European Journal of Political Economy 78 (2023) 102363

Contents lists available at ScienceDirect

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Decentralization, social capital, and regional growth: The case of the Italian North-South divide

Luciano Mauro [a,b,*], Francesco Pigliaru [c], Gaetano Carmeci [a]

[a] Università di Trieste, Italy
[b] Duke University, USA
[c] Università di Cagliari and CRENoS, Italy

ARTICLE INFO

JEL classification:
O4
N9
R5

Keywords:
Social capital
Regional convergence
Economic growth
Decentralization

ABSTRACT

This paper aims to show how a region's constant level of social capital may have a very different impact on its economic growth depending on whether the central or the local level of government is responsible for regional policy.

Our case study is the economic performance of Northern and Southern Italy in the post-World War II period, when a long phase of regional convergence came to a sudden halt in the early 1970s. We focus on the economic effects of the 1970s institutional reforms on government decentralization and wage bargaining. Our main hypothesis is that decentralization allocates the provision of public capital to institutions, the local ones, more exposed to a territory's social capital. Since social capital is lower in the Southern regions, decentralization made their developmental policies less effective from 1970 onwards, and regional inequality increased.

We build an endogenous growth model augmented to include the interaction between social capital and public investment as well as the reform of the Italian labour market. We calibrate our model using data of the Italian regions for 1951–71. Our quantitative results indicate that decentralization triggered the influence of local social capital on growth and played a central role in halting the convergence path of the low-social-capital regions.

1. Introduction and motivations

Since Putnam's contribution "*Making Democracy Work: The Civic Tradition of Modern Italy*" (Putnam et al., 1993), it is widely accepted the idea that the performance of an economy is influenced by its civic traditions made of "trust, norms and networks" that are persistently rooted in long-run historical events (Guiso et al., 2004; Alesina and Giuliano, 2015). [1] Among other effects, these traditions – social capital in short – favour government efficiency. Therefore, if in a country social capital is heterogeneously distributed across regions, formally identical institutions may perform differently at the local level. In this respect, the Italian case is emblematic: Charron

* Corresponding author. Università di Trieste, Italy.
E-mail addresses: maurolu@units.it (L. Mauro), pigliaru@unica.it (F. Pigliaru), gaetano.carmeci@deams.units.it (G. Carmeci).

[1] See the influential definition of social capital given by Guiso et al. (2011), namely "those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities". See Bisin and Verdier (2010) on how persistence can be sustained by mechanism of cultural transmission.

https://doi.org/10.1016/j.ejpoleco.2023.102363
Received 21 February 2022; Received in revised form 7 December 2022; Accepted 29 January 2023
Available online 4 February 2023

et al. (2014) report that in the Southern regions of Italy, or "Mezzogiorno", where social capital is low, the quality of local governments is three times worse than in the rest of the country.[2] In turn, this impacts the quality of public policies and economic performance. Persistent economic differences across regions may thus result from heterogeneity in local stocks of social capital.

The idea that social capital is a determinant of economic divides is supported by countless empirical papers.[3] Nonetheless, some aspects of this relationship still require further scrutiny. As Acemoglu (2009) points out, referring to the South Korea's economic miracle, the coexistence of persistent cultural traits with sudden, dramatic changes in growth raises doubts about social capital as a key determinant of economic development.

A neat example of a swift, significant change in growth path is offered, again, by the Italian case. Fig. 1 shows the time pattern of the per-capita GDP gap of the Mezzogiorno after World War II. From a long-run perspective, the large relative gap shows no sign of diminishing. However, the years from 1951 to 1971 are a notable exception. Notwithstanding its persistently low social capital, in those two decades the South enjoyed a significant period of high growth and fast convergence, driven by market forces and public investment. This episode ended abruptly at the beginning of the 1970s.[4]

In this paper, we aim at explaining this apparent puzzle. Our main point is that a constant level of social capital in a region may have a very different impact on its economic growth depending on whether the central or the local level of government is responsible for regional policy. In Italy, around 1970, the institutional set-up was modified by a reform that initiated a robust political and administrative devolution process in favour of the newly born regional governments. A formerly centralized administration of public investment, a crucial factor for sustaining growth in lagging regions,[5] was transferred to a level of government more exposed to the local social context. In territories with low social capital, the local institutions work in (and are permeated by) a context in which the beliefs and values required to overcome opportunistic behaviour are feeble or absent. Frauds and misappropriation of public expenditure by corrupt public officials and private companies are less likely to be carefully monitored and sanctioned and are, therefore, more frequent. This waste of resources, in turn, weakens public investment and makes it less effective in supporting development.

In a nutshell, our proposed explanation hinges on an institutional shock – decentralization – that reduces the distance between the social context and the management of public resources for development. Since this mechanism penalises territories with low social capital, it can harm regional convergence.[6]

Extensive empirical evidence supports the key components of this hypothesis. First, the existence of a large North-South divide in the levels of social capital is amply documented, as well as its long-run persistence (Accetturo and de Blasio, 2014; Di Liberto and Sideri, 2015; Guiso et al., 2016). Second, the positive correlation between the effectiveness of public policies and the regions' social capital is stronger when policies are managed locally (Giordano and Tommasino, 2013; Felice and Lepore, 2016; D'Adda and de Blasio, 2016). Third, and consistently, the correlation between regional growth and social capital becomes significantly positive only in the post-decentralization period. Finally, Golden and Picci (2005) document that public investment involves "iceberg costs" due to corruption, the magnitude of which strongly correlates with the regional social capital.

The main objective of our paper is to quantify how much the institutional shock represented by decentralization explains of the observed halt of the South's convergence.[7] Our first step is to formalize our proposed explanation within a well-established theoretical framework in which public investment plays a central role. For this purpose, we use the modelling structure of Futagami et al. (1993), who, building on Barro (1990), propose an endogenous growth model where public capital is an input in the production function. We augment this framework by focusing on the link between social capital and the quality of the institutions in charge of public investment. In our model, a high, positive (bridging) social capital contributes to countering misuse of public spending by creating a context that enhances accountability and increases the probability that misbehaving officials and firms are sanctioned (Knack, 2002).[8]

More specifically, to promote convergence in the lagging-behind region, public investments are financed by a national tax rate augmented by a fiscal residual-to-income ratio or "transfer rate" and are implemented by contractor firms selected through public tenders. After winning the tender, the selected contractor can cheat on costs, capturing illegal rents and, thus, lessening public capital accumulation. The risk-neutral contractor maximizes the expected net benefit of illegal activity. The probability of being sanctioned

[2] In this paper, we will define "North" the subset of the central and northern regions (Val d'Aosta, Piedmont, Lombardy, Liguria, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria, Marche; and "South" (the "Mezzogiorno") the subset of regions formed by Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily and Sardinia.

[3] To limit ourselves to the Italian and the European regions, see, among many others, De Blasio and Nuzzo (2009), Di Liberto and Sideri (2015), Guiso et al. (2016) on Italy, and Akçomak et al. (2009), Forte et al. (2015), Tabellini (2010) and Rodríguez-Pose and Ganau (2022) on Europe. On the historical roots of social capital and its economic effects in Italy, see Dessí and Piccolo (2016).

[4] According to several researchers, for example Costabile (2012) and Daniele and Malanima (2014), this episode casts doubt on the role of social capital as a fundamental determinant of growth.

[5] See Aresu et al. (2022) for recent evidence on the role of public investment in the Italian regions' economic performance.

[6] Acconcia et al. (2022) propose a different link between institutional shocks and social norms. In our case, an institutional shock, devolution, increases the economic effect of a constant level of social capital. In their case (they focus on post-unification tax evasion), the shock causes the emergence of social norms that tend to persist over time.

[7] The creation of regional governments was provided by the 1948 Italian Constitution. Due to complex political equilibria between the main Italian parties, the centrist Christian Democratic Party and the leftist Communist Party, their implementation was delayed until 1970 (Leonardi et al., 1981). In terms of our model, the regions' birth is therefore treated as an exogenous institutional shock. For similar reasons, we also treat as an exogenous shock the labour market reform (see below).

[8] A vast literature shows that greater participation in civic life and high levels of moral stigma for uncivic behaviour are important factors in explaining government efficiency. Among others, Knack and Keefer (1997), La Porta et al. (1997), Bjornskov (2003, 2011); Nannicini et al., 2013).

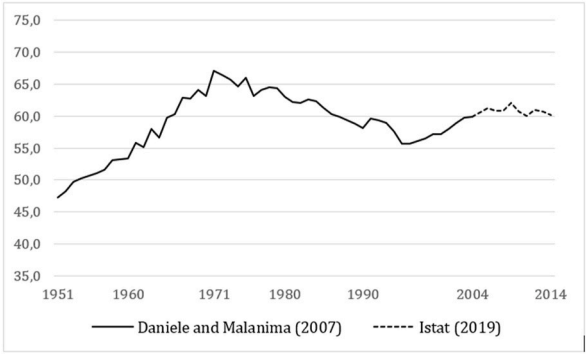

Fig. 1. Per capita GDP, South/North, 1951–2014, %.

depends on the efficiency of the institutions that manage the public investment plans. Since this efficiency depends on social capital, a negative relationship between the optimal level of illegal rent and the level of social capital emerges in line with the literature (Bjornskov, 2011; Golden and Picci, 2005; Del Monte and Papagni, 2001, 2007). As a consequence, decentralization negatively (positively) affects the growth of poorly (richly) social capital-endowed regions.

Besides our hypothesis concerning the effect of decentralization in a country with a large North-South divide in the levels of social capital, there exist two other hypotheses put forward by the literature investigating the recent widening of the Italian divide: the centralization of wage bargaining and the switch of regimes in regional transfer policies. The first one concerns a change in the institutional setting of the Italian labour market that took place around 1970. Traditionally, local wages had been linked to an index of the cost of living defined for each Italian province. In 1969, a system of nationwide wage formation was adopted, and wages were made uniform across all territories, with significant consequences for the South's competitiveness (Boltho et al., 1997, 2018; Carmeci et al., 2003; Boeri et al., 2019). The other hypothesis has to do with a change in the composition of public spending: in the post-1970 period, current spending largely replaced capital spending (Del Monte and Giannola, 1978; Giannola et al., 2016).

As both the centralization of bargaining and the switch of regimes in regional transfer policies could explain at least part of the halt of convergence, in this paper, we develop a framework in which these two competing/complementary hypotheses can be assessed alongside the decentralization effect. In so doing, we can quantify the relative importance of the three institutional/policy shocks on convergence. In particular, we take into account the shift to a nationwide bargaining system by introducing heterogeneity of the union delegates in a monopolistic union model (McDonald and Solow, 1981). Moreover, by distinguishing, in our model, the share of regional public revenues destined for public investment, we also take account of the change in the composition of regional public spending in our model.

