

# Social Variables and Economic Success: the Case of Italian Industrial Development

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## Abstract

Italy makes for a very interesting case study of the impact of social variables on economic performance. Across its provinces, differences in social and cultural attitudes seem associated to large differences in economic development. We analyze the importance of some social variables on industrialization and on employment creation across 95 Italian provinces during the period 1951-1991. On one hand we find little evidence that civic involvement (Social Capital) was associated with industrial and economic development. On the other hand we find strong evidence that organized crime, measured as high murder rates, was negatively correlated with industrial and economic development. We use measures of murder rates in the distant past to suggest that the correlation captures, at least in part, a stable and possibly causal link between organized crime and lack of employment growth.

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# 1 Introduction

European leaders and politicians are extremely concerned with the economic development of regions within their countries, perceiving that liberalization in the movements of goods and factors across national boundaries increases the importance of regional economies and provides them with unprecedented challenges and opportunities. "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 [9] "but the disparities between its .. various 250 regions... are striking". Among economists, improvements in the collection of data at the regional level has given a new impulse to the study of regions as the basic economic units acting within a borderless Economic and Monetary Union. Recent models describing the economic geography, industrialization and development of interdependent regions have shown that some features that give regions an initial advantage may result in stronger agglomeration economies and virtuous development cycles as trade becomes freer across them (e.g. Krugman [22] and then Krugman and Venables [23] and Fujita et al. [11]). On the other hand, with increasing economic integration, some forces such as technological diffusion, are set in motion that should promote convergence and development of backward regions (see for instance Chapter 7 of Baldwin et al. [1]). There is a growing perception, however, that the roots of differential economic success of regions may depend, at least in part, on some factors that are harder to transport than physical capital, human capital or technology. The long persistence of disparities within the same country (North-South of Italy, Scotland-England, East-West Germany) reminds Europeans that neither free markets nor common institutions are enough, by themselves, to promote speedy development and convergence. Social factors may play a crucial role: regions better endowed with "good" social characteristics may have a significant and long lasting economic advantage on other regions.

This paper is a case study inquiring into economic and social determinants of local industrial and economic development. We look at Italy and at the economic development of its provinces during the post World War II (1951-1991) era. During this period the country went from being a largely rural, war-weary and still developing country to being the fifth largest economy in the world. Our goal is to identify, once we control for economic forces, important social factors that affected agglomeration economies. Such forces allowed some provinces within Italy to take full

advantage of the economic take off, while prevented others from doing so, leaving them in a still semi-developed economic condition. Three characteristics contribute to make our data particularly interesting. First, Italy due to different historical roots between its regions and often between its cities, exhibits large variation of some social and cultural characteristics. Second, in spite of the common administration, common institutions and free mobility of goods and factors within the country since 1949, the economic performances across provinces has been rather different. The convergence in productivity and in employment rates across provinces was slow and is still far from complete. Third, the focus on the period 1951-1991 is of the greatest interest for growth and development economists. In 1951 Italian per capita income was only one third of the U.S. per capita income and the country was still largely rural and agriculture based. Forty years later Italy was fully industrialized and with an expanding service sector, after having increased its per capita income almost five fold to reach 75% of the U.S. level. This period can be genuinely considered as the phase of economic take-off for Italy, during which it joined the "club" of developed nations.

We analyze the differential development across provinces during a period of fast industrialization. Agglomeration economies (determined by existing urbanization and specialization) as well as local social variables justify the existence in the long-run of differences in labor productivity across provinces. Market potential, input-output linkages and local conditions generate different agglomeration economies in different locations and attract factors (mostly capital and entrepreneurship) generating dense areas with concentration of firms and peripheral regions, with much fewer firms. In our study we focus on employment and its growth (rather than productivity) as done in previous studies of local agglomeration economies and their determinants within the U.S. (such as Glaeser et al.[12] and Henderson et al. [18] ). We argue that in Italy differential productivity across provinces produced differences of labor demand across regions, while a common institutional set-up provided similar labor supply conditions (wage-setting procedures). The resulting equilibrium would feature different employment rates across provinces: high-productivity provinces have higher employment rates in equilibrium. We illustrate the main features of such mechanism in a stylized model in section 2. A second important reason to focus on employment is that low employment rates, due to a combination of low participation and high unemployment rates, are probably one of the main concerns of continental European economies. Vis a vis the United Kingdom and the United States, European countries have very low employment rates. While taxation is often blamed for this dis-

tortion, depressed labor demand and low mobility of people could be a key factor in contributing to the phenomenon or at least to its regional aspect. A look at cross-province differences will make clear that local factors may have a lot to do with labor demand and employment rates. Finally, and perhaps most crucially, employment is regarded as a key variable across regions. It is a widespread perception in Europe among policy makers and economists, that while it would be possible from an economic point of view, to improve the conditions of poorer regions either by pushing people to leave or by financing their unemployment and low participation (posting the bill to richer regions), both measures would generate strong strains on the society and would damage the cohesion between poor and rich regions. Social costs of low employment rates, of migrations and of taxing some regions to support others are probably larger than the pure economic costs. European policy makers accept the view that no way to development of poor regions exists other than promoting some degree of agglomeration economies to attract private capital and entrepreneurship and to generate firms and employment growth. The set up of the "structural" funds to help develop poorer regions within the European Union embodies this view. Understanding what economic and social factors affect the process of regional industrialization is therefore a very important task.

We focus on two social characteristics in order to analyze their impact on employment growth. They are the degree of civic involvement of citizens and the presence of violent crime. These two variables may affect labor productivity through their impact on capital accumulation and on local knowledge diffusion. While their choice is somewhat guided by the Italian case we believe that they are key social variables, rarely analyzed in their regional impact on development and very interesting also beyond the boundaries of our case-study. Moreover, as we consider the impact of these variables on development within the same country we isolate their "direct" effect from the effect that they may have on economic development due to their impact on institutional arrangements and on political systems and their stability. Several recent cross-country analyses have included these variables as determinants of development (Knack and Keefer, [21], Coleman [7], Temple and Johnson [36]). However, at the country level, it is hard to distinguish their direct impact from the impact through institutions that these social variables contributed to shape. Our question in this paper is: could these social variables have a significant effect on productivity and employment growth also within an identical institutional arrangement? The answer may shed light on the complex relation between economic factors, institutional factors and social factors in which each one has an important and

separate role in promoting economic development.

The rest of the paper is organized as follows. Section 2 contains a stylized labor-market model that illustrates the mechanism determining the employment rate and, in transition, employment growth. Section 3 discusses the social variables and the channels through which they may affect economic performance with specific reference to agglomeration economies and capital accumulation. Section 4 presents some preliminary evidence on correlations between employment rates and economic and social characteristics. Section 5 performs the econometric analysis of industrial agglomerations and their determinants for Italian provinces 1951-1991 with a particular focus on the impact of the social variables. Section 6 concludes the paper.

## 2 The Framework

### 2.1 Labor Demand and Wage-Setting Equation

In this section we present a simple model that justifies the key long-run relationship between employment rates and productivity levels in an economy whose labor markets have the features typical of the Italian regional markets during the period 1951-1991. The labor market in Italy was rather segmented at the regional and local level as people were not very mobile (especially after the seventies). Small and medium firms accounted for most of the labor demand and some form of organized wage bargaining describes the conditions of labor supply better than perfect competition across workers. In the rest of the paper we argue that different social and economic characteristics affect the long run level of labor productivity of firms through capital accumulation and local agglomeration economies. The model presented in this section shows how, in this environment, differences in labor productivity generate differences in employment rates rather than (or as well as) differences in wages. This result carries to relative growth rates of employment in transition towards the balanced growth path once we control for initial employment rates.

Let us assume that 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  $T_i$  and enjoys a level of total factor productivity  $A_i$ . A first channel for social variable to affect economic outcome is through their effect on local agglomeration externalities and local TFP. We can consider  $A_i = A(S_i)$  where  $S_i$  is a measure of social variables in province  $i$ . The production function is:

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

The share  $\alpha$  of produced income goes to compensate the fixed factor, the share  $\beta$  compensates capital and the remaining  $(1 - \alpha - \beta)$  share goes to compensate labor. The production sector is in perfect competition, and firms equate wages to marginal productivity of labor, defining a labor demand curve. Physical capital is assumed to be mobile across regions so that in equilibrium net returns to capital are also equated across provinces. A second channel through which local social variables may matter is in determining the return to physical capital. We may think that in regions with low social capital or high crime some resources need to be spent (wasted) to appropriate the returns of investments. These resources may be needed to avoid diversion or simply to ensure the enforcement of the contract. Guiso et al. [16] show that social capital resulting in "trust" makes financial transactions more widespread and less costly. This would act as a tax  $\tau(S_i)$  on return to capital which is higher for regions with poor civic spirit and high crime rate. Free mobility of capital implies:

$$r = r_i = (1 - \tau(S_i))\beta A(S_i)T_i^\alpha K_i^{\beta-1} L_i^{1-\alpha-\beta} \quad (2)$$

