geographic Variables:
Coastal Location: Dummy equal to 1 if the province territory includes a coastal line and 0 otherwise.
Distance from Bruxelles: Shortest air-distance from Bruxelles in thousands of Kilometers.
Macro-Region Dummies: Three dummies for province being in the North East, North West, or Center (dummy South is omitted)

The estimated specifications for employment growth (1-6) include the initial employment rate and population growth for each province as controls. The coefficient on initial employment rate is always negative, confirming the convergence of employment rates to steady state values. The coefficient on population growth is

significant but small, ranging from 0.04 to 0.14 confirming the low mobility of working age people across Italian provinces. High mobility would imply high correlation between employment and population changes (a coefficient close to one), while no mobility would imply no correlation between employment and population changes (a zero coefficient). Our estimates suggest that workers were mostly immobile across provinces. We also include two geographic indicators along with the macro-region dummies: coastal position and distance from the EU core. These characteristics may affect the openness to trade of a province and its economic interactions with the rest of Europe, potentially influencing its economic take-off. Distance from the European Union core, calculated as flight distance from Bruxelles, has significantly negative effect on employment growth for both the overall period (1951-71) and the earlier period alone (1951-1971). A province's coastal position seems not to play much of a role, except in the early period (1951-1971) where it has a positive correlation with growth. The reduced effect of a province's coastal position and distance from the EU core in the later period may reflect the development of better road and railway networks connecting peripheral and land-locked provinces to European markets. The coefficient on the murder rate when entered linearly (specifications 1, 3 and 6) is always large and very significant. While not as large as in the estimates of Table 4, an increase in the murder rates by 0.1 increases the growth rate of private employment in a province by 0.24-0.30 percentage points per year. In specifications 2, 4 and 6 we test for a non-linear effect of murder rates on employment growth, captured by the dummies $Medium\ Murder$, $High\ Murder$, $Very\ High\ Murder$ defined in section 5.1. It is apparent that while very high murder rates are always associated with large and highly significant negative effects on employment growth more modest murder-rate levels do not seem to impede such growth, confirming the presence of an aggregate-level non-linear (threshold) effect. Our interpretation is that murder rates above a certain level signal the pernicious effects of organized violent crime and are associated with negative effects on growth. Below that threshold the variation in murder rates is less systematic and thus less relevant. Finally the effect of the $CIVIC$ index is less than significant in each specification. Civic involvement appears to have no significant correlation with economic growth, and even when we enter the single proxy variables together ($Turnout74$, $AssociationDensity$ and $Newspaper$) in the regression (not reported) we do not obtain significant coefficients on any of them. These results confirm those found in Table 4: the presence of organized violent crime is the single most important social variable negatively associated with economic development of Italian provinces. Finally, we should elaborate somewhat over specifications 7 and 8. Here we find that the qualitative effects of social and geographic variables on the growth of per capita income (1971-1991) are extremely similar to the effects of those variables on employment growth rates. Including initial per capita income to control for convergence towards the balanced growth path, we find that murder rates and distances from the EU core are, by far, the most relevant variables in explaining the growth of income per capita. When

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we include murder rates allowing for a non linear effect we find that provinces with very high murder rates (more than 7 murders per million) experienced a per capita growth rate 0.41% per annum lower than other provinces. In contrast, differences in civic involvement were not associated with significant differences in growth rates of income per capita.

6   Conclusions

We know surprisingly little about the effects of social variables on economic performance. Once we control for institutions, could historically-rooted differences in civic involvement or the presence of organized criminal activity affect long-run economic outcomes? The present case study makes an initial attempt to answer this question. It is an important question because the heterogeneous development experienced by regions in some countries seems to defy a facile economic explanation. One such country, Italy, was the object of an extremely influential recent piece of research by Robert Putnam (1993). Such work galvanized economists to study "social capital" and to carefully consider how to measure it and its effects on economic development. So it seemed to us a worthwhile enterprise to study in detail, using newly collected data, the relationship between Robert Putnam's "Civic Spirit" and provincial development in Italy. It also was apparent to us that little is known about the effects of organized criminal activity on economic development: how direct, disruptive and persistent are the effects of organized crime on economic growth? Indeed, one of the best known and most conspicuous social problems of certain regions in Italy is the pervasive misdoing of local criminal organizations.