To quantify the impact of decentralization, as well as the other two shocks, we proceed as follows. We split the whole period under analysis into two subperiods divided by the year convergence came to a halt, 1971. We calibrate the model using data from the North and the South for the 1951–1971 period, when regional policy was centralized. To reflect this, we use the national average value of social capital in our calibration. Then, we generate the model predictions of the North and South growth rates for 1971–2004, when decentralization was in place, *mutatis mutandis*. In particular, to reflect the new governmental framework, the values of social capital we use are the average values of the Northern and Southern regions.

Overall, our model predicts well the (nontargeted) two regions' growth rates of the post-decentralization period, and closely reproduces the observed halt of convergence and the post-1971 worsening of the South's gap. Our analysis also shows that decentralization is a very important component of this unfavourable outcome, *ceteris paribus*. The labour market reform also played a quantitatively similar role in the same negative direction. The third factor we analysed – the worsening of the quality of public expenditure – is found to have a large role in lowering growth in both macro areas but not in affecting their growth differentials.

Therefore, our results yield quantitative support to the central hypothesis of our paper: decentralization exposed public policies to the local levels of corruption and misappropriation and thus boosted the negative effect of the Mezzogiorno's low social capital on its economic perspectives.

A more general implication of our results is that changes in formal institutions may account for variations in growth regimes in the presence of a persistent heterogeneity in local stocks of social capital. In turn, this suggests that a proper governmental design can partially offset the adverse effects of low social capital endowments and can thus render effective policies otherwise doomed to fail.

The rest of the paper is organized as follows. Section 2 deals with the related literature and to what extent the empirical evidence supports our fundamental assumptions. Moreover, new econometric results are reported. Section 3 presents and discusses our model, while its calibration and the associated quantitative results are shown in Section 4. Section 5 concludes.

2. Related literature and empirical evidence

2.1. Review of the literature

Our paper deals with a specific case, the Italian South, and focuses on how decentralization affects economic development at the

local level. In this section, we review the contributions which are more relevant for our viewpoint.

We start with the South of Italy. The literature on the economic conditions of the Mezzogiorno of Italy is large, and we do not claim to offer a complete review here. We limit ourselves to dealing with studies directly related to our paper, particularly the three sources of the South's slowdown discussed in the Introduction. Given the intermittent and disappointing nature of regional convergence in Italy, few articles refer to the Mezzogiorno's economic history as a standard case of regional convergence.[9] The obvious example is Barro and Sala-i-Martin (1991), for whom there was "nothing surprising" in the Italian case.[10] The reversal of convergence in later years has profoundly changed the scenario analysed in their paper.

Another strand of research concerns the size and the quality of the external financial support made available to the Mezzogiorno to foster its growth. Regarding quantity, Iuzzolino (2009) presents detailed evidence against the idea that insufficient resources were mobilized to prompt convergence. Quality is a more complex issue. Del Monte and Papagni (2001) show that corruption has negative effects on the efficiency of public spending and per worker GDP growth of the Italian regions.[11] Several scholars emphasize that a deterioration in quality took place during the 1970s. Giannola et al. (2016), for instance, argue that the 1950–1970 convergence spell was due to supply-side policies aimed at creating essential physical infrastructure and large industrial plants. Successive policies instead aimed at sustaining consumption and income levels, with detrimental effects on productivity convergence. While this change in composition is present in the data (see D'Adda and de Blasio, 2016), the reasons for this policy deterioration have yet to be clarified. We suspect that it could be a (perhaps unintended) consequence of the decentralization effect defined in our model, but we leave this hypothesis to future research. In any case, our model is designed to quantitatively measure the effect of that deterioration on the convergence process.

The change in the legislation of wage setting described in the Introduction has also attracted a certain amount of attention. Boltho et al. (1997) and (2018), identify the post-1970 lower flexibility of wages in Italy as one of the main causes of the halt of convergence. Interestingly, after unification, Germany moved from an initial phase characterized by centralized bargaining to a decentralized system (Carlin, 2010). Boeri et al. (2019) estimate what would happen if the flexibility of the German labour market were adopted in Italy and find that the South's relative position would improve significantly. The formal institutions of the labour market are therefore very relevant both in theory and empirically, and for this reason their functioning is carefully defined in our model and their effects measured in our calibration exercise.

Our introductory Section has examined social capital as a component of the overall explanation of the Italian divide. Our main contribution is to clarify how decentralization may trigger the role of a lacking social capital as the source of regional divide. Mauro and Pigliaru (2011), and more recently D'Adda and de Blasio, 2016, provide preliminary evidence on this decentralization effect.

More generally, our paper is also related to the ample economic literature on the economic effects of decentralization of political and administrative power to local governments (for an overview, see Bardhan, 2002, Rodríguez-Pose and Ezcurra, 2011, and, more recently Faguet and Pöschl, 2015). The classic papers by Musgrave (1959), Oates (1972), and Tiebout (1956) consider decentralization as beneficial for territorial communities due to the existence of a hypothetical comparative advantage of local governments in providing public goods. Other papers focus on moral-hazard problems in government and identify an additional reason to regard decentralization as beneficial for local communities. In this literature, centralization implies a lack of political accountability at the local level (Myerson, 2020). These positive effects of decentralization for local communities are often obtained in contexts where culture is similar across territories. Our paper considers instead a case in which social contexts are highly heterogeneous. In such an environment, we show that the presence of low levels of civic capital in the poorer regions can make locally managed public policies so faulty as to reverse the effect of decentralization from positive to negative. (see Lessmann and Markwardt, 2010, for a similar viewpoint).[12] The paper that matches our thinking most closely is Helliwell and Putnam's (1995), who put forward the idea of decentralization as a factor that negatively affected the process of convergence.

Regarding the empirical evidence of these contrasting predictions about the effects of decentralization, clear-cut results are lacking, as they range from positive to nil or even negative (Baskaran et al., 2016). From the viewpoint developed in this paper, the persistent heterogeneity of institutional quality at the local level may explain part of this apparent indeterminacy.

Finally, another issue related to our paper is the persistence of economic divides across countries and regions. Persistence implies that long-past historical events keep their influence on current outcomes through several channels, from formal institutions (Acemoglu et al., 2001) to culture (Nunn and Wanchekon, 2011; Guiso et al., 2016) among many others (see also La Porta et al., 1997). In this respect, our paper provides an example of how the effect of an unfavourable persistent local culture may vary significantly depending on the degree of devolution allowed by the set-up of formal institutions.

2.2. *Our main assumptions and the empirical evidence: a review*

In this subsection, we review the empirical evidence supporting the main assumptions of our paper. The key elements of our

[9] See Di Liberto (2007) for a comprehensive survey.

[10] To quote them in full: "there is nothing surprising in the relative performances of the regions of Northern and Southern Italy. The South of Italy has not yet caught up because it started far behind the north, and the rate of convergence is only about 2 percent a year" (Barro and Sala-i-Martin, 1991, p. 151). Mauro and Podrecca (1994) confute this optimistic view.

[11] See also discussion in Section 3.

[12] Using a dataset covering up to 64 countries, these authors find that decentralization counteracts corruption only when effective monitoring is in place. Otherwise, corruption increases with decentralization.

proposed explanation are as follows: (*i*) a large, persistent North-South divide exists in the levels of social capital; (*ii*) with decentralization, the cross-region differences of social capital endowments become a key determinant of regional growth – to the disadvantage of the low-social-capital Southern regions; *(iii)* point (*ii*) is the result of the increased role assigned by decentralization to the local level of government, which is more exposed to the influence of the social context. So public policies are more (less) effective in supporting local growth where social capital is high (low).

Fig. 2 refers to point *(i)* and is based on an index of "trust" computed using several waves of the European Value Survey (EVS, 2011) and World Value Survey (WVS, 2020) and offers a glimpse of this divide and its magnitude. The economic literature on social capital considers this image the result of the heterogeneous medieval history of the Italian territories. Putnam et al. (1993) proposed this interpretation in their influential work on the origins of the current differences in civic behaviour. Since then, an extensive body of empirical evidence has confirmed the long-run persistence of cultural traits behind the current cross-region heterogeneity in social capita. Discussing in detail the mechanisms behind this persistence and the associated empirical evidence is beyond the scope of this paper. Here, we limit ourselves to noting that, according to the existing econometric evidence, up to 50% of the current cross-region variation in social capital is explained by social-political differences dating back to the Middle Ages (Accetturo and de Blasio, 2014, p. 33). On similar lines, see de Blasio and Nuzzo (2009), Di Liberto and Sideri (2015), and Guiso et al. (2016), among many others.

Fig. 3 below shows some preliminary evidence consistent with our point *(ii)*. The panel on the left refers to the pre-decentralization sub-period, while the one on the right shows how the correlation between regional growth and social capital changes in the second, post-decentralization sub-period.[13] This outcome is consistent with our idea that the correlation between the local levels of social capital and regional growth becomes significantly positive only when the 1970 reform on devolution enhanced the role of local institutions.[14]

We now turn to point *(iii)*, the core of our explanatory hypothesis. We first discuss the evidence available in the relevant literature and then provide additional evidence based on new econometric estimates. Since public sector data for the 1950–1970 period are fragmented and incomplete, empirically assessing our third hypothesis is not an easy task. This problem can be partly bypassed because different levels of decentralization often characterize the sectors of the public administration that provide public goods and services. For example, while education is still largely centrally managed, healthcare services are the main component of the activities carried out directly by the Italian regions. Our hypothesis implies that we should find a significant difference in the correlation between the two types of public services and the local stocks of social capital. The dataset developed by Giordano and Tommasino (2013) provides data on cross-region efficiency in providing these two services and, therefore, allows us to assess our assumption.[15] As predicted, the correlation is significantly higher for the locally managed healthcare services (0.66) than for the more centrally managed education (0.37).

Giordano et al. (2009) offer additional evidence on similar lines based on a quantile regression that exploits the different degrees of decentralization across four different public services.[16] Their main result is that "being managed by central or regional governments improves [public sector efficiency] in areas where efficiency is low. In contrast, within the provinces where the average quality of public services is higher, locally provided services are more efficient than centrally provided ones" (Giordano et al., 2009, p. 13). Given the extensive available evidence that links the efficiency of local institutions and social capital (more on this below), this result is also consistent with our assumption.

Clearly, the most direct way to assess our assumption (*iii*) would be to compare efficiency in the local provision of public goods before and after decentralization.[17] As we have noted, the empirical evidence does not abound, mainly because the available time series do not cover the relevant period adequately. In the following, we start reporting some relevant evidence available in the existing literature and then provide evidence based on a time series on public investments covering 1963 to 1994.