We assume that the population in working age in province  $i$ ,  $N_i$ , is fixed and not mobile so that firms hire within such pool and  $L_i \leq N_i$ . This assumption captures a feature of the Italian economy during the period 1951-1991: the mobility of population across provinces was rather small and closer to no mobility than to perfect mobility. Looking at the available statistics on inter-regional migration in Italy for the period 1971-1991, for which data are available, we compute that on average only 3% of the population moved across regions within a decade. This is dramatically lower than, say, for the U.S., where inter-state migration in a decade is closer to 20% of the population<sup>1</sup>. We denote with  $e_i = L_i/N_i$  the employment rate (between 0 and 1),  $k_i = K_i/N_i$  is capital per person and with  $t_i = T_i/N_i$  the amount of fixed-factor per person. Using this notation the labor demand, obtained by equating wage to marginal productivity of labor, once we solve out for the capital stock, can be written as:

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<sup>1</sup>Author's calculations on Eurostat "Regio" data and U.S. Census Data.

$$w_i = \Phi(1 - \tau(S_i))^{\frac{1}{1-\beta}} A(S_i)^{\frac{1}{1-\beta}} t_i^{\frac{\alpha}{1-\beta}} e_i^{-\frac{\alpha}{1-\beta}} \quad (3)$$

$w_i$  is the real wage. Let us call the term  $a_i(S_i) = \Phi(1 - \tau(S_i))^{\frac{1}{1-\beta}} A(S_i)^{\frac{1}{1-\beta}} t_i^{\frac{\alpha}{1-\beta}}$ , where  $\Phi$  is an unimportant constant, as "productivity net of crowding effects". This term depends on social capital  $S_i$  in a positive way, both through the positive effect of civic interactions on local TFP  $A(S_i)$  and through the negative effect of social variables on  $\tau(S_i)$ . We can think of social factors and urbanization and agglomeration economies as affecting positively the term  $a_i$ , once we control for the crowding (density) effects of  $t_i$ .

On the supply side, rather than modeling the choice of competitive agents we describe the behavior of workers as defined by a wage-setting relation. We specify a very general wage-setting function, just as in Blanchard [4] Chapter 6, to capture the idea that, either because of unionized bargaining or because of search frictions, workers have more bargaining power when the employment rate  $e_i$  is high (tight labor market). This is due to the fact that, when the labor market is tight, workers have several outside options as they can be hired elsewhere, while firms have little alternatives, as few potential workers are available. This shifts bargaining power in favor of workers and allows them to ask for higher real wages. The only difference with standard models of bargaining is that we consider employment rates (rather than unemployment rates) as the relevant variable in determining bargaining power of workers. This seems reasonable as the difference between people unemployed and people out of the labor force is often rather feeble. For a good perspective of job and salary many people would enter the labor force. Moreover, flows into or out of employment are almost equally distributed between the pools of "unemployed" and pool of people "out of Labor Force"<sup>2</sup>. Therefore we only distinguish between employed ( $L$ ) and non-employed ( $N - L$ ). Firms in the long run consider the total population in working age  $N$  as the potential pool from which they can hire. We specify the wage-setting function as follows:

$$w_i = F(e_i, z) \quad (4)$$

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<sup>2</sup>Blanchard 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 (and to) "out of the labor force" were 1.5 (1.7) million per year.

The real wage requested by the workers is a positive function of the employment rate  $e_i$  which captures the labor market conditions and a positive function of a catch-all variable  $z$  that captures the features of the labor market institutions increasing the bargaining power of workers (such as minimum wage, unemployment subsidies or union power). Importantly the institutional variable  $z$  is common to all provinces as they share laws, institutions and labor organizations.

If we consider the overall national market, indicating with a subscript  $N$  the variables relative to national averages, the equilibrium is achieved where the labor demand crosses the wage-setting curve and employment rate in equilibrium is given by the following condition:

$$a_N e_N^{-\frac{\alpha}{1-\beta}} = F(e_N, z) \quad (5)$$

In expression (5)  $a_N$  is the average national productivity net of crowding and  $e_N$  is the average national employment rate. Taking logs on both sides and taking a log-linear approximation of function  $F$  we can write the equilibrium condition isolating the endogenous variable  $e_N$  on the left hand side:

$$\ln e_N^* = b - \frac{\gamma(1-\beta)}{\alpha + \delta(1-\beta)} \ln z + \frac{1-\beta}{\alpha + \delta(1-\beta)} \ln a_N \quad (6)$$

$e_N^*$  is the average national employment rate in equilibrium.  $b$  is an unimportant constant,  $\gamma$  is the positive elasticity of function  $F$  to the variable  $z$  ( $\frac{\partial F}{\partial z} \frac{z}{F}$ ) and  $\delta$  is the positive elasticity of function  $F$  to the variable  $e_N$  ( $\frac{\partial F}{\partial e} \frac{e}{F}$ ).

## 2.2 Local Employment Rates

The equilibrium in the national market is illustrated in the right figure of Panel 1, labeled "National Average". The equilibrium wage ( $w_N^*$ ) and employment rate ( $e_N^*$ ) are determined where the Labor Demand and the Wage-setting curves cross. On the horizontal axis, which measures employment rate, we have also reported the upper bound for  $e_N^*$  that is one. The distance between the point  $e_N^*$  and the upper bound is the "non-employment rate". The national market is, however, the aggregate (average) of several provincial markets. In particular there are some provinces with high productivity (higher than average) and some with low productivity (lower than average). Their



labor demand and wage setting curves are illustrated in the left and center figures of Panel 1, labelled "Low Productivity Province" and "High Productivity Province" respectively. Notice that while the Labor demand curves are province-specific because productivity, net of crowding effects, varies from province to province, the wage setting curve reported is the same in each region because the parameter  $z$ , capturing institutional features, is a national parameter.

Two different equilibria are reported in Panel 1 for the provincial markets. We illustrate both and show that both of them imply larger employment rates in provinces with larger productivity. The first case is that of a "centralized bargaining" equilibrium and the second is a "de-centralized bargaining" equilibrium. In the centralized bargaining set-up workers, organized in unions, bargain collectively for their wages by looking at the aggregate national labor market. Considering the average national employment rate,  $e_N$ , workers and firms choose the real wage  $w_N^*$  compatible with the wage-setting behavior and with the aggregate labor demand. Once they set such wage, the workers organizations impose it to all the local markets. Given different labor demand across provinces such common wage  $w_N^*$  implies that high-productivity provinces (central figure) employ more workers achieving employment rate  $e_H^c$  and low productivity provinces (left figure) employ less workers and achieve employment rate  $e_L^c$ . The superscript  $c$  denotes the "centralized" equilibrium. In this case, at the province level, the equilibrium does not lie on the wage-setting curve. This is because local workers do not consider local labor market conditions ( $e_i$ ) when bargaining for their wages, but they adopt the centralized wage, based on national conditions ( $e_N$ ). Centralized wage setting was the prevalent institutional arrangement for manufacturing workers in Italy since the sixties up to the late eighties due to strong union organizations.

Alternatively, and this was the case in the fifties and again in the recent years, we can think that workers engage in decentralized bargaining with firms at the province level. This allows them to react to local market conditions ( $e_i$ ), but we still assume that the "rules" or the "frame" of the bargaining (captured by  $z$ ) is common because dictated by national laws and practices. In this case we can assume that workers and firms achieve local agreements, responsive of local conditions and the wage and employment rate in equilibrium are given by the intersection of the wage-setting curve (identical in shape across provinces) and the province-specific labor demand curve. Employment rates in equilibrium are  $e_H^d$  and  $e_L^d$  in the high and low productivity province, respectively. Equilibrium wages, now also differ across regions, and are  $w_H^d$  and  $w_L^d$ . Importantly,

in both types of equilibrium, there is a positive association between provincial productivity and provincial employment rate. Formally, the equilibrium employment rate in province  $i$  ( $= H, L$ ) in the decentralized set-up is:

$$\ln e_i^d = \phi_N^1 + \frac{1 - \beta}{\alpha + \delta(1 - \beta)} \ln a_i(S_i) \quad (7)$$

where  $\phi_N^1$  is a term that depends only on national variables ( $z$ ) and constant parameters ( $\alpha, \beta, \gamma, \delta$ ). In the centralized equilibrium set-up the equilibrium expression for the employment rate is:

$$\ln e_i^c = \phi_N^2 + \frac{1 - \beta}{\alpha} \ln a_i(S_i) \quad (8)$$

where  $\phi_N^2$  is a term that depends only on national variables ( $z$  and  $a_N$  in this case) and constant terms ( $\alpha, \beta, \gamma, \delta$ ). The above relationships determine the equilibrium employment rates as a function of the equilibrium productivity in provinces. If relative productivity,  $a_i$ , in the long run reaches and moves around its balanced growth path level, employment rates would reach its steady state too. Therefore, controlling for the initial employment rate the growth rate of employment in a province is positively dependent on the balanced growth path level of productivity. As population growth was rather homogeneous across provinces and not correlated with employment growth (0.07 correlation coefficient for the 1950-1990 period) we can approximate the growth rate of the employment rate with the growth rate of employment plus an error term  $\varepsilon_{it}$ . We assume that during the transition towards the balanced growth path, which took place after world war II, employment grew faster for provinces starting farther from their balanced growth path (BGP). Therefore this growth rate would depend negatively on initial employment rate  $e_{i,t}$  and positively on the BGP employment rate determined by (7) or (8). Qualitatively the dependence of employment growth on Social variables can be expressed, therefore, in reduced form as follows:

$$\ln(L_{i,t+1}/L_{i,t}) = G(\underset{-}{\ln e_{i,t}}, \underset{+}{\ln a_i(S_i)} + \varepsilon_{it}) \quad (9)$$

We estimate a linear specification of equation (9) including as dependent variables the initial employment rates and including some social variables to capture  $S_i$  and some variables to capture

important characteristics of industrial specialization, industrial competition and diversity which may also affect industrial productivity  $a_i$ .