Testing these two social variables (civic involvement and presence of organized crime as revealed by murder rates) as potential determinants of differences in local economic success reveals some interesting results. A positive correlation of civic involvement with measures of economic development exists in the raw data, although this is mostly due to North-South differences and does not survive robustness checks and the inclusion of geographic controls. The negative correlation of murder rates and economic success, on the other hand, appears to be large and very significant. We consider murder rates as an imperfect measure of the presence of organized criminal groups in some provinces. The estimates of such correlations are robust to the inclusion of several controls, predetermined measures of murder rates and industry-specific analysis. These results then suggest that at least part of this correlation illustrates the direct negative effect of organized crime on economic development. If this is indeed the case, and the direction of causation can be better established, we can claim that some provinces in Sicily and Calabria may have experienced lower employment growth by as much as one percentage point per year for forty years due to the presence of active criminal organizations. Once the direction of causation is confirmed, eradicating organized crime could prove to be one of the single most important policy measures to finally break the backwardness of several provinces in

southern Italy.

A   Appendix: The Relation between Productivity and Employment

In this section we present more formally three different models that justify the positive relation between employment rates and labor productivity used in the main text. The first model with perfect labor mobility and competitive Walrasian markets is very simple and has been used extensively in studies of economic growth of U.S. localities (e.g. Glaeser et al., 1992). The second model involves the lack of labor mobility and centralized union wage-setting but still assumes Walrasian markets. The last model is a search model, in the mode of Pissarides (2000). It departs more drastically from the concept of labor demand and labor supply, and develops "job creation" and a "wage-setting" conditions that, under very reasonable assumptions, imply a positive relation between productivity and employment rates.

A.1   Production Function

In order to produce a homogenous, perfectly tradable good, Y_i, the representative firm in province i employs labor L_i, capital K_i and a fixed factor (land, natural resources) T_i and enjoys a level of total factor productivity A_i. As argued in the main text social variables may positively influence local agglomeration externalities by promoting communication and diffusion of knowledge so that $A_i = A(S_i)$, $\partial A/\partial S_i > 0$, where S_i is a measure of social variables in province i. The production function is:

$$Y_i = A(S_i)T_i^\alpha K_i^\beta L_i^{1-\alpha-\beta} \tag{5}$$

The share α of produced income goes to compensate the fixed factor, the share β compensates capital and the remaining $(1-\alpha-\beta)$ share goes to compensate labor. Cost-minimizing firms equate factor prices to their marginal productivity. Physical capital is assumed to be perfectly mobile across regions[5]. Low social capital and high crime imply that some resources need to be spent (wasted) to appropriate the returns on investments (by monitoring or protecting projects). This would act as a tax $\tau(S_i)$ on returns to capital so that $\partial\tau/\partial S_i < 0$. Free mobility of capital implies equal net return across provinces:

$$r = r_i = (1-\tau(S_i))\beta A(S_i)T_i^\alpha K_i^{\beta-1} L_i^{1-\alpha-\beta} \tag{6}$$

It is useful to define the population in working age in province i as N_i and define variables standardized by N_i. We denote with $e_i = L_i/N_i$ the employment rate (between 0 and 1) and $t_i = T_i/N_i$ the amount of the fixed-factor per person.

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[5]If physical capital is not mobile across provinces but is accumulated locally, the effect of higher $\tau(S_i)$ in a province is to decrease the capital stock in balanced growth path, just as in the case with perfect mobility. This can be shown using a standard Ramsey model and reducing by $\tau(S_i)$ the marginal return to capital.

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Marginal productivity of labor in province i, after solving out for K_i using equation (6), is equal to:

$$MPL_i = \Phi a_i(S_i)^{\frac{1}{1-\beta}} t_i^{\frac{\alpha}{1-\beta}} e_i^{-\frac{\alpha}{1-\beta}}, \qquad (7)$$

where $a_i(S_i) = (1-\tau(S_i))A(S_i)$ and Φ captures the unimportant constant terms. The term $a_i(S_i)$ affects labor productivity and depends positively on social capital S_i through the positive effect on agglomeration economies, $A(S_i)$, and through the negative effect on $\tau(S_i)$. The term $t_i^{\frac{\alpha}{1-\beta}}$ captures crowding effects and decreases as total population N_i grows.

A.2 Model 1: Perfect Labor Mobility, Competitive Walrasian Markets

In the case of Walrasian markets and perfect labor mobility, labor demand is determined by equating wages to the marginal productivity of labor, $w_i = MPL_i$. Workers move across regions to eliminate any wage differential determining the labor-supply condition: $w_i = \overline{w}$, ($\overline{w}$ is the average national wage). Equation (7) implies:

$$e_i = (\Phi/\overline{w})^{(1-\beta)/\alpha} a_i(S_i)^{1/\alpha} t_i \qquad (8)$$

which basically mirrors the relation derived in Glaeser et al. (1992), and shows the positive correlation between employment rates e_i and S_i through the "labor productivity" term $a_i(S_i)$. Taking logs on both sides we obtain expression (1) in the main text. Figure 1 Panel A shows the labor demand curves, the equilibrium wage $\overline{w}$ and employment rates e_H and e_L for two regions with high and low productivities (a_H and a_L respectively) under the assumptions of this model.