The existing evidence focuses on the massive investment in infrastructure carried out since the 1950s by Cassa per il Mezzogiorno, an agency created to foster the development of the South. The story of this important agency is a sharp example of how deeply and suddenly decentralization changed the governance and the effectiveness of regional policy in the Mezzogiorno. With its massive infrastructure and industrial investments directly managed, this agency was the driving force behind the convergence process of the

[13] The data considers only the s.c. "ordinary Regions". We also dropped Umbria, which represents a clear outlier since the WVS figures of Trust for Umbria are the lowest, whereas all other sources (e.g., ISTAT), including the most recent waves of WVS, position Umbria close to the value of Toscana and Marche as one would expect.

[14] Andini and Andini (2019) use data on Italian municipalities between 1951 and 2001. Their evidence strongly supports the hypothesis that social capital is crucial in explaining growth inequality across Italian territories.

[15] We use the data in Table 2 of Giordano and Tommasino (2013) and the level of "trust" as measured by the WVS. Efficiency in education is obtained by the authors using the number of teachers per pupil in the primary and first three years of secondary school as input, and the performance of 6th- and 9th-grade students in tests carried out by Invalsi (the public institute in charge of evaluating the Italian educational system) as output. As for health, they use as input the per capita public health expenditure adjusted for the population's age structure, while the health performance indicator is based on the change in life expectancy.

[16] The data used are the same as in Giordano and Tommasino (2013), excluding waste management.

[17] In general, the evidence that social capital and the provision of public goods and services are positively correlated abounds. However, it mostly refers to the post-1970 period, when decentralization was in place, and therefore says little or nothing about the previous period in which public policies where centralized. See for instance Di Liberto and Sideri (2015) who obtain an index of institutional quality for 1996–2001 and show that a strong positive correlation (0.86) exists between this index and social capital at the provincial level. Similar results are provided by Giordano and Tommasino (2013) and by Golden and Picci (2005). In particular, the latter paper provides data on regional levels of efficiency in investment in public infrastructure. Again, a significant positive correlation (0.47) exists between the index of "trust" and the index of regional efficiency.

Source: WVS(2020), Inglehart et al. (2020)

Fig. 2. Level of trust (WVS).
Source: WVS (2020), Inglehart et al. (2020).

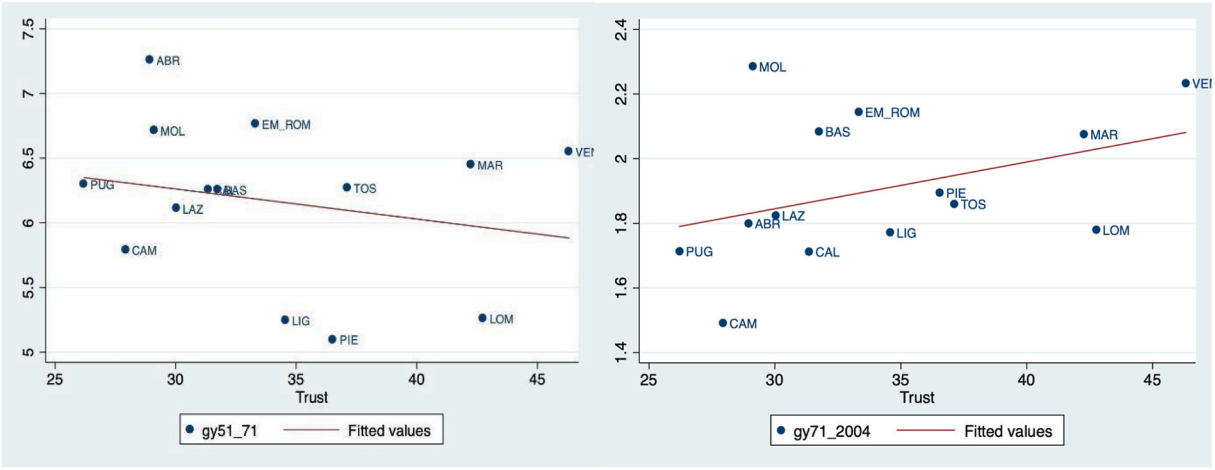

Fig. 3. Social capital and regional growth before and after decentralization.
Source: WVS (2020), Inglehart et al. (2020).

period from 1950 to 1970. In those years, the Cassa was designed to operate autonomously in a highly centralized way, with its operations "concentrated in the capital, Rome, to avoid local pressures" (Felice and Lepore, 2016, p. 10). Local pressures were instead more successful as soon as the regions were born. In 1971, a law was passed that allowed the regions to exert their "political influence over the Cassa, by directly intervening in the planning and carrying out of projects, and by progressively replacing the Cassa's technicians with their own local bureaucracy" (Felice and Lepore, 2016, p. 13).[18]

D'Adda and de Blasio (2016) have assessed the economic consequences of this change of governance on the effectiveness of the Cassa's actions. They exploit the fact that one of the areas in which the *Cassa* has been active was formed by municipalities that can be classified into two well-defined groups according to their level of social capital. Their econometric evidence shows that a low social capital negatively affects the effectiveness of the infrastructural and industrial investment of the Cassa "*only in the second phase (1971–1991) of [its operation]*. Over the first two decades (1951–1971), when the policy was characterized by centralism, …we fail to find any impact of [a low social capital]" (D'Adda and de Blasio, 2016, p. 322). This empirical result strongly supports our assumption.

[18] Similarly, Lepore (2012) underlines that the creation of the *Regioni* in 1970 has conditioned "more and more, in terms of political pressure and bureaucratic burden, the extraordinary intervention, making some of the essential characteristics of the Cassa per il Mezzogiorno, such as centralization, autonomy and agility of action, disappear."

2.3. Additional evidence

Finally, to further assess assumption (*iii*), we provide new empirical evidence based on the annual time series of Italian regional public investments from 1963 to 1994. More specifically, using a panel data model, we estimate the long-run regional growth effect of public investment, allowing for its interaction with social capital. Given the limited number of years available, these effects are estimated both for the entire available period (1964–1994) and for the sub-period in which decentralization was implemented (1972–1994). As outlined in the previous sections, the level of social capital that affects regional public investment after decentralization is the local one, while the appropriate level before decentralization is the country's average. Hence, we expect the interaction term between regional public investment and the regional social capital level to be significant, with a positive coefficient, in the 1972–1994 estimation period. Running the same panel regression on the 1964–1994 data, we expect to find a different, possibly not significant, estimate of the interaction term's coefficient. Finding these results in the estimates will be interpreted as evidence of a break in the estimated long-term relationship in 1971. Therefore, by comparing the two estimation results, we will be able to assess if any change observed in the second period is consistent with our assumption.

We consider the following heterogeneous panel data model for the 20 Italian regions:

$$ln\left(y_{i,t}\right) - ln\left(y_{i,t-1}\right) = \alpha_i + \beta_1\, ln\left(prinv_{i,t}\right) + \beta_2\, ln\left(pubinv_{i,t}\right) + \beta_3\, sk_i\, ln\left(pubinv_{i,t}\right) + \gamma_i^{'}\, x_t + e_{i,t}$$

where $y_{i,t}$ is the real per capita output of the *i-th* region at time *t*, *pubinv* and *prinv* denote regional public and private investment to output ratios, and $e_{i,t}$ is an error term. Moreover, the model contains the interaction term $sk_i \bullet ln(pubinv_{i,t})$, which reflects our a priori that decentralization should strengthen the role of local social capital (sk_i) in determining public investment returns at the regional level. Social capital at the regional level is based on the variable *trust*, defined as the average of the values of all available waves contained in EVS (2011) and belonging to the period 1963–1994.[19] The variable *sk* is defined as *trust*/100 in order to be in the [0,1] interval. For any region, we control the presence of regional fixed effects, the regional private capital accumulation rate, and the presence of common factors across regions, potentially related to the regional private and public capital accumulation rates. The heterogeneous effects of such factors are controlled by adding the vector x_t in the model. Following Pesaran (2006) and De Vos and Westerlund (2019), this vector will contain as proxies the cross-sectional means of the dependent variable and the regressors, including the interaction term.

The above panel data model is estimated using the Pesaran (2006) Common Correlated Effects Pooled (CCEP) estimator, which, in line with our specification, assumes the parameters β_1, β_2, and β_3 to be common across regions. Indeed, employing the Pesaran (2004) Cross Dependence (CD) test, we have found strong evidence of cross-sectional dependence in the residuals of the estimated Fixed Effects (FE) model, i.e., the model not controlling for the presence of common factors across regions correlated with both private and public investment rates. As the FE estimator is inconsistent and inference misleading in the presence of such common factors, it is important to control for them using the CCEP estimator.[20] It is worth noticing that the effects computed from the CCEP model can be interpreted as long-run effects, given that the model errors $e_{i,t}$ are allowed to be correlated over time.[21]

We show the CCEP estimates of the model in Table 1, where the dependent variable is the annual real per capita output growth, and standard errors are reported in parenthesis. As outlined above, estimation results are reported for the entire sample (1964–1994) and the sub-period in which decentralization was implemented (1972–1994).

To recall, our a priori implies that decentralization triggered the interaction between social capital at the regional level and public investment. In low social capital regions, devolution exposed public investment to significant levels of corruption and misappropriation, hampering local economic performance. Our econometric evidence corroborates this hypothesis. The estimates for the post-decentralization period show that the interactive term enters the model positively (as expected) and is statistically significant at the 5% level. Moreover, we reject Wald's test for the null joint hypothesis that both β_2 and β_3 are equal to zero at the 10% significance level. Using the values of *sk*, we find that the estimated overall effect of public capital accumulation on output growth is positive for most of the Italian regions in the period 1972–1994. Furthermore, given that the interaction term enters the model positively, the higher the regional social capital level, the greater the positive effect of public investment on growth. Comparing the results of the model estimated over the longer period of 1964–1994 (including both pre-decentralization and post-decentralization observations) with those of the same model estimated over the sub-period 1972–1994, we see that a structural break around the year 1971 is present in the relationship.[22] In fact, when we estimate the model by adding the observations belonging to the pre-decentralization period, the coefficient of the interaction term is no more significant.

To sum up, the existing evidence and new one discussed in this Section support our idea that decentralization makes public policies more (less) effective in supporting local growth where social capital is high (low). This feature is at the heart of the model of growth

[19] It corresponds to the percentage of respondents in the region who answered, "Most people can be trusted", to the statement *a165* of the Integrated Values Surveys.