### 3 Social Variables and Productivity

#### 3.1 Civic Involvement

The idea of "civic involvement" as vehicle of agglomeration economies and enhancer of local productivity follows the original contribution by Robert Putnam [32] who first identified, measured and studied the impact of civic involvement (often called "social capital" by the author) on regional institutions in Italy. Later, in a shorter paper (Helliwell and Putnam [17]) the effect of civic involvement on regional per capita income was tested. Abundant qualitative literature relative to the economic success of industrial districts in northern and central Italy has also analyzed concepts of social cooperation, social networks and local characteristics (see for instance Brusco [6], Leonardi and Nanetti [26], [25]). More recently Forni and Paba [10] have analyzed the effect of industrial and social variables on productivity growth in Italian provinces, finding an important role of some of them such as labor conflict and electoral participation. The social variables analyzed are often closely related to the idea of civic spirit defined in Putnam [32]. In particular involvement in local organizations, participation in networks and in general the degree of "trust" among citizens may affect labor productivity through two channels. First, decreasing the uncertainty of economic transactions by increasing reciprocal communication and trust among agents may increase the returns to investments. This would act, in the model presented above, through a reduction of the term  $\tau(S_i)$  which is a unit cost of appropriating returns from investment in a world with diversion or imperfect enforcement of contracts. This is the channel emphasized in the recent analysis of Guiso et al. [16] that focuses on social capital and financial markets in Italy. Second, it may increase the provision of local public goods and facilitate the learning interactions outside the natural units of productions (firms) inducing urbanization externalities which are external to the firm but internal to the industrial agglomeration. In particular Marshallian externalities from "local knowledge spillovers" could be made stronger when agents interact frequently in a trusting local environment. This effect would act through an increase in the term  $A(S_i)$  in the model presented above. Becattini [3] and other scholars analyzing the Italian industrial districts have often emphasized the presence

of these local networks (i.e. of local civic involvement) together with homogenous specialization and local competition as determinants of the industrial success of some of these districts. We do not explicitly observe through which channel the social variables operate but we analyze their final impact on employment creation.

Existing studies have analyzed the impact of civic involvement, or of the somewhat more general idea of "trust" among citizens, on productivity and growth across countries (Knack and Keefer [21]). Here we test whether local labor productivity and urbanization externalities depend on the intensity of civic involvement. While the variables used to measure civic involvement are similar to those proposed by Putnam we believe that civic involvement is a much more local and diversified phenomenon in Italy than it emerges from the analysis of twenty regions (as done in Putnam [32]). There are strong (historically determined) local identities, often centered in cities, rather than in regions, and the extent of interactions and civic involvement is probably better captured by using provinces, rather than regions, as units. Therefore, we use 95 provinces, corresponding (most of them) to one main city and its surroundings, possibly inclusive of other smaller towns. This choice allows a much richer characterization and much larger variance of social variables as well as stronger statistical power to identify partial correlations. Three main variables are used to identify civic involvement and all of them have been collected going back to the sources of Putnam's data (method and sources for these as well as for all data are described in the Appendix). 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 performed in the early eighties. This variable (*AssDens*) captures the propensity of citizens to gather in recreational, cultural, artistic, sport, environmental and any other kind of non-profit association. Second we measure the electoral turnout in the referendum elections of 1974 (*Turnout74*). The referendum held in 1974, that decided about legalization of divorce, was a heated topic of contention and socially minded citizens were extremely concerned about its social consequences. Local organization and networks were mobilized and responded so that turnout in the referendum was a measure of social involvement of people. We collect from the reports of that referendum the data on the percentage turnout in each province. Finally the reading of newspapers, both local and national, as a way to be informed on local and general issues is regarded by Putnam as another potential indicator of civic involvement. We use the share of citizen reading non-sport newspapers for year 1974 (*Newspaper*),

the earliest year for which we could find these data, as a measure of intensity of newspaper reading in the community. While each of the three indicators is probably an imperfect proxy for the unobservable variable "Civic Involvement" we combine the three into an index (*CIVIC*) that should parsimoniously capture most of the covariance of these proxies.

### 3.2 Violent Crime

Economists have studied crime, its determinants and its consequences since the early work of Gary Becker [5]. Most of the empirical work has focused, however, on the economic determinants of crime, (see Gould et al. [14], Grogger [15], Lochner and Moretti [27], Machin and Meghir [28]) rather than on its economic consequences. The direct cost of some form of crime, such as murder, is so high that there would be plenty of policy reasons to be concerned with it even lacking any other negative externality of crime. There is little work, therefore, on the aggregate consequences of violent crime on economic development and growth. From the theoretical point of view recent models argue that the decision of committing crimes or engaging in productive activity are simultaneous (Murphy et al. [30], Sah [34]). In particular the presence of many criminals introduces a negative externality on people who produce (as they are more easily victimized) and a positive externality on people who commit crimes (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. In this context it does not make sense to ask whether criminal activity affects or is affected by crime, as the two are simultaneously determined. This explanation is often invoked in order to account for the large variations of crime rates over time and across space (mainly in the U.S.) vis a vis similar economic conditions. Glaeser, Sacerdote and Scheinkman [13] claim that the major determinant of the large variation in crime rates over space in the U.S. are the local social interactions which act to reinforce each other's behavior. However, such simultaneity and self-reinforcement is stronger for petty crime and much weaker for murder. We will argue that in Italy murder rates across provinces have been rather stable over time and along different stages of development. Murders have been the expression of organized crime with tendency to operate in specific areas and not the expression of occasional criminal activity fluctuating in time and space with economic conditions. In trying to convince the reader of an effect from murder rates to economic activity, we will use the temporal dimension and check the correlation between crime rates in the far past and subsequent long run

growth.

At the country-level violent crime has been analyzed in the form of social unrest, political assassinations and frequency of "coup d'etat" across countries, as determinant of political instability and, through that channel, as a hurdle to economic growth (Barro [2], Mauro [29]). Several violent phenomena, however, conducive to crimes and murders with potentially major disruptive consequences on economic activity, are neither at the individual level nor at the national level. The Basque Countries within Spain, Corse within France, Northern Ireland in the United Kingdom and some provinces of the Italian Mezzogiorno are but a few examples of regions where violent crime stems from diverse causes (ethnic identity, religious divides, organized criminal activity) and has a clear regional or provincial connotation. Some of the roots of the phenomena of civic involvement and violent crime could be common. Lederman et al. [24], for instance, show that "social capital" is one important determinant of murder rates across countries. Ethnic fragmentation may lead to low civic involvement and more crime, or the presence of "positive" civic organization can keep the crime level under check. The two phenomena, however, might be somewhat correlated but are well distinct. Lack of trust does not normally degenerate into criminal violence. On the other hand phenomena such as terrorism or well organized criminal groups (Mafia, drug lords) may generate violent crime in regions where civic involvement of the average citizen is high.

We focus only on the most extreme form of violent crime, namely the murder rate per 10,000 inhabitants captured by the variable *Murder*. We believe this is an interesting measure that captures the maximally disruptive aspect of violent crime on economic activity and, in Italy, murder rates have been associated to the presence of established criminal organizations. We use historical data to measure the murder rates in 1991, 1971 and, at the regional level, in 1951. The correlation coefficients of murder rates across decades are very high (0.6 between 1990 and 1970 and 0.72 between 1950 and 1970) and some provinces such as Palermo, Caltanissetta in Sicily and Napoli, Reggio Calabria in the South are consistently among those with highest murder rates. Also the variation of murder rates across provinces is large. Many provinces experienced less than one murder per million of inhabitants and others had more than 20 murders per million. However, some economic variables (such as employment rates) also exhibit large variations across provinces. A second reason to focus on Murder rates is that it is very unlikely to under-report murders as, once the "violent" cause of death is ascertained, the Judiciary authority is automatically notified.

This avoids the problem of under-reporting of crime in areas where people have low trust in Police forces or in less developed areas. In a recent study Soares [35], comparing victimization surveys and official statistics, finds that the extent of under-reporting for 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, that this is not true for homicides. While it would be interesting to look at statistics on petty crime, thefts, larceny or robbery across Italian provinces their under-reporting would severely bias any conclusion. A third reason to think that murder rate has a maximal negative external effect on economic activity is that murders are known through national reports in the whole country and entrepreneurs and investors are well informed on them and tend to associate high murder areas with high uncertainty and additional costs for security. This is likely to produce disincentives and centrifugal forces pushing factors and enterprises out of these regions.