A.3 Model 2: No Labor Mobility, Walrasian Markets, Wage-Setting Union

Let's now assume that people are not mobile at all between provinces. Thus the population in province i, N_i, is not mobile and firms hire within the pool of local inhabitants ($L_i \leq N_i$). On the supply side we describe the behavior of workers as defined by a wage-setting relation. We specify a very general wage-setting function of a national union that is concerned about the national employment rate e_{ITA}, and about the average common wage paid to its members w_{ITA} whose bargaining power is determined by a set of institutional arrangements in the national labor market z_{ITA}. Once the union has set the common wage w_{ITA} unilaterally, the competitive firms in the provinces choose the employment level e_i. Without getting into much detail of the Union's wage-setting equation, it is clear that it will be of the form: $w_{ITA} = F(e_{ITA}, z_{ITA})$. The common wage is based on national characteristics, while provincial demands determine employment rates:

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$$e_i = (\Phi/w_{ITA})^{(1-\beta)/\alpha} a_i(S_i)^{1/\alpha} t_i \qquad (9)$$

The expression is very similar to (8) except that the common wage w_{ITA} will be larger, as it is determined unilaterally by the union. As long as $e_i < 1$ for all provinces, we have an equilibrium in which, again, employment rates and productivity levels are positively correlated. Figure 1 Panel A can be considered a representation of this equilibrium as well, once we interpret $\overline{w}$ as w_{ITA}.

A.4 Model 3: No Labor Mobility, Search Frictions, Decentralized Bargaining

This model maintains the assumption of no labor mobility across provinces but departs from the assumption of Walrasian markets. Instead we consider each province as a separate market in which workers search for jobs and firms search for workers to fill vacancies. With minor variations the model for each province i is identical to the model of the labor market developed and analyzed in Pissarides (2000), Chapter 1. We refer the reader to that book for a more detailed analysis. Here we simply present and justify the main equations and the key equilibrium relationship between the employment rate and productivity derived using that model. The only difference with the standard Pissarides models is that we consider non-employment rates $(1 - e_i)$, rather than unemployment rates, as the relevant variable in determining market tightness and the bargaining power of workers. This seems reasonable as the difference between unemployed and people "out of the labor force" is often rather feeble. Quite simply, for a good prospective salary many people would look for a job. Moreover, flows into or out of employment are almost equally distributed between the pools of "unemployed" and pool of people "out of the Labor Force"[6]. We simplify the production function (5) assuming $\alpha = 0$. Using the assumption of perfect capital mobility and Cobb-Douglas production, the product available to a worker in province i, after paying capital its marginal return, is: $\widetilde{a}_i(S_i) = \phi(1-\tau(S_i))^{\beta/(1-\beta)} A(S_i)^{1/(1-\beta)}$, where ϕ contains all the common constants. Firms pay a cost c to keep a vacancy open in each instant and there is an exogenous probability, λ, that a worker-firm relation is exogenously broken with the termination of a job. The number of new matches created in each period is a function of the available vacancies v and of the non employed workers $(1 - e)$. Defining $\theta = v/(1 - e)$ as the tightness of the labor market, the frequency at which vacant jobs are filled is $q(\theta)$, a decreasing function of market tightness $(\partial q(\theta)/\partial\theta < 0)$, while the rate at which a non-employed person finds a job is $\theta q(\theta)$, an increasing function of market tightness $(\partial(\theta q(\theta))/\partial\theta > 0)$. In steady state the employment rate is constant and is defined by $e = 1 - \lambda/(\lambda + \theta q(\theta))$. Given the properties described above the equilibrium relation between e and θ is

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[6]Blanchard (2003) reports that in the U.S. during the period 1994-2000 the flows into (out of) employment from (to) unemployment were 1.8 (1.5) million per year. Similarly the flows into (out of) employment from (to) "out of the labor force" were 1.5 (1.7) million per year.