[20] Notice that the CD test does not reject the null hypothesis of no cross-sectional dependence at the 5% level of significance, when applied to CCEP residuals.

[21] The CCEP estimator remains consistent even if the model errors are autocorrelated as well as subject to a weak (local) form of spatial correlation. See Pesaran and Tosetti (2011).

[22] We have also estimated the model for the sub-period 1964–84. Again, no significant interaction between social capital and public investment rate was found.

Table 1
CCEP estimates.

	1964–1994	1972–1994
ln (prinv)	−0.016	−0.006
	(0.012)	(0.021)
ln (pubinv)	0.022	−0.030
	(0.029)	(0.019)
sk ln (pubinv)	−0.030	0.118**
	(0.071)	(0.055)
Wald's test	1.974	4.955*
p-value rowhead	0.373	0.084
Num. obs.	620	460

***p < 0.01; **p < 0.05; *p < 0.1.

that we discuss in the next Section and that we will use to assess the quantitative role played by decentralization in the reversal of regional convergence in post-1971 Italy.

3. The model

We model the economy of a generic region populated by a unit mass of risk-neutral firms and infinitely lived households. Each household inelastically supplies one unit of time but will be partially unemployed due to labour market imperfections. Each firm maximizes profit in a competitive setup and produces a final good that can be consumed or invested in private and public capital. In the labour market, firms face a monopolistic union and the wage is bargained. The government taxes income and uses tax revenues to finance public investment or lump sum transfers to households. For each public investment project, the government calls for tender. Risk-neutral contractors bid to win these tenders. Then, contractors decide if and to what extent they commit misappropriation of the public tender.

We proceed as follows: after describing technology and regional resources equilibrium, we describe the contractors' decision and then the firms and the labour market setup. Finally, we present the household intertemporal maximization problem and the dynamic general equilibrium of the regional economy.

The good is produced using labour and private and public capital. Barro (1990) initially proposed a similar technology with productive public expenditure as an input. Later, Futagami et al. (1993) developed a version with public capital, p, where firms combine labour with private capital, taking public capital as given. In per capita terms, the output of the region can be defined as:

$$y = Ak^{\alpha}l^{1-\alpha}p^{1-\alpha} \tag{1}$$

where k and p are private and public capital (per capita), respectively, and A represents the regional technological level. Since we normalize to one both the mass of households and the time endowment of labour, $l \leq 1$ denotes the employment rate of the regional economy.[23]

Although labour and private capital are assumed to be immobile, there are fiscal transfers among regions so that the resources available for the public sector can be larger or smaller than $\tau \times y$, where τ is the average tax rate. In particular, a poor region can receive additional resources in the form of government transfers financed by tax revenues levied elsewhere within the country. Therefore, the public resources available at the regional level are $(\tau + \nu)y$, where ν is positive for the lagging-behind regions. We assume that a share γ of the regional public resources is spent on funding public projects. The residue is returned to households as a lump sum in the form of current expenditure by the government. Therefore, the central government budget constraint can be written as follows: $\sum_1^n \tau_i y_i = \sum_1^n (\tau_i + \nu_i) y_i$, where n denotes the number of regions in the country and $\sum_1^n \nu_i y_i = 0$. Moreover, in the aggregate, $\sum \tau_i y_i = \sum \gamma_i (\tau_i + \nu_i) y_i + \sum (1 - \gamma_i)(\tau_i + \nu_i) y_i$.

Our strategy to model the illicit misappropriation of resources for public investment is the following. Public capital formation is assigned to risk-neutral companies (contractors, from now on) selected through public tenders. Contractors purchase units of final goods produced by the competitive firms of the private sector and transform them one to one into public capital with zero costs for the sake of simplicity, without loss of generality. Del Monte and Papagni (2001), building on Barro (1990), also introduce a wedge between the tax revenue and the productive public services. In their model, corrupted public officials misappropriate part of the public expenditure. [24]

[23] We set the exponent of l equal to $(1 - \alpha)$ to simplify the dynamic analysis ahead. About the quantitative implications of this choice, see Section 4 below.

[24] Instead, in our model that borrows on Futagami et al. (1993) and where the arguments of the production function are the stock of public and private capital, it is the flow of public investment to be diverted by dishonest contractors.

3.1. Social capital, corruption, and decentralization

In our model, not all tax revenue allocated to public investment turns into public capital because of corruption in public procurement. Corruption here is used broadly, referring to a process characterized by the misappropriation of public resources that takes the form of embezzlement by private contractors. More specifically, in our model, we allow contractors to illegally seize an amount of the project's overall cost. They can do so by cheating on the productive factors employed in producing capital goods for the government. The amount of public resources illegally seized by the contractors depends on the level of social capital through the probability of being caught. In fact, in deciding whether to cheat or not, a risk-neutral contractor considers the probability of being caught that depends on two factors: the amount of the fraud and the social capital. We assume that the larger the illegal share of the project that the contractor seizes, s, the higher the risk. In addition, contractors consider the level of social capital. Contractors consider the average social capital in the entire economy if the institutions responsible for financing and monitoring the public project are at the central level. They instead look at the local social capital in cases where the local institutions are in charge. These assumptions are justified since the role of social capital as a determinant of the level of illegal activity is a well-documented fact, especially concerning the management of public resources. With low social capital, corruption in public procurement is expected to be weakly fought in the society at large, and in the bureaucracy, whistleblowing is less frequent, as breaking the code of silence to denounce illegal behaviour is more costly for an individual.[25] Low social capital, therefore, implies that it is easier for a contractor to avoid detection and reporting of acts of corruption (see Bjornskov, 2011; Golden and Picci, 2005, for evidence on Italy).

Formally, the contractors maximize the expected value of a stochastic profit function defined by the value of the public resources stolen, s, the probability of being caught, pr, and the fine they have to pay if caught, which is assumed proportional to the amount seized (fs). The contractor's expected illicit profit for a project of value one is therefore:

$$E(\pi) = (1 - pr)s - pr(fs) \tag{2}$$

Moreover, in line with what was discussed above, we assume that the probability of being caught depends on the amount stolen by the contractor and the level of social capital in the region in the following way:

$$pr = P(Being\ Caught \mid s, S_k) = s\ S_k \tag{3}$$

where $s \in [0,1]$ and $S_k \in [0,1]$ is social capital. The interpretation of (3) is straightforward: when social capital is at its highest level – i.e., one – and the contractor grabs 100% of the value of the public investment, the probability of being caught is one.[26] Using (2) and (3), the representative contractor's problem for a project of value one is, therefore:

$$Max\ E(\pi) = [(1 - s\ S_k)s - s\ S_k\ (fs)], \text{w.r.t. } s \tag{4}$$

The first order condition implies the following optimal level of illegal rent s^*:

$$s^* = Min\left(\frac{1}{2(1+f)S_k}, 1\right). \tag{5}$$

For a given level of f (namely, 2.61, the value used in our model's benchmark calibration discussed in Section 4 below), the solution implies a piecewise negative function of S_k in the interval [0,1], as shown in Fig. 4. When social capital is very low, contractors steal a large part of the public resources, greatly reducing actual public investment. From the government's point of view, s^* represents a sort of "iceberg cost" since that fraction of the government allocation for investment is lost along the path that transforms public resources into public capital. We assume that these iceberg costs are the only costs to be paid to execute a public project (i.e., managing costs are set to zero).

Our description of the mechanism that links the level of social capital to growth in our model is now complete: social capital is a crucial element in determining the level of corruption, which, in turn, reduces the resources available to finance the accumulation of public capital, one of the main factors, as we will see further on, that determine the aggregate growth rate.

This inverse relationship between social capital and the level of waste of public resources due to corruption is a well-established regularity in many cross-country studies (for instance, Knack and Keefer, 1997; La Porta et al., 1997; Knack, 2002). Bjornskov (2003, 2011) formalizes and empirically confirms the negative link between social capital as trust and corruption. As far as Italy is concerned, Golden and Picci (2005) document the existence of an iceberg cost in creating public infrastructures that varies widely across regions. They consider this cost to be an index of corruption and show that its variation is strongly correlated with the regional levels of social capital, as our model predicts. Del Monte and Papagni (2007) report that in the case of the Italian regions, some proxies of social capital, such as the presence of voluntary organisations, are significant determinants of corruption.

In turn, corruption affects regional growth. This setting allows us to describe the effects of decentralization on regional convergence as we discuss in section 3.3. Decentralization implies that local institutions are responsible for designing and managing developmental policies, including tenders to create public infrastructures. This institutional level is likely to be significantly affected by the local stock of social capital. On the other hand, central institutions are unlikely to be influenced by the social capital of a specific region. Therefore, we more realistically assume that central institutions are influenced by the country's average level of social capital.

[25] See Glazer and Glazer (1989) and Uys and Smit (2016) on the importance of social capital for whistle-blowing.

[26] Nussim and Tabbach (2009) propose a model of crime close to ours.

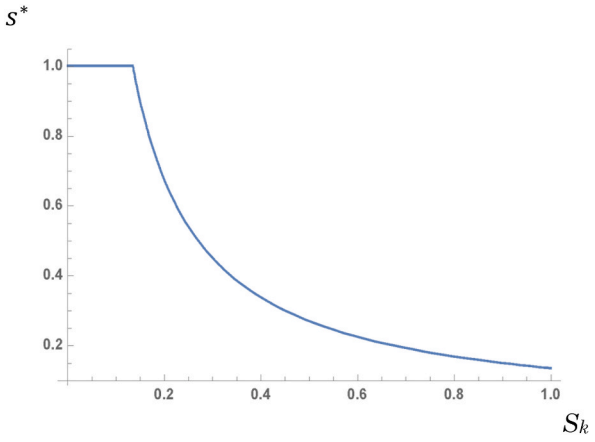

Fig. 4. Optimal Contractor's choice function.

Consequently, for regions with low social capital, transferring decision-making from central to local governments may negatively impact the effectiveness of its public policies and aggregate growth.

Formally, for these regions, decentralization implies a negative shift in the value of S_k (from the country's average level to the lower regional one) in Eqs. (3)–(5), with the consequent increase in the iceberg cost that affects the accumulation of public capital.[27]

3.2. Centralized vs decentralized wage bargaining

As we stated above, decentralization was not the only institutional change in Italy around 1970. The legislation on wage-setting also changed profoundly in 1969. A system of nationwide wage formation was adopted, and as a result, wages were equalized across all territories with the result that unemployment differentials increased, as shown in Fig. 5.