## **4 Preliminary Evidence: Employment Rates in the Private Sector**

To prepare the ground to the analysis of social variables and economic performance for Italian Provinces, we present here some stylized facts and correlations. This section is meant to convince the reader that there are some relevant correlations in the data and these correlations survive when we control for some of the variables which could affect both social and economic performances. We also make some attempts to inquire into the direction of causation by using long lags of independent variables. We begin by considering a cross-sectional analysis as it gives us an idea of the dramatic economic differences across Italian provinces, still present in 1991. Over the decades the intervention of the central Italian government in trying to stimulate local development has often taken the form of promoting public employment in poor areas, subsidizing income and equating wages between rich and poorer areas. For this reason and following our stylized model in Section 2, rather than measuring average income it is interesting, and closer to a measure of the strength of the local private economy, to measure the employment rate in the private sector. Employment rates and their growth rates are highly correlated to other measures of economic development such as income per capita (see, for instance Forni and Paba [10]). We consider all employees working in the industry and service sectors, excluding public employees (i.e. those working for the Public Administration, the Education Sector and the Health Care Sector, which were completely public

during the considered period) and we express them as percentage of working age population (age 16-64) in each province. Higher employment rates in the private sector reveal stronger private labor demand in the province and, indirectly, stronger agglomeration externalities. Figure 1 plots the employment rate in the private sector against the murder rate (Murders per 10,000 inhabitants) for the 95 Italian provinces in year 1991.

Each province is denoted with an identifier which could take the values "SO", "CE", "NE" or "NW" depending on the location of the province in the South, Center, North East or North-West of the country, respectively. Three facts are clear from the figure. First a negative and significant correlation between murder rates and employment rates exists and is statistically significant and quantitatively large. The OLS regression line, reported in Figure 1 has a coefficient equal to -1.5 (t-statistic 3.81) and explains 18% of the variance of the employment rate. A decrease in the murder rate of 0.1 is associated to an increase in participation rate of 0.15 (15%). Second, it appears that the association between murder rates and employment rates is non-linear. While for low levels of the murder rate (say below 0.5 murders per 10,000 people) there is a large range of possible employment rates, high murder rates (above 0.5) are systematically associated with low employment rates (below average). It is reasonable to think that murder rates above a certain threshold are very harmful to private economic activity, while small differences at low rates do not really affect economic incentives. Finally, looking at the provincial identifiers, we realize that there is a large variation even within each of the four large areas in crime rate and economic performance. Some of the provinces exhibit private employment rates as high as 80%, which is remarkable also for U.S. standard, while others agonize at levels of 20-30%, which is very low even for European Standards. On the other hand, while most of the high-crime provinces are in the South, there are some of them in the North-West as well and there are several southern provinces with low crime-rates. This variation of crime-rates across Italian provinces, including within a geographic area, will be very useful to identify the impact of violent crime on employment at the provincial level.

It is also useful to produce a scatterplot, similar to Figure 1, for the second variable of interest, namely the degree of civic involvement. To do so, we combine the three variables described in Section 3, namely the participation rate at the 1974 referendum (*Turnout74*), the density of association per 1,000 inhabitants (*AssDens*) and the percentage of people reading newspapers



(*Newspaper*) into one variable. This variable is the first principal component of the three measures. It is the linear combination that explains the largest share of common variance of the three variables. The three variables are highly correlated. The correlation coefficient between *Turnout74* and *Newspaper* is equal to 0.75, while *AssDens* has a correlations coefficient of about 0.4 with either of the other two variables. The civic engagement variable (*CIVIC*) is therefore defined as:

$$CIVIC = 0.89(Turnout74) + 0.88(Newspaper) + 0.63(AssDens) \quad (10)$$

The variable *CIVIC* explains 44% of the variance of *AssDens*, 65% of the variance of *Newspaper* and 70% of the variance of *Turnout74*. Figure 2 reports the scatterplot of private employment rate against the index *CIVIC*, together with the linear regression line between them. The positive relation between the two variables is statistically significant, quantitatively relevant and tighter than in the case of the Murder rate. The index *CIVIC* explains almost 50% of the variation of the private employment rate, and the t-statistic on the OLS coefficient is as large as 8.78. However, it is clear already from a first glance, that most of the correlation is due to the fact that all southern provinces (denoted with "SO") have low values of *CIVIC* (and of employment rates) relative to all other provinces. There is not much correlation between *CIVIC* and employment rate within the Southern group and within the group of all other regions taken one at a time.

Moving beyond the raw correlations, we present in Table 1 some regression results to convince the reader that the correlation between social variables, particularly between murder rates, and employment rates is robust to the inclusion of several other controls. Column 1 of Table 1 shows the OLS regression of Employment rate on *Murder* and *CIVIC*. While the two explanatory variables are correlated with each other (-0.41 is their correlation coefficient), confirming that some of their causes may be common, each has a significant and large impact on the employment rate and together they explain about half of its variation. An increase by one standard deviation of *CIVIC* is associated with a 7 percentage points increase in the employment rate. An increase of one standard deviation of *Murder* is associated with a decrease by 3 percentage points of the employment rate. The inclusion of measures of Human Capital (Column 2) in the form of the share of population with a secondary school degree (*Secondary*) or with an higher education degree (*Tertiary*) does not affect the partial correlation of the Social Variables with employment rates. These measures

of human capital are positively related to employment rates. However only the share of college graduates (tertiary education) is significant in its positive effect on employment. The inclusion of geographical dummies, however, for North-East, North-West and Center (leaving out South) decreases significantly the impact of social variables. In particular *CIVIC* is only significant at the 10% level (Column 3), while *Murder* is still significant at the 5%. To confirm that the impact of social variables is not simply an effect identified by the contrast between the north and the south of the country in Column 4 we run the regression limiting the data to the 29 southern provinces. Interestingly, the size and significance of the social variables is similar to those estimated in Column 3.

While the index *CIVIC* could be a convenient way of summarizing the information from imperfect measures of the civic involvement of citizens, it is useful to include the three variables separately in the regression in order to see which one is mostly correlated with employment rates. Column 5 disentangles the contribution of the *CIVIC* index by including separately each of the variables *Turnout74*, *AssDens* and *Newspaper*. The regression reveals that only the variable *Turnout74* is positively and significantly correlated to employment rates. The low significance of the coefficients on the other two variables, especially for the Association Density, casts some doubts on our understanding and measuring of Civic involvement and, possibly, of its impact on economic performance.

Finally we address preliminarily in column 6 to 8 the issue of reverse causation between *Murder* and Employment rates as economic development reduces crime and, possibly, murder rates. While we would need some exogenous variation of murder rates in order to address properly the issue, the best we can do here is to rely on the idea that past variables are predetermined with respect to later ones so that if we can measure murder rates in the distant past for Italian provinces this could help as a "more exogenous" instrument for contemporary murder rates. From Italian historical statistics on crime we are able to measure murder rates in provinces in year 1971 (*Murder71*) and also murder rates in Regions (rather than provinces) in 1951 (*Murder51*). We use *Murder71* as instrument for *Murder* in column 6 and we use *Murder51* as instrument in Column 7. The two variables are good instruments, explaining about 35% of the variation of Murder and the estimates, while rather imprecise, do not show any evidence of an endogeneity bias towards 0 of OLS. If anything the instrumental variables estimates are larger in absolute value than the OLS ones. In

column 7 we cluster the errors by region, as the instrument varies only across regions. Column 8 shows that, using *Murder51* as instruments, we can identify a very important role for violent crime even when we restrict the analysis to the southern provinces only. All in all, acknowledging the limits of cross-sectional regressions, we think that we identified a robust partial correlation between murder rates and employment rates. Such correlation does not seem to be fully driven by the impact of economic activity on crime and may indicate a relevant effect from crime rates to economic development and agglomerations. We set to analyze this issue further in the next section.

## 5 Local Characteristics and Employment Growth

Large part of the economic success, or lack of it, of an Italian province in 1991 was accounted for by the development (or lack of it) occurred in the post Second World War period. In particular, industrial and in general economic take off depended on the presence of a dynamic core of agglomeration in the province, attracting firms and generating employment growth. It is therefore very instructive to study the emergence of industrial agglomerations during the 1951-1991 period, focussing mainly on footloose industries, i.e. the manufacturing sector, and on the economic and social determinants of these agglomeration forces. Italy was a rather underdeveloped country in 1951 and its economic growth took the form of industrial development, at first, becoming mainly growth of the service sector only much later. Large industrial agglomerations (such as the car industry in Turin or shipbuilding in Genoa) served as focal points of economic development in the fifties and sixties while smaller industrial clusters (such as the industrial districts in the Center and North-East) continued to provide economic stimulus in the seventies and eighties. Focussing on agglomeration economies in the manufacturing sector is therefore particularly interesting and appropriate in order to understand economic development in post-war Italy.