monotonically increasing $(\partial e/\partial \theta) > 0$. Define r as the interest rate and w_i as the wage paid to a worker in province i. The value of a vacancy to a firm in province i, V_i, and the value of an occupied job, J_i, are defined by the following two Bellman equations: $rV_i = -c + q(\theta)(J_i - V_i)$, $rJ_i = \widetilde{a}_i(S_i) - w_i + \lambda(V_i - J_i)$. Imposing the condition of free vacancy posting ($V = 0$) we obtain from the two Bellman equations the "job-creating condition" which is a relationship between wages and market tightness (and therefore employment rates) very similar to a labor demand curve. The condition is:

$$w_i = \widetilde{a}_i(S_i) - \frac{(r + \lambda)c}{q(\theta(e_i))} \tag{10}$$

q is a negative function of θ which in turn, in equilibrium, is a positive function of e_i. So the job-creating condition is a negative relationship between wages and the employment rate in province i, and shifts one-for-one with labor productivity $\widetilde{a}_i(S_i)$. The wage setting equation, on the other hand, is derived combining the Bellman equation for the value of working, the Bellman equation for the value of being unemployed and the Nash-Bargaining solution to the problem of splitting the surplus between firms and workers. These three conditions provide the following wage setting equation for province i:

$$w_i = (1 - \beta)z + \beta \widetilde{a}_i(S_i) + \beta c\theta(e_i) \tag{11}$$

where $\beta < 1$ is the relative bargaining power of workers and z captures unemployment benefits. This wage-setting condition is a positive relation between wages and employment rates in province i. While an increase in productivity $\widetilde{a}_i(S_i)$ shifts this curve up, the shift is smaller than one-for-one, since $\beta < 1$. This implies that, for common values of the other parameters, a province with high productivity $\widetilde{a}_i(S_i)$ has a higher equilibrium wage w_i as well as a higher equilibrium employment rate e_i than a province with low productivity. This is illustrated in Panel B of Figure 1. The job-creation condition in the high productivity region is higher than in the low productivity region. While this is true also of the wage-setting equation in the high productivity region, the difference (between the case with high and low productivity) is larger for the job-creation condition. This implies a positive relationship between productivity and employment rates across provinces.

B   Appendix: Employment and Income Data

The data for sectorial-provincial employment and for private-sector provincial employment are from the Italian Census published by ISTAT (the Italian Institute of Statistics) and held every ten years between 1951 and 1991. The census covers all non-agricultural establishments and their employees. In 1996 ISTAT made available in electronic format the data on total employees and establishments, homogenized across the Census 1951-61-71-81 and 91 at the Municipality (Comune) level. The

file (cis.txt) was released with the electronic data of the Census 1996 and it is available from the author upon request, together with the SAS program used to extract the variables. The growth rates of employment, the employment rates, as well as the variables *Concentration*, *Diversity* and *Competition* have been constructed using these data. The sectors within manufacturing for which it was possible to reconstruct a consistent definition between 1951 and 1991 (used in Table 3 and 4) are the following 15 (we report in parentheses the Italian census code associated to each sector): Food and Beverages (3010), Tobacco (3020), Leather (3030), Textile (3040), Apparel and Shoes (3050), Wood and Furniture (3060), Paper products (3070), Printing (3080), Metal Products (3090), Machinery and Vehicles (3100), Non Metal Mineral Products (3110), Chemicals and Pharmaceuticals (3120), Rubber Products(3130) Plastic and other manufacturing industries (3140).

The data on total population in working age are from the ISTAT (1971, 1991). The data on provincial value added per capita are available (publicly for year 1991 and for purchase for year 1971) from Istituto Tagliacarne (2004).

C   Appendix: Social Variables

The variables used to construct the index $CIVIC$ are those originally suggested in Putnam (1993). We refer to his sources and, where possible, we collected and updated them at the province level. The variable *AssociationDensity* is the number of associations per 1,000 people. The count of association, local and national, by province was manually made by a research assistant from the 1981 census of Italian associations (Mortara, 1985). The count of people is taken from the Annuario Statistico Italiano, ISTAT, 1983. The variable *Turnout*74 is equal to the electoral turnout for the referendum held in 1974 on the legalization of the Divorce. The source of the data is Forni and Paba (2000) and we also checked the Annuario Statistico Italiano, ISTAT 1975. The variable *Newspaper* is equal to the share of people reading non-sport newspaper in the population for year 1974. The source is ISTAT (1975), under the Chapter "Statistiche Culturali e Sociali Varie". Such variable is available at the regional level only, so we assigned the same value to provinces within the same region.

The variable *Murder* 1991 is the murder rate per 10,000 inhabitants calculated averaging the rates in 1990, 91 and 92 from the publication ISTAT (1993). The variable *Murder*1971 was obtained from Forni and Paba (2000). They collected the data from ISTAT (1973). For the variable *Murder* 1951 we used the publication SVIMEZ (1961) which under the mortality statistics and cause of death reports the number of murders in 1951 by region. We also checked the values using the publication ISTAT (1958). We used the population count from the Census 1951 to obtain the rates.

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