To include the centralization of wage bargaining in our model, we introduce heterogeneity in a monopolistic union scheme of wage formation. We assume some degree of heterogeneity across unions' delegates to reflect regional differences in per capita income and consumption. Given this regional heterogeneity, we show that a centralized bargaining system generates a high spatial rigidity in the labour market, with unions demanding a common national wage. If the wealthier regions are overrepresented in the union, as in the Italian case, the common wage determines unemployment in the poorer ones. We assume that price-taking firms equalize marginal productivities to factor costs (Barro and Sala-i-Martin, 2003)[28]:

$$w = (1-\alpha)Al^{-\alpha}k^{\alpha}p^{1-\alpha} \tag{6}$$

$$r = \alpha l^{1-\alpha}Ak^{\alpha-1}p^{1-\alpha} - \delta \tag{7}$$

where δ is the depreciation rate.

In the standard monopolistic labour model, a myopic labour union maximizes the following expected utility of its members (see McDonald and Solow, 1981)[29]:

$$U(w)l(w) + (1-l(w))U(\overline{w}) \tag{8}$$

where $\overline{w}$ is the reservation wage. The standard result is that the union sets the wage as a markup over $\overline{w}$. Typically, $\overline{w}$ can be thought of as unemployment benefits or disutility of working. In our case, given that we do not have agents engaged in a labour-leisure choice or benefits for unemployed workers, we interpret $\overline{w}$ as a linear function of the level of per capita consumption, as suggested by Bean (1994).[30] Moreover, we assume that the labour union is an elective institution where union representatives display single-peaked

[27] Clearly, our model implies a greater sigma divergence of regional per capita incomes when decentralization is implemented.

[28] As is common practice in many regional growth models, we assume that capital is not mobile across regions. In the Italian case, this assumption is consistent with consolidated evidence that shows large, persistent regional differences in the cost of capital. However, there are significant fiscal flows implemented by the central government that redistribute public resources from the wealthier regions to the poorer ones.

[29] We use the simpler monopolistic union model presented in the first part of their contribution. The myopia of the union is an assumption that can be justified by the nature of the elective type of union we are considering.

[30] In Bean (1994), the reservation wage should include not only the unemployment benefits, but also the marginal utility of leisure. The author shows that assuming a standard isoelastic utility function that includes leisure and consumption, the reservation wage becomes a linear function of the level of per capita consumption (see Bean (1994), footnote 2, p. 527). As an example, using a Cobb-Douglas utility function of the kind: $c^{\alpha}(\overline{h}-h)^{1-\alpha}$where is the time endowment and h labour time, the standard equilibrium condition $(U_c/P_c = U_{\overline{h}-h}/w)$ implies that $\overline{w} = (1-\alpha)c/\ \alpha\overline{h}$ (Bean (1994), footnote 2, p. 527). In the model, we retain Bean's insights without explicitly considering the labour leisure choice.

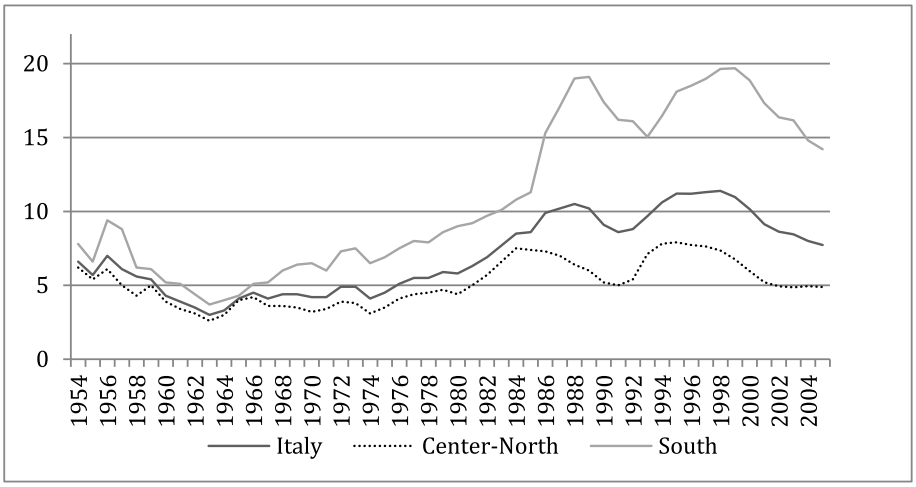

Fig. 5. The divergence of regional unemployment rates in Italy.

preferences over wages (Boeri and van Ours, 2013). Therefore, since the level of per capita consumption that matters is the one of the union median voter, the demanded wage is:

$$w = \vartheta\, c_m \tag{9}$$

where the subscript m stands for the median voter. In a decentralized bargaining setup, Eq. (9) implies that the reservation wage chosen by the delegates depends on the level of consumption in their region of origin. In order to allow for a different bargaining institution, it is convenient to modify Eq. (9) as follows:

$$w = \vartheta\, c_m = \vartheta\, \frac{c_m}{C} c = \varphi c \tag{10}$$

In Eq. (10), φ is the markup over the average consumption, the product of c_m/c and ϑ. The first is thought to capture the spatial rigidity, whereas the second, assumed to be homogeneous across regions, accounts for the standard temporal rigidity (e.g., firing costs) implied by the national employment protection law.

Let us now consider a decentralized wage bargaining setup and the changes brought about by a reform that centralizes it. In the pre-reform setup, the wage in each region is set by the delegates elected by workers of the same region, who are assumed to have relatively homogeneous per capita consumption levels. In terms of our model, this implies that the ratio $c_m/\,c$ is closer to unity across all regions.[31] In the post-reform case, the union delegates come from all regions and therefore reflect per capita consumption levels far more heterogeneous than in the previous case. If they vote based on the majority rule, it is the median delegate's per capita consumption level that matters. In this setting, there is a unique c_m for the whole country, and if the wealthier regions are overrepresented in the union, the median consumption, c_m, reflects the higher levels of per capita consumption of those regions. This implies that the post-reform $c_m/\,c$ and φ (as well as the ratio $w/\,c$) are higher in the poorer regions. Consequently, the centralized setting makes w increase more in the less-advanced regions.[32]

Now, we formally analyse the long-run growth consequences of such institutional change. To this aim, we use Eqs. (6) and (10) to express the employment rate as follows[33]:

$$l = A^{\frac{1}{\alpha}} \left(\frac{1-\alpha}{\varphi} \right)^{1/\alpha} \widehat{p}^{\frac{1-\alpha}{\alpha}} \widehat{c}^{-\frac{1}{\alpha}} \tag{11}$$

where $\widehat{p}$ is the public-to-private capital ratio, $p/\,k$, and $\widehat{c}$ is the consumption-to-private-capital ratio, $c/\,k$. The parameter that measures labour market rigidity, φ, is pushed up in the poorer regions when bargaining is centralized, with the associated decrease in employment there.

This model prediction is in line with the empirics of the regional labour markets of Italy. The labour market reform is associated with the substantial increase in the North/South unemployment rate differential shown in Fig. 5, from almost null to up to around 15%.

[31] According to Istat's household consumption expenditures survey, in Italy in 2010 the cm/c was about 0.85 for all regions, and 1.07 for the southern regions, when the Italian average median consumption is used.

[32] The reverse is also possible if poor regions are overrepresented.

[33] If, alternatively, the monopolistic union bargains over the net wage instead, Eq. (11) turns out to be: $l = A^{\frac{1}{\alpha}} \left(\frac{1-\alpha}{\varphi} (1-\tau) \right)^{1/\alpha} \widehat{p}^{\frac{1-\alpha}{\alpha}} \widehat{c}^{-\frac{1}{\alpha}}$. Both versions have been tested in the calibration.

3.3. Steady-state growth

This Section completes the description of our model. We first analyse the households' savings choice and then the dynamic equilibrium of the system. We assume that each household in the regional economy solves a standard inter-temporal maximization problem, where agents' preferences are proxied by a standard iso-elastic utility function of consumption:

$$Max \int_0^{\infty} \frac{1}{1-\theta} c(t)^{1-\theta} e^{-\rho t} dt \tag{12}$$

subject to:

$$\dot{a} = (1-\tau)(r\,a + w\,l) - c + T + B \tag{13}$$

where

$$T = (1-\gamma)\,(\tau+\nu)\,(w\,l + r\,a) \tag{14}$$

T is a per capita sum transferred from the government (the share of the tax revenue not used for investment), B (see below) is the per capita illicit revenue seized by the contractors, and r is the return on asset equal to the return of real capital minus depreciation. Both T and B are taken as lump-sum for the households when they solve the inter-temporal maximization. Given the standard condition:

$$a(t)e^{-r\,t} = 0 \tag{15}$$

the solution to the problem yields the standard Euler condition:

$$\dot{c} = \frac{1}{\theta} c((1-\tau)r - \rho) \tag{16}$$

The average per-capita illegal revenue is:

$$B = (1 - s^* S_k) s^*\,(\tau+\nu)\gamma\,(w\,l + r\,a) \tag{17}$$

At the regional level, the aggregate private asset corresponds to the aggregate private capital, since the private factors of production are assumed to be immobile (Barro and Sala-i-Martin, 2003). From (14) and (17), we obtain the equation of motion of per capita private capital of the regional economy:

$$\dot{k} = A k^{\alpha} p^{1-\alpha} l^{1-\alpha}\, D - c - D\,\delta\,k \tag{18}$$

where $D = [(1-\tau) + (1-\gamma)\,(\tau+\nu) + (1 - s^* \bullet S_k) s^*\,(\tau+\nu)\gamma]$.