Our empirical framework, justified by the model in section 2 is similar to the one adopted by other authors who have analyzed agglomeration economies in cities or regions and their effect on employment growth. Following Glaeser et al [12], Henderson et al. [18], and other authors (reviewed in Rosenthal and Strange [33]) we estimate the following equation, using a sector in a province as the unit of observation:

$$\ln(L_{pit}/L_{pi0}) = D_i + \ln(L_{p0}) + Conc_{pi0} + Div_{pi0} + Comp_{pi0} + Social_{p0} + \varepsilon_{pi} \quad (11)$$

The dependent variable is the growth rate of private employment  $L$  in sector  $i$ , province  $p$  between period 0 (=1951) and  $t$  (=1991). Our data on employment are from the Italian Census of Manufacturing and Services which takes place every ten years. The manufacturing industries for which we can reconstruct comparable data between 1951 and 1991 are fifteen (listed in the Appendix) and the provinces are 95 so that we have 1,425 potential observations in our cross-sectional growth regression. However, as very small sectors could have an erratic behavior and their growth rates could be very noisy, we only include those industries which accounted for at least 1% of the manufacturing employment of the province in 1951 leaving only 921 observations. Due to strong centralized wage setting for each sector we assume that the wage growth within each sector has been equal for all provinces so that  $D_i$ , the sector fixed effect, captures change in employment due to change in wages.  $L_{p0}$  is the total manufacturing employment in province  $p$  in 1951. It controls for all the effects related to the overall size of the province. It could be positive because of local demand effect or negative due to congestion and mean reversion of employment density across provinces. We include this term, following Combes [8], so that the coefficient on the variable  $Conc_{pi0}$ , which measures the relative concentration of sector  $i$  in province  $p$  ( $L_{pi0}/L_{p0}$ ), 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.  $Div_{pi0}$  is an index of diversity in the manufacturing sector. It is calculated as  $1 - \sum_{j \neq i} (sh_{jp0})^2$ , where  $sh_{jp0}$  is the share of manufacturing workers of province  $p$  employed in sector  $j$ . The index is sometimes called "index of fractionalization" and it measures, for each sector  $i$  and province  $p$ , how "diverse" the sector composition of the rest of the manufacturing in the province is. Its value is bounded between 0 and 1 and higher values correspond to higher diversity. Diversity of the manufacturing composition may promote urbanization externalities, due to beneficial interactions among industries. The effects of diversity on productivity are often called "Jacobs Externality" since Jane Jacobs [19], [20] identified the crucial role of diversity and of cross-fertilization of ideas

in the emergence of cities as economic and social motors of development.  $Comp_{pi0}$  is a measure of the initial degree of local competition among firms of industry  $i$  in province  $p$ . It is measured as the inverse of the average employment in a firm in province  $p$  relative to the average employment in a firm at the national level for that sector: the smaller the average firm in a province, relative to the national average, the larger the competition in the sector within that province. Local competition could be a strong promoter of product and process innovation and therefore another important source of agglomeration externalities. The work of Porter [31] has developed, through several case-studies, the idea that local competition generates higher intensity of innovation and technological spillovers in the local industry. The inclusion of such variable follows Glaeser et al. [12] who first tested the importance of this competition-effect on city growth. The summary statistics for the variables defined above can be found in Table A1 of the Data Appendix.

Finally  $Social_{p0}$  are the measures of the two social variables described above, *Murder* and *CIVIC*. They vary across provinces and we can identify their effect on agglomeration economies, for the average sector in each province. While ideally we would measure these variables at the beginning of the period (1951) data availability forces us to use indices calculated for the seventies. For the Murder rate we use the regional value in 1951 as instrument in one specification. We also rely on the fact that the structure of the regression, the inclusion of sector and regional controls and the stability of the social variables over time, reduce the potential endogeneity problems.

## 5.1 Effects of Diversity, Competition and Concentration

We implement empirically regression (11) and we report the results in Table 2 and Table 3. We first present the results including only the economic variables as determinant of agglomerations and growth. Table 2 reports this specification that omits the social variables so that we can compare some of the results to those in the previous literature which has focussed on various kinds of agglomeration externalities. Next section and Table 3 present the evidence when we include the social variables which are the focus of our analysis. The dependent variable is the yearly growth rate of employment for the province-sector. We can interpret the magnitude of the coefficients as the effect of the independent variable on the yearly percentage growth rate of employment. Column 1 does not include either sector or regional dummies, but only the measures of Concentration, Diversity and Competition. Column 2 includes fifteen sector dummies. Column

3 adds the share of manufacturing in total employment of the province as regressor, in order to separate the effect of pure crowding from the effect of manufacturing concentration. Finally Column 4 adds nineteen regional dummies, controlling for any regional difference in employment growth and allowing identification of the agglomeration effects only using within region, within sector (across provinces) variation. Column 4 is certainly the preferred specification as it controls for any sector-specific factor (such as wage growth) and any region-specific factor (such as provision of public infrastructure, or distance from large European markets). The estimated effects are, however, rather stable and precise across specifications. First of all the positive effect of sectorial Diversity and local competition (*Div* and *Compet*) is statistically significant and large in each specification. Increasing the degree of local competition by one standard deviation (1.8) increases employment growth in the provincial sector by 0.66 percentage points per year. Increasing the diversity of the manufacturing sector by one standard deviation (0.11), increases employment growth by 0.52 percentage points per year. Keeping in mind that the average growth rate of employment in the considered industries was around 0.5 percentage points per year in the period 1951-1991 we have very large effects from competition and diversity. Our estimates of these two effects are very consistent with the findings of Glaeser et al. [12] relative to American city-industries. They find positive effect of competition and of diversity on growth of employment 1956-1987. A positive effect of diversity on employment growth was also found by Henderson et al. [18] for high tech city-industries in the U.S. As for the presence of MAR externalities, the effect of initial concentration of employment in a sector (*Conc*) on the following growth is consistently negative. Increasing the initial concentration of a sector has a negative effect on following growth, revealing that crowding effects are stronger than MAR externalities. For a given relative concentration of the sector, increasing the overall size of the manufacturing employment has also a mildly negative effect (Column 2) which is the combination of a negative absolute effect of initial size of the manufacturing ( $L_p$ ) and a positive effect of initial share of overall employment in manufacturing (*Share of Manufacturing*). The negative effect of relative concentration is consistent with the findings of several previous studies such as Combes [8] and Glaeser et al. [12].

## 5.2 Effects of Civic Involvement and Violent Crime

Different growth rates of employment in province-industries are indicators of the presence of stronger or weaker agglomeration economies, at least in the long run. While some of these economies depends on specific conditions of the province-sector, such as its concentration or degree of competition, others may be induced by the presence of "good" social characteristics in the province. Different sectors may benefit to different extents from the presence of these social characteristics. Here, however, we are interested in measuring the average effect on employment growth of a province-sector, of the intensity of civic involvement and of the presence of violent crime, once we control for the specific economic factors. Table 3 reports the estimates of equation (11) including the social variables. Columns 1 and 2 report the estimates when we include, separately, *CIVIC* and *Murder*. Columns 3 and 4 report the estimates when we include both measures without or with nineteen regional dummies. Column 5 includes *CIVIC* and the murder rate measured in 1951. The advantage of such specification is that we can rely on a measure of crime rate which is predetermined with respect to the employment growth. However the 1951 data are not available at the province level so that we can only use crime rates at the regional level. This reduces significantly the variance of our measure and the precision of the coefficient estimate. Finally column 6 includes each of the variables used to construct the index *CIVIC* rather than *CIVIC* itself, and Column 7 includes the murder rate variable in non parametric form. All specifications include the set of fifteen sector dummies and the variables capturing economic determinants of agglomeration economies. The coefficient estimates on the variables *Conc*, *Div* and *Compet* are similar to those reported in Table 2. I focus here on the estimates of the effect of the social variables. In general a regularity emerges across specifications. The effect of *CIVIC* is small and never significant, while the effect of *Murder* is negative, large and very significant. Considering, for instance, the estimates in Column 3, which includes sector dummies and the economic controls as well as *CIVIC*, a decrease of 0.1 of the murder rate (i.e. a decrease of one murder per 100,000 people) is associated with 0.7 percentage points higher growth of employment in each year. Even controlling for regional dummies and relying only on within-region cross-province differences (Column 4) the above mentioned decrease in murder rate would increase yearly employment growth by 0.37 percentage points. To the contrary no effect on employment growth is associated with different degrees of

civic involvement. Column 5 provides some reassurance on the direction of the causation. Even including the regional measure of crime rate taken in 1951, which is fully predetermined relative to the growth of employment between 1951 and 1991, we still get a significant (at 10% level) and negative effect of this variable on growth. Unluckily a lot of the variation of crime rates is at the provincial, rather than at the regional level, and we lose that source of identification when we use the 1951 regional crime rates.

Decomposing the *CIVIC* index into its components and estimating the effect of each of them (Column 6) does not reveal any variable (*Turnout74*, *AssDens* and *Newspaper*) as significantly associated with employment growth. Finally Column 7 explores the possibility of a non-linear dependence between employment and murder rate. The preliminary analysis of employment rates in 1991 conducted in section 4 suggested that there could be a non-linear relation between murder rate and economic activity. Only provinces with unusually high crime rates suffered the consequences in the form of slower growth and depressed labor demand. In column 6 we study the effect of murder rates by including 3 dummies. The reference group is the set of regions with murder rate in the bottom 25% of the distribution. *Medium Murder* correspond to the group in the 25%-50% of the distribution, *High Murder* identifies provinces in the 50-75% of the distribution and *Very High Murder* signals provinces in the top 25% of the distribution. The coefficient for each of the dummies represents the (negative) difference in yearly growth rate between a province in that group and a province in the quartile with lowest murder rate. The coefficient estimates for each dummy are significantly negative and their absolute value increases going from *Medium Murder* to *Very High Murder*. Remarkably the difference in yearly growth rate, keeping all other determinants constant, between a region in the top 25% and a region in the bottom 25% of the murder rate distribution is a huge 1.50 percentage points. In forty years such difference in employment growth implies that the average manufacturing sector employs 80% more workers in the provinces with lowest murder rates than in those with highest. Once we control for regional effects and for economic characteristics the effect of crime rate on employment growth appears rather linear.

### **5.3 Employment Growth in Province Manufacturing**

It is useful, at this point, to go back to our aggregate provincial data to confirm the impact of social variables (Murder Rates) on overall manufacturing employment growth across Italian provinces.



Aggregate growth in manufacturing employment during the era of industrialization of the country 1951-1991, serves as an important indicator of development. Moreover it is also instructive to check whether the presence of organized crime has been a hurdle to development in each of two subperiods: 1951-71 and 1971-91. We check that the negative effect of violent crime on employment growth, which we studied within sectors in the previous section, had actually a significant aggregate effect on manufacturing employment growth and was at work in the early industrialization period (51-71) as well as in its more mature phase (1971-91). We also inquire on the much weaker effect of civic involvement. Table 4 reports the estimates of a simple regression of yearly growth of employment in the manufacturing sector of 95 provinces in the period 1951-1991 and in its subperiods on measures of their social variables at the beginning of the period. Columns 1 and 2 consider the whole sample, include initial level of employment and geographic dummies a controls. We include each "social variable" separately (Column 1) as well as the index *CIVIC* and *Murder* only (Column 2). Column 3 and 4 do the same for the late sub-period (1971-91), while column 4 and 5 do it for the early sub-period (1951-1971). Notice that while the early sub-period is more interesting in terms of industrial development (the so called "economic miracle" took place during those years) we have a coarser measure of murder rates for 1951 and this may affect the precision of the estimates. On the other hand the 1971-1991 period is interesting as it experienced the fast development of small and medium enterprises, characterizing the Italian industrial districts, while the traditionally large companies were growing at a slower pace (Becattini [3]). The results reported in Table 4 reinforce the finding that high murder rates are associated with significantly lower economic growth while the variables capturing civic participation do not have a significant effect. The quantitative effect of murder rates is very large. The coefficient in Column 2 implies that the difference in employment growth between the safest province (murder rate =0.08) and the most dangerous (murder rate=0.48) was a stunning 1.2 percentage points per year for the whole 1951-1991 period. Very interestingly such effect is significant and large for each of the two subperiods and, possibly, even larger in the second one. Taking the coefficients at their "face value" the difference in employment growth associated to 0.4 difference in murder rates was 1.73 percentage points per year in the 1971-1991 period.

The analysis within subperiods also allows us to check the very high stability of murder rates across provinces relative to their employment growth. Correlation between crime rates in 1951 and

1971 is 0.70, while between 1951 and 1991 is 0.55. Correlation of employment growth rates between 51-71 and 71-91 is only 0.22. While this implies that other factors and shocks, besides criminal presence, affected employment growth in each period, they emphasize the slowly changing nature of our independent variable (crime rates) hardly depending on recent economic success (employment growth).

## 6 Conclusions: Organized Crime or Lack of Civic Spirit?

Little is known about the effect of social variables on economic performance. Once we control for institution, for the rule of law and for the political system, could different attitudes of people towards civic relations and the presence of criminal activity affect the economic outcome of a region? The present case study takes a first cut at this question. The question is important because several countries have experienced very unequal regional development (e.g. Germany, Italy) and economic factors are often not enough to account for such inequality. Italy, on the other hand, represents a very interesting case study, especially when we consider the period of its industrial take-off after World War II. A period of intense industrialization could generate dynamics that increase differences. As agglomeration forces shape the economic geography of a country, some persistent social differences may generate virtuous or vicious cycles that set regions on diverging paths. Italy was also the object of study of one extremely influential recent piece of research by Robert Putnam [32] . Such study galvanized economists to study "social capital" and to think hard how to measure it and how to capture its effects on economic development. It seemed to us a worthwhile enterprise to study in detail, using newly collected data the relationship between Robert Putnam's "Civic Spirit" and industrial development in Italy. However it seemed to us that very little is known also about the effect of violent criminal activity on industrial development, especially at the regional level. The single and best known social problem of some regions in Italy is certainly the presence of organized violent crime often perversely involved in criminal economic activities. The unsafe environment and the uncertainty produced by violent crime may act as a negative externality on economic growth and on the possibility of generating employment and industrialization, independently from the civic attitude of people.

The result of running these two social variables (Civic Involvement and Violent Crime) one

against the other as potential determinants of differences in employment growth and industrial agglomeration across Italian provinces is rather clear. While the positive correlation of Civic involvement with employment rates, industrial growth and industrial agglomerations is at best small and scarcely significant, the negative correlation of high rates of violent crime, measured using the Murder rates in provinces, and industrial growth is very large and very significant. Our analysis finds that crime could have represented a major hurdle to industrial development for some provinces. Some provinces in Sicily and Calabria (the two southernmost regions) might have experienced lower employment growth by as much as 1.2 percentage points each year for forty years, because of their very high crime rate. While the inclusion of several controls, the use of predetermined variables, the slowly changing intensity of provincial murder-rates, all suggest that at least part of the connection between violent crime and employment growth may be from crime to employment, the issue deserves further research. Importantly, though, we established that the negative correlation between violent crime and low employment growth is robust, extended to long periods of time and not diminishing in the recent decades, while the one between civic involvement and employment growth is rather weak. We hope that this piece of research will encourage interest in the analysis of the relation between crime and economic success. We also hope that our results may encourage Italian policy makers to renew their efforts to eradicate violent crime in some areas even as an effective form of economic policy.

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## A Data Appendix

### A.1 Census Data

The data on employment for the sector-province and for the total manufacturing sector at the province level are from the Italian Census of Manufacturing, published by ISTAT (the Italian Institute of Statistics), and held every ten years between 1951 and 1991. 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 as well as the variables *Conc*, *Div* and *Comp* have been constructed using these data. The summary statistics of these variables are reported in table A1 below.

**Table A1**  
**Summary Statistics of the variables Used in the Regressions**

<b>Unit of Observation: Sector-Province</b>	<b>Average</b>	<b>Standard Deviation</b>	<b>Min.</b>	<b>Max.</b>
<i>Yearly growth rate of employment: 1951-1991</i>	0.5%	2.9%	-16%	+8%
<i>Conc.</i>	0.1	0.9	0.01	0.70
<i>Div.</i>	0.8	0.06	0.44	0.94
<i>Compet.</i>	1.7	1.8	0.02	13
<i>Share of Manufacturing</i>	0.41	0.11	0.18	0.71

The sectors within manufacturing for which it was possible to reconstruct a consistent definition between 1951 and 1991 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 95 provinces used in the regressions are listed in the Table A2 below. We also indicate the

region and the geographical area of the country (North-East, North-West, Center, South) in which they are located.