Assuming the same depreciation rate of the private capital, the law of motion of public capital with iceberg costs is[34]:

$$\dot{p} = (1-s^*)\gamma(\tau+v) A\, k^{\alpha} p^{1-\alpha} l^{1-\alpha} - (1-s^*)\gamma(\tau+v)\delta\, k - \delta\, p \tag{19}$$

The model can be summarized by the following system of nonlinear differential equations, written using the equilibrium employment defined in Eq. (11) and the optimal value of s^* in Eq. (5):

$$\frac{\dot{\widehat{p}}}{\widehat{p}} = (1-s^*)\gamma(\tau+v) A \widehat{p}^{-\alpha} l^{1-\alpha} - \delta - (1-s^*)\gamma(\tau+v)\delta\,\widehat{p}^{-1} - \frac{\dot{k}}{k} \tag{20}$$

$$\frac{\dot{\widehat{c}}}{\widehat{c}} = \frac{1}{\theta}\left(\alpha\, A \widehat{p}^{1-\alpha} l^{1-\alpha}(1-\tau) - (1-\tau)\delta - \rho\right) - \frac{\dot{k}}{k} \tag{21}$$

$$\frac{\dot{k}}{k} = A \widehat{p}^{1-\alpha} l^{1-\alpha} D - \widehat{c} - D\,\delta \tag{22}$$

Substituting Eq. (22) into Eqs. (20) and (21), we obtain the two zero-growth loci for $\widehat{p}$ and $\widehat{c}$ as follows:

$$\frac{\dot{\widehat{p}}}{\widehat{p}} = 0, \quad \widehat{c} = (1-s^*)\gamma(\tau+v) A \widehat{p}^{-\alpha} l^{1-\alpha} - \delta - (1-s^*)\gamma(\tau+v)\delta\,\widehat{p}^{-1} - A \widehat{p}^{1-\alpha} l^{1-\alpha} D + D\,\delta \tag{23}$$

$$\frac{\dot{\widehat{c}}}{\widehat{c}} = 0, \quad \widehat{c} = -\left(\frac{1}{\theta}\alpha(1-\tau) - D\right) A \widehat{p}^{1-\alpha} l^{1-\alpha} + \left(\frac{1-\tau}{\theta} - D\right)\delta + \frac{\rho}{\theta} \tag{24}$$

[34] For simplicity, we assume that the revenue from fines is spent in managing the judiciary system.

where l is a function of $\widehat{p}$ and $\widehat{c}$ (see Eq. (11)).[35]

Once the balanced growth path is reached, $\widehat{p}^*$ and $\widehat{c}^*$ (and l^*) are stationary values, with *c, k,* and *p* that grow at the same constant rate. Thus, the long-run growth rate of the economy can be analysed by focusing on the equation of motion of public capital only. In the long-run growth, therefore, our regional economy grows at the following constant rate:

$$g^* = (1 - s^*(S_k, .))\gamma(\tau + v)\, A\, \widehat{p}^{*-\alpha}\, l^{*1-\alpha} - (1 - s^*(S_k, .))\gamma(\tau + v)\delta\, \widehat{p}^{*-1} - \delta \tag{25}$$

The stability of the system has been assessed by calculating the vector field numerically using the values of the parameters that we will discuss in Section 4 below. The result is shown in the *c/p - k/p* phase diagram depicted in Fig. 6.[36]

The impact of decentralization on regional growth and convergence can be analysed in this setting. In our model, the contractors' illegal appropriation is a function of the stock of social capital that influences the institutions responsible for managing public investment. When decision-making is attributed to the local government, the local level of social capital matters, whereas when decision-making is attributed to the central government, it is assumed to be influenced by some average of the regional endowments of social capital. The idea here is that decisions taken centrally result from influences coming from all regions, each with its weight – i.e., the size of its population – and its cultural traits and constituencies. This is self-evident when bureaucrats' selection is considered. When the central government officials are the results of selection based on open competition, they reflect the distribution of the population among the regions. As a result, the central government bureaucracy is likely to be formed by individuals who carry the beliefs and values of their territories, which do not vanish in places other than those of origin (Fisman and Miguel, 2007; Ichino and Maggi, 2000).

Formally, *ceteris paribus*, the growth effect of decentralization derives from a change in the value of S_k in Eq. (25). When decentralization takes place, the index of social capital relevant for the management of public investment is no longer the country's average level, but the regional one. Whenever the target region has a level of social capital lower than the national one, decentralization decreases its growth rate with obvious consequences on its convergence process.

Evaluating the effect of decentralization on the *national*growth rate is a complex task as it requires a detailed analysis of the distribution of social capital within the country that goes beyond the aim of this paper (for details, see Mauro et al., 2018). The effect on convergence is, instead, unambiguous. Regions poorly endowed with social capital will be damaged by decentralization, whereas those richly endowed will gain from it. Therefore, an ongoing process of convergence may be weakened or reversed.

4. Quantitative analysis

In this Section, we use the model developed in Section 3, particularly the dynamic steady state defined in Eq. (25), to quantify how much of the observed halt of the South's convergence is explained by decentralization. Moreover, our model allows us to evaluate the relative importance of the other two critical shocks considered by the literature on convergence: the centralization of bargaining in the labour market and the switch of regimes in regional transfer policies.

We proceed as follows. We split the entire period under analysis into two sub-periods divided by 1971, the year convergence came to a halt. We calibrate our growth equilibrium using data of the North and the South for the first subperiod, 1951–1971, when regional policy was managed centrally and the local levels of social capital did not significantly influence regional policies.[37] Then, we use the model to predict the North and South growth rates for 1971–2004, when decentralization was in place and the cross-region differences in social capital became relevant. We analyse the model fit by comparing its predictions with the actual growth rates. Finally, we carry out a series of counterfactual exercises to quantify the fraction of the overall convergence halt that can be attributed to the mechanism of decentralization, as well as the other two policy shocks.

4.1. Calibration, 1951–1971

Let us start with the parameter values of our baseline calibration, 1951–1971. In the following, we describe the external sources used to pin down the values of the preference parameters θ and ρ, the technology parameters α and δ, the policy parameters $\tau, \gamma_s, \gamma_n, v_s, v_n$, and the index of social capital S_k^{it} (from now on, the subscript s is for South and n for Center-North).

As for θ, the parameter measuring the relative risk aversion, we set it to 1.3, a value in the range found in the literature (Attanasio and Weber, 1995; Gomme and Lkhagvasuren, 2013). Following Barro and Sala-i-Martin (2003), we set ρ equal to 0.02, in line also with Gomme and Lkhagvasuren (2013). We set α to 2/3, a standard value in the growth literature when human capital is not explicitly included as an input in the production function (see Barro and Sala-I-Martin , 2003). In this context, l is raw labour with an exponent of 1/3. The depreciation rate δ is set to the standard value of 5.5% (again, Barro and Sala-i-Martin, 2003). The parameter τ represents the average national tax revenues based on the dataset developed by Giannola et al. (2016). The parameters for interregional transfers of public resources, v_s, v_n, are based on the data in Giannola et al. (2016). Their values are 11.6% for the South and −2.45% for the North. The part of public resources allocated to capital expenditure in the two regions, γ_s (25.7%) and γ_n (15.2%), are computed from Table A2

[35] Differently from what we do when computing our numerical solution of the model (see below), to keep the notation simple we do not use Eq. (11) to substitute for $l(\widehat{p}, \widehat{c})$ in Eqs. (23)–(25).

[36] The vector field has been numerically calculated using Mathematica and tested for many parameter values in the range used in the calibration exercise. Global stability is not an unusual feature for endogenous growth models, as discussed in Ortigueira and Santos (1997).

[37] The model data are obtained using Mathematica. The code is available upon request.

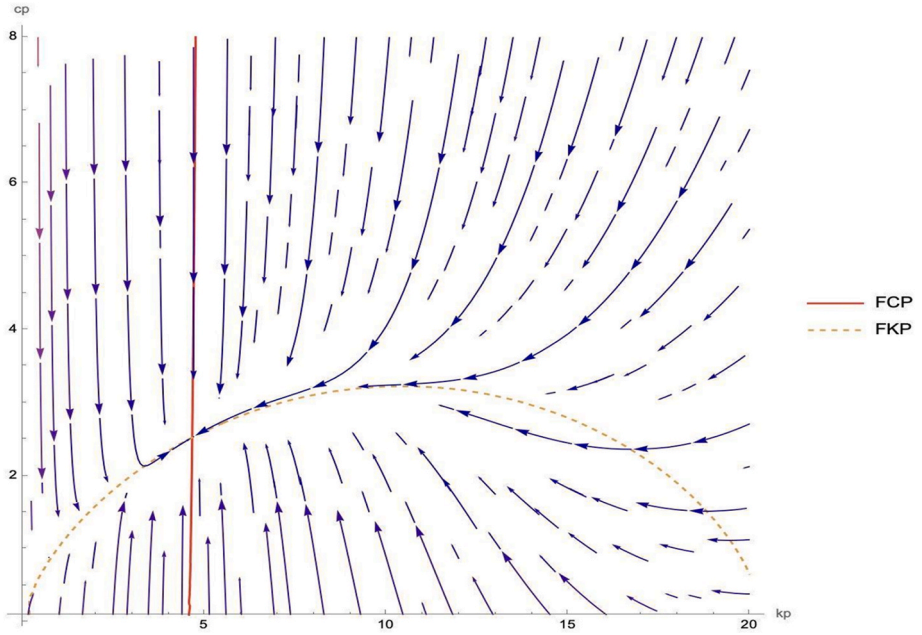

Fig. 6. Phase diagram FCP: zero growth loci of c/p; FKP: zero growth loci of k/p.

again in Giannola et al. (2016).[38] As for social capital, our model is based on the hypothesis that the value relevant for the period before decentralization took place is the whole country's index.

To this aim, we use the index of "generalized trust" as defined in Tabellini (2010), based on the World Value Survey. This value gives us the proportion of positive answers to the statement "most people can be trusted" and is equal to 35.4%.[39]

In this respect, for the sub-period 1971–2004, when the *regional* levels of social capital are brought to the forefront by the process of decentralization, we again use Tabellini's dataset.

To sum up, the values of our externally defined parameters are shown in Table 2.

The remaining parameters are φ_s, φ_n, A_s, $A_{n,}$ and f. φ_s and φ_n measure labour market rigidity in the two regions, A_s and A_n are the usual regional technological parameters, and f is the fine given to a contractor when caught. To set these five parameter values, our targets are five moments that refer to 1951–1971. Four of them are the averages of the two regions' growth and unemployment rates from 1951 to 1971. Their values are 6.22% (g_s), 4.38% (g_n), 5.90% (u_s), and 4.08% (u_n).[40] The values of these calibrated parameters are shown in Table 3. The fifth targeted moment, s^*, refers to the "iceberg cost" generated by corruption and, more generally, misuse of public resources. Golden and Picci (2005) compute "a measure that consists of the difference between a measure of the physical quantities of public infrastructure and the cumulative price government pays for public capital stocks". This measure is computed on a regional basis. Since we assume that f is the same everywhere within the country, we use the iceberg cost index that refers to Italy as a whole. Its value is 0.39,[41] meaning that on average, nearly 40% of public expenditure for infrastructures is "siphoned off to mismanagement, fraud, bribes, kickbacks, and embezzlement", as the authors put it. This estimate of the "illegal rent" is used in Eq. (5), together with the average level of the country's social capital. The resulting value for f is 2.61.

The results of our calibration are reported in Table 4. Our model matches the targeted moments very closely.

4.2. Exogenous changes in parameter values, 1971–2004

We use the 1951–1971 calibration to predict the performance of the two economies in the subsequent period and to assess the individual impacts on convergence of the major reforms that took place after 1971.

To this aim, we must first consider a number of well-documented changes that took place in the 1971–2004 period. In this Section, we list each of these changes and discuss the external information we use to adjust the relevant parameter values.