<b>TABLE A2</b>					
<b>province</b>	<b>region</b>	<b>Area</b>	<b>province</b>	<b>region</b>	<b>Area</b>
Torino	Piemonte	North-West	Firenze	Toscana	Center
Vercelli	Piemonte	North-West	Livorno	Toscana	Center
Novara	Piemonte	North-West	Pisa	Toscana	Center
Cuneo	Piemonte	North-West	Arezzo	Toscana	Center
Asti	Piemonte	North-West	Siena	Toscana	Center
Alessandria	Piemonte	North-West	Grosseto	Toscana	Center
Aosta	Valle d'Aosta	North-West	Perugia	Umbria	Center
Imperia	Liguria	North-West	Terni	Umbria	Center
Savona	Liguria	North-West	Viterbo	Lazio	Center
Genova	Liguria	North-West	Rieti	Lazio	Center
La Spezia	Liguria	North-West	Roma	Lazio	Center
Varese	Lombardia	North-West	Latina	Lazio	Center
Como	Lombardia	North-West	Frosinone	Lazio	Center
Sondrio	Lombardia	North-West	Caserta	Campania	South
Milano	Lombardia	North-West	Benevento	Campania	South
Bergamo	Lombardia	North-West	Napoli	Campania	South
Brescia	Lombardia	North-West	Avellino	Campania	South
Pavia	Lombardia	North-West	Salerno	Campania	South
Cremona	Lombardia	North-West	L'Aquila	Abruzzo	South
Mantova	Lombardia	North-West	Teramo	Abruzzo	South
Bolzano	Trentino-Alto Adige	North-East	Pescara	Abruzzo	South
Trento	Trentino-Alto Adige	North-East	Chieti	Abruzzo	South
Verona	Veneto	North-East	Campobasso	Molise	South
Vicenza	Veneto	North-East	Isernia	Molise	South
Belluno	Veneto	North-East	Foggia	Puglia	South
Treviso	Veneto	North-East	Bari	Puglia	South
Venezia	Veneto	North-East	Taranto	Puglia	South
Padova	Veneto	North-East	Brindisi	Puglia	South
Rovigo	Veneto	North-East	Lecce	Puglia	South
Udine	Friuli-Venezia Giulia	North-East	Potenza	Basilicata	South
Gorizia	Friuli-Venezia Giulia	North-East	Matera	Basilicata	South
Trieste	Friuli-Venezia Giulia	North-East	Cosenza	Calabria	South
Pordenone	Friuli-Venezia Giulia	North-East	Catanzaro	Calabria	South
Piacenza	Emilia-Romagna	Center	Reggio di Calabria	Calabria	South
Parma	Emilia-Romagna	Center	Trapani	Sicilia	South
Reggio nell'Emilia	Emilia-Romagna	Center	Palermo	Sicilia	South
Modena	Emilia-Romagna	Center	Messina	Sicilia	South
Bologna	Emilia-Romagna	Center	Agrigento	Sicilia	South
Ferrara	Emilia-Romagna	Center	Caltanissetta	Sicilia	South
Ravenna	Emilia-Romagna	Center	Enna	Sicilia	South
Forlì-Cesena	Emilia-Romagna	Center	Catania	Sicilia	South
Pesaro e Urbino	Marche	Center	Ragusa	Sicilia	South
Ancona	Marche	Center	Siracusa	Sicilia	South
Macerata	Marche	Center	Sassari	Sardegna	South
Ascoli Piceno	Marche	Center	Nuoro	Sardegna	South
Massa-Carrara	Toscana	Center	Cagliari	Sardegna	South
Lucca	Toscana	Center	Oristano	Sardegna	South
Pistoia	Toscana	Center			



## A.2 Social Variables

The variables used to construct the index CIVIC are those originally suggested in Putnam [32]. We referred to his sources and, where possible, we collected them at the province level. The variable *AssDens* 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 1982 census of Italian associations ("Le Associazioni Italiane" a cura di A. Mortara, Franco Angeli, Milano 1985). The count of people is taken from the Annuario Statistico Italiano, ISTAT, 1983. The variable *Turnout74* 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 Annuario Statistico Italiano, 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* (1971) used in most regressions is the murder rate per 10,000 inhabitants calculated averaging the rates in 1970-71 and 72 from Forni and Paba (2000). They collected the data from Annuario di Statistiche Provinciali, ISTAT 1971-73. The variable *Murder* for the year 1991 was obtained from the publication "Statistiche Giudiziarie Penali", ISTAT 1993. For the variable *Murder Regional* 1951 we used the publication "Un Secolo di Statistiche Italiane: Nord e Sud" SVIMEZ, Roma, 1961 which under the mortality statistics and cause of death reports the number of murders in 1951 by region. We used the population count from the census 1951 to obtain the murder rate.

# Tables and Figures

**Table 1**  
**Cross Sectional Correlates of Employment Rates**  
**95 Italian Provinces, year 1991**

Specification	1 OLS	2 OLS	3 OLS	4 OLS South Only	5 OLS	6 IV	7 IV	8 IV South Only
<i>Murder (1991)</i>	-0.54** (0.27)	-0.65** (0.27)	-0.44** (0.20)	-0.45** (0.20)	-0.39** (0.20)	-1.5** (0.70)	-1.29* (0.74)	-1.50** (0.41)
<i>CIVIC</i>	0.07** (0.01)	0.07** (0.01)	0.033* (0.017)	0.05** (0.015)		0.03* (0.18)	0.03 (0.19)	0.038** (0.16)
<i>Secondary</i>		0.11 (0.30)	0.12 (0.41)	0.55** (0.20)	0.23 (0.40)	0.13 (0.39)	0.13 (0.39)	0.42** (0.06)
<i>Tertiary</i>		0.40 (0.30)	0.41* (0.23)	0.93** (0.09)	0.33 (0.20)	0.61 (0.40)	0.58 (0.44)	0.94** (0.14)
<i>Geographic Dummies</i>	No	No	Yes	No	Yes	Yes	Yes	Yes
<i>Turnout74</i>					0.005** (0.001)			
<i>Association Density</i>					0.05 (0.05)			
<i>Newspaper</i>					0.008 (0.01)			
R <sup>2</sup>	0.51	0.52	0.59	0.54	0.61	0.53	0.55	0.54
Observations	95	95	95	28	95	95	95	28
Instrument						<i>Murder71</i>	<i>Murder51</i>	<i>Murder 51</i>
R <sup>2</sup> of first stage IV						0.35	0.32	0.32

**Notes:**

Dependent Variable= Private Sector Employment Rate in 1991 calculated as number of Employees in the private sector of the economy relative to the population within 16-64 years of age.

In parentheses Heteroskedasticity Robust Standard Errors.

\*\* significant at 5%, \* significant at 10%.

**Murder (1991):** Number of murders per 10,000 inhabitants. Year 1991.

**CIVIC:** First principal component of the variables Turnout74, AssDens, Newsp (defined below). The equation defining CIVIC is (1) in the text.

**Secondary:** Share of the population with a secondary school degree, year 1990

**Tertiary:** Share of the population with a tertiary degree (College), year 1990

**Geographic Dummies:** Three dummies for province being in the North East, North West, Center of the Country (dummy South is omitted)

**Turnout74:** Percentage of participants to the Referendum elections in 1974

**Association Density:** Number of association per 1,000 people in the province, 1980

**Newspaper:** Percentage of people reading non-sport newspaper, 1974

**Table 2**  
**Economic Determinants of Agglomeration Economies:**  
**Employment growth in Sector-Provinces 1951-1991**

Specification	1	2	3	4
<i>L<sub>p,1951</sub></i>	-0.04 (0.09)	-0.09 (0.07)	-0.30* (0.08)	-0.29* (0.08)
<i>Conc.</i>	-1.33 (1.60)	-6.50** (1.00)	-5.80 (0.99)	-5.75** (1.10)
<i>Div.</i>	3.70* (2.00)	6.40** (1.40)	6.90** (1.30)	4.76** (1.60)
<i>Compet.</i>	0.37* (0.05)	0.36** (0.07)	0.46** (0.07)	0.40** (0.07)
<i>Share of Manufacturing</i>			3.70** (1.10)	4.40** (1.40)
<i>Sector-Dummies</i>	No	Yes	Yes	Yes
<i>20 Regional Dummies</i>	No	No	No	Yes
<i>Observations</i>	921	921	921	921
<i>R<sup>2</sup></i>	0.06	0.56	0.57	0.63

**Notes:**

Dependent variable: Average yearly growth rate of employment in the sector-province, 1951-91.

In parentheses: Heteroskedasticity-robust standard errors. Standard errors are clustered by province.

\* significant at 10%, \*\* significant at 5%

**L<sub>p, 1951</sub>**: Total employment in Manufacturing in the province, year 1951

**Conc**: Employment in Sector *i* province *p* relative to total manufacturing employment in province *p*, year 1951.

**Div**: Index of Sector-Diversity within manufacturing:  $1 - \sum_{j \neq i} (sh_{jp1950})^2$ , *sh<sub>jp1950</sub>* is the share of employment in sector *j* for the manufacturing sector of province *p* in 1950.

**Compet**: Index of local Competition. Average number of Firms per Employee in the sector-province relative to the national average number of Firms per employee in the sector, year 1951.