A first issue concerns a generalized slowdown that involved the post-1970 European economy (Adler et al., 2018). After the so-called "golden age" of the 1950s and 1960s, average growth in Europe decreased by two full percentage points during the 20 years

[38] The data in Table A2 of Giannola et al. (2016) refer to the 1971–1973 period. Since we do not have data for previous years, we assume that the values computed from the table were constant during the whole 1951–1971.

[39] Using different indexes of social capital, including multidimensional ones (i.e., Nuzzo, 2006), would not significantly change our results.

[40] Growth rates are based on the data published in Daniele and Malanima (2007), unemployment rates are based on Casavola (2015).

[41] The value for Italy is the average value of the three best performing regions in Table 1, Column 4, in Golden and Picci (2005).

Table 2
Externally defined parameters, 1951–1971.

α	δ	θ	ρ	τ	γ_n	γ_s	ν_n	ν_s	S_k^{it}
2/3	0.055	1.3	0.02	0.18	0.152	0.257	−0.025	11.6	0.354

Table 3
Calibrated parameters.

f	φ_n	φ_s	A_n	A_s
2.610	0.894	0.652	0.637	0.520

Table 4
Targeted moments %, 1951–1971.

	s^*	g_n	g_s	u_n	u_s
Data	39.00	4.38	6.22	4.08	5.90
Model	39.00	4.39	6.22	4.09	5.83

that followed. Among the causes, a predominant role is attributed to a diminished efficiency caused by a widespread increase in regulation and market rigidity (Craft, 1995; Temin, 1997), as well as to a general decline in the potential growth of advanced economies, as suggested by the literature on the "secular stagnation hypothesis" (see Pagano and Sbracia, 2014, for a survey). From our point of view, focused on the Italian regional dynamics, this is an exogenous shock that we must consider when we use our model to generate the data for 1971–2004.

To incorporate this shock in our quantitative exercise, we need to identify the change in parameter A that makes the Italian economy slow down as much as the European economy. In our model, a variation of A has a growth effect that reflects the observed slowdown of TFP growth observed across the European economies. We proceeded as follows. We first generated the growth rate for Italy from 1951 to 1971 using weighted averages of the regional parameters obtained in our baseline calibration. We obtained a growth rate of 4.9%, a value that closely matches the 4.8% observed in the data for the Italian economy. Second, we used the PWT dataset to quantify the average decrease in European growth. From 4.84% in 1951–1971, it goes down to 2.39% in 1971–2004, with a loss of 2.45 percentage points.[42] We used this latter figure as our target to identify the corresponding change in the efficiency parameter A. In our model, this reduction in growth (from 4.9% to 2.44%) implies a 30% decline in A for the Italian economy. As a second step, we incorporated this generalized exogenous shock in the two regional economies by reducing by the same amount the regional values of A_s and A_n found in our baseline calibration. This reduction is slightly less but in line with the figures reported by the IMF, which estimates a drop of around 40% in TFP growth after 1970 for the set advanced economies (see Adler et al., 2018).

Other changes that took place in Italy after 1970 require adjustments in the relevant parameters. The average national tax rate increased significantly, as did the number of resources transferred to the South from the rest of the country. Significant changes also took place in the share of investment spending in total public spending, which diminished sharply in both regions. Finally, we need to quantify the impact of the two major reforms (decentralization and wage-setting) on the relevant parameters. As we mentioned earlier, we have external data to quantify all these changes, and we discuss them individually in the following.

The new values of the parameters concerning the level and the allocation of tax revenues (τ, ν_s,ν_n, $\gamma_{s,}$ and γ_n) are based on Giannola et al. (2016). Their values are shown in Table 5 below, together with the previous ones. As for social capital, recall that decentralization implies the use of the levels of each of the two regions. The values we use are from Tabellini (2010), as anticipated in Section 4.1. Finally, the reform of the wage-setting system is reflected by φ_s and φ_n. In our model, the main impact of this reform is in the Mezzogiorno, where we predict rigidity to increase significantly more than in the Center-North. As expected, both φ_s and φ_n must increase, but more so the first (+38%) than the second (+14%).

Before proceeding, it is important to recall that φ in Eq. (10) does not reflect only the impact of the reform of wage bargaining. In fact, it is the product of two different factors that determine the overall degree of rigidity of the labour market. The first, ϑ, is interpreted here to be a function of employment protection laws (EPL) that apply uniformly within the country. The second, $\frac{c_m}{c}$, reflects the *spatial* rigidity, i.e., asymmetrical changes that may result from reforms such as the one that transformed the wage bargaining system into a centralized one. Both components underwent significant changes in the 1970s. While a detailed description of the evolution of the Italian EPL is beyond the scope of the present contribution, it can be said that the 1969 reform called "Statuto dei Lavoratori" significantly increased not only the spatial component to the detriment of the South, but also the common, national EPL component. The EPL quickly kicked off a process of successive reforms that went in the opposite direction: greater flexibility in the

[42] We use data on output per worker of the countries of the Euro area countries: Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Malta, Netherland, Portugal.

Table 5
Changes in parameter values, 1971–2004.

	1951–1971	1971–2004		1951–1971	1971–2004
α	*2/3*	*2/3*	f	*2.610*	*2.610*
θ	*1.300*	*1.300*	φ_s	0.652	**0.900**
ρ	*0.020*	*0.020*	φ_n	0.894	**1.020**
τ_s	0.180	**0.384**	Sk_{it}	0.354	–
τ_n	0.180	**0.384**	Sk_s	–	**0.284**
ν_s	0.117	**0.183**	Sk_n	–	**0.394**
ν_n	−0.025	**−0.060**	A_s	0.520	**0.350**
γ_s	0.257	**0.150**	A_n	0.637	**0.440**
γ_n	0.152	**0.100**	δ	*0.055*	*0,055*

(Values that stay constant across sub-periods are in *italics*.).

national labour market was introduced but only with respect to temporary contracts and part-time jobs (Siebert, 1997).[43] The change in the value of φ_s that we estimated implies that the increase in the spatial rigidity due to the reform of the wage bargaining system added up to rigidity in EPL, whereas the change in the value of φ_n suggests that the late labour market reforms did not bring back labour flexibility to its former level.[44] Table 5 below shows the values used in our 1951–1971 calibration compared with the above-described changes adopted for 1971–2004.

4.3. Quantitative results

Model's fit. A first set of predictions is shown in Table 6, in which we report the 1971–2004 growth rates generated by our model using all the information in Table 5. The model matches well the two regions' untargeted growth and unemployment rates. While we are mainly interested in the pattern of relative growth over time, it is nevertheless worth noticing how close the growth rates generated by the model are to the real ones. In addition to this, even though the labour market is not our main focus,[45] the calibration exercise does, indeed, imply plausible results about the unemployment levels in the two regions: while unemployment in the South is over-estimated, the model is still able to capture the long-run trends of the regional labour markets, with unemployment in the South growing much faster than in the North, an expected result of the post-1970 increase of spatial rigidity in wage bargaining.

We now consider a second set of untargeted moments to assess our model's fit further. They are the net investment-output ratio (I/Y), the marginal productivity of capital (MPK), and the capital-output ratio (K/Y). Table 7 shows the model's predictions of these moments for both regions. Data shortage makes it difficult to find their exact empirical counterparts. In our model, the numerator of I/Y refers to the sum of the net private and human capital investment, while the available data measure the sum of gross private and public investment (GI). As for investment in human capital, only public expenditure in education and culture for the whole country is available, covering 1951–2004 (see HI/Y).[46]

Rather than comparing the levels of the variables, therefore, it is meaningful to compare the variations between the two periods. In this respect, the predictions of our model on I/Y correctly capture the decrease in the ratio GI/Y between the first and second period in both regions. Similarly, HI/Y also shows a decrease of its value at the country's level in the second period (in Table 7, numbers in italics refer to country averages).

As for the marginal productivity of capital, its empirical counterpart is the real interest rate for both periods and regions. However, data on interest rates are only available at the country level. The predicted values of the marginal productivity of capital, shown in Table 7, are higher than the observed real interest rates. However, the values get significantly closer once we consider the 5.5% depreciation rate assumed in our calibration. Besides, our model correctly predicts the fact that the value of the interest rate diminishes significantly in the second period.

Finally, in our model, the numerator of K/Y refers to private physical and human capital. In our predictions, this ratio shows a remarkable increase in the second low-growth period in both areas. To compare this pattern with the empirical data, we use: *(i)* the series of private physical capital (KW) computed by Piketty and Zucman (2014) from 1966 onwards for Italy as a whole; *(ii)* the stock of human capital measured as the average years of schooling (HK) in both areas (Svimez, 2011); *(iii)* the series on public and private

[43] For a period shorter than ours, the increase in the flexibility at the country level is confirmed by the Oecd EPL index.

[44] Italy authorized temporary job contracts in 1977. Rules were made even more flexible in 1984 and 1987. Layoffs for economic reasons were authorized in 1986, and firing restrictions were eased for large firms in 1991. In 1992, Italy ended its uniform wage-bargaining across economic sectors and cancelled the indexation of wage adjustments. While the 1993 social pact provided a broad bargaining framework between the social partners, the s.c. Treu reforms in 1997 (Law 197/1997) aimed to increase flexibility by introducing temporary contracts and providing incentives for part-time work. Another law in the same year (Law 469/1997) on the privatization and decentralization of job centers abolished the principle of a public monopoly on employment services. Efforts to increase labour market flexibility further were also the core of the 2003 Biagi reform (Law 30/2003).

[45] The imperfect labour market depicted in the model is a very simplified one. For instance, the participation rates and the active population rates are not allowed to vary.

[46] The data for HI/Y are from MEF (2021). As for the first of our periods (1951–71), only 1960, 1970, and 1971 are available. In Table 7, we report the average of these three years.

Table 6
Untargeted moments %, 1971–2004.

	g_n	g_s	u_n	u_s
Data	2.16	1.82	5.66	13.40
Model	2.15	1.90	5.38	20.20

Table 7
Additional untargeted moments, 1951–2004.