**Table 3**  
**Economic and Social Determinants of Agglomeration Economies**

Specification	1	2	3	4	5	6	7
<i>L<sub>p,1951</sub></i>	-0.10 (0.07)	-0.06 (0.06)	-0.03 (0.07)	-0.10 (0.10)	-0.11 (0.06)	-0.10 (0.09)	-0.08 (0.12)
<i>Conc.</i>	-6.40** (1.05)	-5.50** (1.02)	6.01** (1.01)	5.05** (1.03)	6.11** (1.10)	5.02** (1.03)	5.00** (1.06)
<i>Div.</i>	5.90** (1.50)	5.07** (1.04)	5.30** (1.40)	2.50** (1.2)	5.70** (1.50)	2.50** (1.2)	2.20** (1.20)
<i>Compet.</i>	0.37* (0.07)	0.43** (0.07)	0.40** (0.07)	0.40** (0.07)	0.39** (0.07)	0.39** (0.07)	0.38** (0.07)
<i>CIVIC</i>	0.03 (0.10)		0.19 (0.13)	0.11 (0.26)	0.10 (0.15)		0.24 (0.31)
<i>Murder (1971)</i>		-5.40** (1.80)	-6.90** (2.40)	-3.70** (1.70)		-3.80** (1.70)	
<i>Murder Regional 1951</i>					-2.00* (1.20)		
<i>Medium Murder (0.03-0.044)</i>							-0.62** (0.23)
<i>High Murder (0.044-0.07)</i>							-1.07** (0.26)
<i>Very High Murder (&gt;0.07)</i>							-1.56** (0.35)
<i>Turnout74</i>						0.02 (0.03)	
<i>AssDens</i>						0.14 (0.43)	
<i>Newspaper</i>						1.69 (1.20)	
<i>Sector-Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>20 Regional Dummies</i>	No	No	No	Yes	No	Yes	Yes
<i>Observations</i>	921	921	921	921	921	921	921
<i>R<sup>2</sup></i>	0.56	0.57	0.58	0.63	0.56	0.63	0.65

**Notes:**

Dependent variable: Average yearly growth rate of employment in the sector-province, 1951-91, in percentage points.

In parentheses: heteroskedasticity-robust standard errors. Standard errors are clustered by province except in Column 5 where they are clustered by region.

**Conc, Div** and **Compet** defined as in Table 3.

significant at 10%, \*\* significant at 5%

**Social Variables:**

**CIVIC:** index of civic involvement constructed as the first principal component of the variables *Turnout74, AssDens* and *Newsp.*

**Murder (1971):** Number of Murders per 10,000 inhabitants, year 1971

**Murder Regional 1951:** Number of Murders per 10,000 inhabitants, data are at the regional level, year 1951.

**Medium Murder:** Dummy equal to one in Provinces with murder rate (Murder) between 0.03 and 0.044.

**High Murder:** Dummy equal to one in Provinces with murder rate (Murder) between 0.044 and 0.07.

**Very High Murder:** Dummy equal to one in Provinces with murder rate (Murder) larger than 0.07.

**Turnout74:** Percentage of participants to the Referendum elections in 1974

**AssDens:** Number of associations per 1,000 people in the province, 1980

**Newspaper:** Percentage of people reading non-sport newspaper, 1974

**Table 4**  
**Growth of Employment in Province-Manufacturing**  
**And Social Variables**

Specification	1	2	3	4	5	6
period	1951-1991		1971-1991		1951-1971	
<i>ln(Employment)</i> (beginning of Period)	-0.30** (0.06)	-0.26* (0.06)	-0.30* (0.06)	-0.32* (0.05)	-0.27* (0.10)	-0.21* (0.11)
<i>CIVIC</i>		0.03 (0.11)		-0.20 (0.15)		0.40 (0.28)
<i>Murder (beginning of Period)</i>	-2.16** (0.81)	-3.04** (0.77)	-4.66** (1.21)	-4.33* (1.05)	-2.01* (1.20)	-3.23** (1.24)
<i>Turnout74</i>	0.03 (0.018)		0.03 (0.02)		0.11** (0.03)	
<i>AssDens</i>	0.01 (0.20)		-0.07 (0.24)		-0.12 (0.37)	
<i>Newspaper</i>	-0.01 (0.01)		-0.01 (0.02)		-0.01 (0.01)	
<i>Geographic Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	95	95	95	95	95	95
<i>R<sup>2</sup></i>	0.44	0.41	0.58	0.57	0.38	0.30

**Notes:**

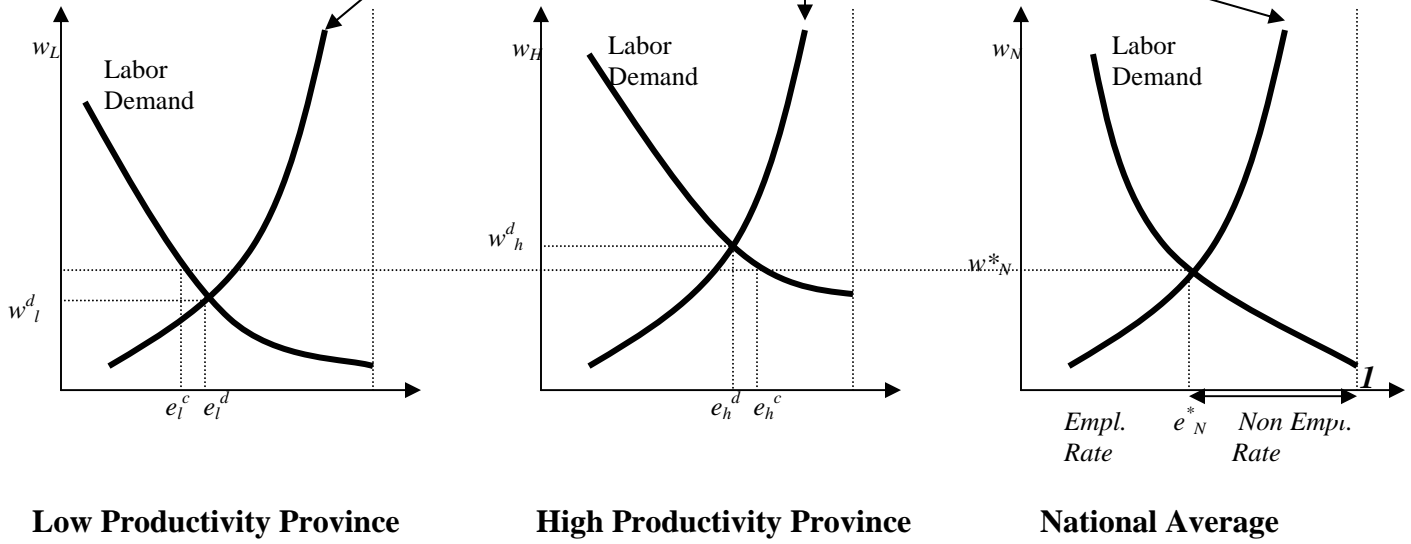
Dependent variable: Average yearly growth rate of manufacturing employment in the province, in percentage points. In parentheses: heteroskedasticity-robust standard errors. Errors are clustered by province, except in regression 5 where they are clustered by region

*ln(Employment)*: logarithm of employment in private manufacturing in the province at the beginning of the period. significant at 10%, \*\* significant at 5%

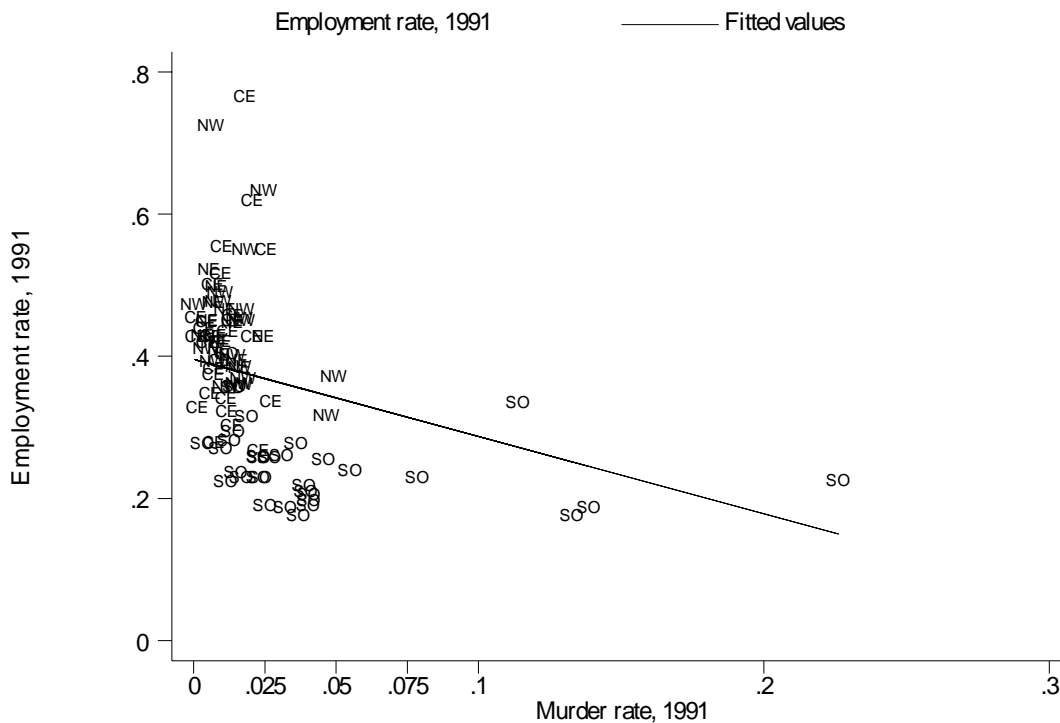
**Social Variables** defined as in Table 3.

**Panel 1**

Wage Setting,  $w = F(e, z)$



**Figure 1:**  
**Violent Crime and Employment rate in Italian Provinces**



**Figure 2:**  
**Civic Involvement and Employment rate in Italian Provinces**