	North							
Model	**I/Y**				**MPK%**		**K/Y**	
	1951–71		0.29		10.0		6.7	
	1971–04		0.21		6.7		10.0	
Data		**GI/Y** [a]	**HI/Y** [b]		**Real i%** [c]	**KW/Y** [d]	**KP/Y** [e]	**HK** [f]
	Pre-71	0.22	*0.056*		*4.5*	2.3	5.2	5.1
	1971–04	0.20	*0.046*		*4.1*	4.2	6.3	8.0
	South							
Model			**I/Y**		**MPK%**		**K/Y**	
	1951–71		0.32		12.0		5.3	
	1971–04		0.20		6.4		10.4	
Data		**GI/Y** (1)		**HI/Y** (2)	**Real i%** (3)	**KW/Y** (4)	**KP/Y** (5)	**HK** (6)
	Pre-71	0.31		*0.056*	*4.5*	*2.3*	6.5	4.0
	1971–04	0.29		*0.046*	*4.1*	*4.2*	7.9	7.3

[a] GI: North and South gross investment in private and public capital, 1951–2004, Svimez (2011).
[b] HI: Public expenditure in education and culture, 1960–1971, 1971–2004, MEF (2021).
[c] Real i%: real interest rate at the country level, 1950–1965 from Carosio and Visco (1977),1965–1975 from Cotula et al. (2001), 1975 onwards from Ameco Database (2022).
[d] KW/Y: Private wealth over national income at the country level, 1966 is the starting year of the series, Piketty and Zucman (2014).
[e] KP/Y: North and South private and public capital over GDP, 1970–1994, Paci and Pusceddu (1999).
[f] HK: North and South average years of schooling, 1951–2004, Svimez (2011).

physical capital (*KP*) computed by Paci and Pusceddu (1999). These variables confirm that significant increases have occurred from the first to the second period, as predicted by our model.[47] They also confirm, consistently with our model, that the physical capital-output ratio is higher in the South in the second period.

To sum up, we go back to the growth rates shown in Table 6. The model's quantitative results strongly support the hypothesis that the worsening of the Mezzogiorno's relative position, severe enough to reverse convergence into divergence, is the result of the main interactions analysed in our model. Although the public investment increased in both regions, with the increment stronger in the South, this growth-enhancing factor was more than offset, especially in the Mezzogiorno, by decentralization, the increased labour market rigidity, and a lower share of investment in public spending. All in all, we observe a growth differential in actual data of −0.34% after 1971, whereas the calibration implies a −0.25%.

Counterfactual analysis. Our next step is to measure the negative impacts on the convergence process of each of these factors using counterfactual analysis. The relatively good fit shown by our model concerning the 1971–2004 relative growth pattern provides solid grounds for this type of exercise. To address our "what if" questions, we use as our *ceteris paribus* setting the outcome presented in Table 6 and the underlying parameters shown in Table 5 for the 1971–2004 period (the "model" scenario, from now on). Using this setting, we generate counterfactual scenarios by deleting, one at a time, the three main policy changes that took place in the post-1970 period. This approach will give us an idea of the relative strength of the effect of each policy change on the Mezzogiorno's convergence path.

We start with the effect exerted by decentralization. To detect it, we leave the parameters shown in Table 5 for 1971–2004 unchanged, all except those on social capital, which are restored to the common pre-decentralization value of 0.354.

With no decentralization, growth in the South would have been faster than in the rest of the country by 0.1% (2.18% and 2.08%, respectively), as reported in Table 8.

Clearly, with no decentralization, the convergence process would have been maintained, albeit at a slightly slower pace than the one achieved in the 1951–1971 period.[48]

To assess the importance of this decentralization effect relative to the other simultaneous shocks, we replicate the same counterfactual exercise for the labour market reform and the decrease in the share of investment in public spending.

We use again the "model" scenario as our starting point to identify the effect of the changes in the labour market. In this setting, we

[47] The initial year of the series by Piketty and Zucman (2014) is 1966, so the growth of private capital would likely be higher if the data from the 1950s were available. The same consideration applies to the figures from Paci and Pusceddu (1999), the starting year of which is 1970.
[48] It is worth recalling that this effect is measured while we control for the potentially confounding factors associated with the other major simultaneous changes in public policies.

Table 8
What-if scenario, %, 1971–2004.

	g_n	g_s	$g_s - g_n$
No Regional Decentralization	2.08	2.18	0.1
No Labour Market Centralization	2.28	2.35	0.07
No Capital Expenditure Change	2.655	2.654	– 0.001

substitute the 1971–2004 values of φ_s and φ_n with those from the previous subperiod. The impact of the changes in the regional labour market is, in our model simulation, summarized in a 0.07% growth rate differential (see the "No Labour Market Centralization" line in Table 8). A note of caution is required here. As we noticed before, on one hand, rigidity in the labour market increased because of the centralization of the wage bargaining system, with adverse effects for the Mezzogiorno. On the other hand, from the 1990s on, several reforms made other aspects of the labour market more flexible. The change in the relevant parameter values we estimated reflects the overall net effect of these contrasting trends and should not be interpreted as a measure of the sole impact of the wage bargaining reform. Our results seem in line with those of Boeri et al. (2019), who find significant increases in labour incomes of the Southern regions in their "what if" exercises, allowing a decentralized wage bargaining reform in Italy of the type adopted in Germany.[49]

Finally, we use the "model" scenario to measure the effect of the changes in the investment share in public spending. If those shares had not diminished in the second period, this would have significantly enhanced growth in both regions but with no relevant effects on convergence.

Table 8 shows that the "decentralization effect" has been an important factor in explaining the reversal of the Mezzogiorno's convergence path, possibly more important than the centralization of wage bargaining and definitely more important than the change in fiscal policy. In 2004, the Southern per capita GDP was around 60% of the Center-North's, a share much lower than its value of 67% in 1971 (see Fig. 1). A simple extrapolation implies that just by cancelling decentralization, the per capita GDP ratio would have been around 70% in 2004.

To check the robustness of our main results, we have also shifted the split year from 1971 to 1976, when the new-born Regions fully replaced the Cassa per il Mezzogiorno in the management of infrastructure investment. The results obtained in this additional exercise (available upon request) confirm the ones based on splitting the whole period using 1971. Our main results are also robust with respect to the specific measure we use to pin down the values of the parameters on social capital in the two regions.[50]

To conclude, our results support the idea that the reversal of the South's convergence path was to a great extent due to the reforms adopted in the 1970s. By centralizing what would have been better to keep decentralized (wage bargaining), and by decentralizing what would have been better to maintain under a firm central control (the management of public investment), the two reforms have created a sort of "perfect storm" that – perhaps unintendedly – killed the promising ongoing post-war period of regional convergence in Italy.

A final note on the pre-WWII period (1861–1951) not shown in Fig. 1 above is in order. While its analysis is beyond the scope of this paper, which is focused on the post-1970 slowdown of convergence, our model can still capture the main quantitative aspects of the dynamic of the gap in that period.[51]

5. Conclusions

This paper focuses on the post-WWII South of Italy's fast income convergence, which lasted 20 years and stopped suddenly in the early 1970s. After that, we observe a slow divergence process leading to a per capita income divide similar to the one recorded in the early sixties.

Our explanation is based on the idea that the dramatic post-1970 halt of convergence was due to a complex interplay between a persistent heterogeneity in the regional levels of social capital and the occurrence of significant changes in the institutional setting of the governmental organization, the labour market functioning, and fiscal policies. The governmental change is tightly connected with the impact of social capital . In our analysis, the birth of regional governments is thought to have increased the influence of local social capital on growth since the control of funds earmarked by the federal government for local public investments became more and more in charge of local governments and therefore more exposed to the local social norms.

We have first presented empirical evidence suggesting a link between social capital, public investment, and economic growth in line with our main idea. Then, to properly quantify the effect of our central hypothesis, we have developed and calibrated an

[49] In their contribution the Southern regions would obtain a wage increase of 16.6% if a decentralized wage bargaining reform were adopted. This result cannot be easily compared with ours because the two subsets of regions are different, and because our analysis focuses on per capita income, which includes capital income.

[50] Nuzzo (2006) yields an alternative measure of social capital based on several indicators of social participation, political participation, and trust. In this composite index of social capital, the North-South ratio is 1.54, higher than the ratio (equal to 1.39) associated with the index of trust based on the WVS, used in our baseline calibration. Nuzzo's index implies a stronger role of decentralization in the post-1971 weakening of convergence.

[51] In our simulations for this period, available upon request, we obtain growth rates compatible with the real ones for the two regions. Our exercise is based on assumptions regarding the tax rates, the (high) degree of flexibility of the two labour markets and a large initial difference in parameter *A*.

endogenous growth model along the lines of Futagami et al. (1993). The original model has been augmented to take account of the interaction between social capital and public investment, as well as the Italian labour market reform and changes in the fiscal policies.

We have calibrated our model using data from the two macro-areas. Its predictions closely match the two regions' untargeted 1971–2004 growth rates. The calibrated model appears to replicate the most important characteristic of the Mezzogiorno's convergence process in the transition from the first to the second subperiod – namely, a slowdown of growth so severe as to halt and even reverse the process. According to our calibrated model, decentralization plays an important role in accounting for the dynamics of the Italian divide on par if not greater than the wage bargaining reform. The changes in fiscal policy appear to have had almost no role in the dynamics of the divide, although they account for a part of the growth slowdown of the two macro-regions.

Two considerations about our results deserve to be discussed. First, as explained in Section 3 above, any conclusion about the growth effect of decentralization at the *country* level cannot be drawn without a careful analysis of the regional distribution of per capita growth rates (see Mauro et al., 2018, on this). Second, the negative effect of decentralization on the Mezzogiorno's convergence should not be interpreted as evidence against decentralization per se. In fact, decentralization benefits regions whose institutional quality is higher than the one at the central level of government.

Our results dispute the validity of including all territories simultaneously in a decentralization process, ignoring the different regional levels of efficiency in the functioning of the local institutions.

Well beyond the Italian case, we can find a general lesson in our results. In the presence of high cross-region heterogeneity of social capital, a proper design of the relationships between the central government and the local ones may determine the effectiveness of the development policies aimed at reducing the regional economic gaps.

To conclude, we believe that almost 30 years after the publication of Putnam's contribution, the Italian case still proves to be a source of inspiration for those scholars studying how cultural attitudes, deeply rooted in history, and formal institutional settings interact to generate persistently different economic outcomes.

Disclaimer

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper.

Funding

This work was supported by the Regione Autonoma della Sardegna, L.R. 7/07, grant no. CRP-60619.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Francesco Pigliaru reports financial support was provided by Autonomous Region of Sardinia.

Data availability

Data will be made available on request.

Acknowledgments

We thank Alberto Bisin, Fabio Cerina, Luigi Guiso, Alessio Moro, Stephen Parente, Pietro Peretto, Fabiano Schivardi, Guido Tabellini, and Jacopo Zotti for useful comments and suggestions. We also thank the participants at seminars held at Duke University and at the University of Salerno. We are grateful to Paola Casavola and Carmelo Petraglia for allowing us to use their data on the Italian regions.

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