The Historical Origins of Regional Economic Inequality in Spain: The Cultural Legacy of Political Institutions

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1 Introduction

As in other works of similar nature, when dealing here with the origins of economic disparities, we start from the basis that innovation and factor accumulation "are not causes of growth; they *are* growth" (North and Thomas 1973) or, at least, they are just *proximate* causes of growth (Rodrik 2003; Acemoglu et al. 2005). This paper is rather interested in the so-called *fundamental* or *deep* causes that set economies on sustainable long-run growth paths. Acemoglu et al. (2005) distinguish three main hypotheses on fundamental causes: geography, institutions, and culture. The latter two form a group that could be called history hypothesis, highlighting its essentially human component, as opposed to the geography hypothesis. When the title refers to the *historical origins* of the regional economic distribution, it points out two issues. The first one is that this distribution can be largely explained by elements of human organization, and the second one is that the organizational variation across regions sinks their roots in a remote past.

If formal institutions and their path dependence were often considered the factors that explain persistence in comparative economic development (Hall and Jones 1999; Acemoglu et al. 2001), the studies about the cultural legacy that formal institutions leave have introduced cultural features as the possible missing link (Guiso et al. 2011) that may explain long-term economic disparities, especially within a nation (Putnam et al. 1993; Guiso et al. 2008a; Tabellini 2010).

This chapter studies the role of certain historical institutions in current regional economic inequality, through their cultural legacy. Those regionally distinctive institutions no longer exist, since all regions are currently integrated—though with

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certain particularities—in a relatively homogeneous institutional framework. It is argued here that the channel through which past political institutions affect current distribution is fundamentally cultural. We start from the theoretical basis that there exist certain cultural traits that are associated with a better economic performance within a liberal institutional framework, are highly persistent, and were partly shaped by political experiences in the distant past.

Our analysis builds on the work "Culture and institutions: economic development in the regions of Europe" (Tabellini 2010), whose aim is studying the role that these cultural traits could have played in current regional economic inequality within five countries—Spain among them. The reverse causality that, according to modernization theory (Inglehart and Baker 2000), exists between economic performance and these cultural traits poses some analytical challenges that he attempts to overcome by delving into history. The current paper tries to address the Spanish case more precisely, including other cultural variables, disaggregating observations into a lower spatial level, such as provinces; developing an alternative proposal about the relevant historical facts for the promotion of these cultural traits; and testing this hypothesis against other so-deemed fundamental causes of development such as geography and human capital.

The chapter proceeds as follows. Section 2 discusses briefly these cultural traits and their relation to economic performance and explains how indicators for both are built. Section 3 contains the two historical hypotheses on which we rely to explain the cross-regional disparities of current cultural traits and their application to the Spanish case. Section 4 poses a two-stage least squares regression on the relation between economic performance and these cultural traits, instrumenting the latter by the historical instrumental variables we previously discussed in Section 3, and investigates the robustness of the obtained results. Section 5 presents some concluding remarks.

2 Culture and Economic Performance

In the last decades, several important empirical studies were conducted on highly persistent cultural traits that find their roots in a distant past (Putnam et al. 1993; Guiso et al. 2008a; Tabellini 2010; Nunn and Wantchekon 2011; Alesina et al. 2013; Talhelm et al. 2014). This cultural legacy is able to persist even after the original circumstances have disappeared. Specifically, we focus here on cultural traits that theoretically promote economic development, either directly or indirectly. In Sect. 2.1, relying on Tabellini (2010) and the social capital research program, we build the variable that attempts to account for the variation of these cultural traits across regions.

In his study, Tabellini (2010) uses four variables as reference in order to measure this cultural variation within his sample: (a) generalized trust, (b) feeling of control over own life, and values related to (c) respect to others and (d) obedience. According to Tabellini, generalized trust and respect to others are traits that

"encourage welfare-enhancing social interactions, such as anonymous exchange or participation in the provision of public goods, and [...] improve the functioning of government institutions." The feeling of control over one's own life is taken as a measure of the conviction that individual effort is likely to pay off. This belief is often related to economic performance since "if individuals are highly motivated to succeed and view economic success as related to their deliberate choices, they are more likely to work hard, to invest for the future, and to innovate and undertake new economic initiatives" (Tabellini 2010). On the other hand, considering obedience as a desirable trait in children is interpreted as an indicator of coercive culture, and "such coercive cultural environments stifle individual initiative and cooperation within a group."

In addition, along with Tabellini's cultural indicators, we take into consideration other variables drawn from the social capital research program. Guiso et al. (2011) provide a brief and intelligible definition of social capital. They consider that social capital is "*civic* capital, i.e., those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities." This description led them to identify it elsewhere as "good" culture (Guiso et al. 2008b). The most known approaches utilize indicators about generalized trust, participation in associations, the widespread presence of certain civic values or norms, and orientation toward political affairs (e.g., see Putnam et al. 1993; La Porta et al. 1997; Knack and Keefer 1997; Brehm and Rahn 1997; Mota and Subirats 2000; Zak and Knack 2001; Beugelsdijk et al. 2004; Beugelsdijk and van Schaik 2005).

2.1 Construction of a Provincial Indicator About These Cultural Traits

Tabellini (2010) gets the information on generalized trust,[1] control over own life,[2] values of tolerance and respect, and values of obedience[3] from the World Values

[1]From the question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Two options are offered: "Most people can be trusted" and "Can't be too careful."

[2]From the question: "Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "none at all" and 10 means "a great deal" to indicate how much freedom of choice and control you feel you have over the way your life turns out.

[3]Information about the past two variables comes from WVS' following question: "Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five." The offered qualities are: independence, hard work, feeling of responsibility, imagination, obedience, tolerance and respect for other people, thrift, perseverance, religious faith, and unselfishness.

Survey (WVS). He obtains his variable *pc_culture* from the principal component of these four indicators.

We follow a similar methodology,[4] using those factors along with other similar information from the WVS[5] and from European Social Survey (ESS).[6] From the former, we use the importance of encouraging independence values in children,[7] and from the latter, we use the importance of being free and making one's own decisions[8] and, again, generalized trust.[9] We obtain one single variable—*trust*—from both surveys' information about generalized trust by computing their principal component. We obtain another variable called *independence* from the principal component of the rest of the variables we have mentioned so far—i.e., all of them except those about generalized trust. This variable accounts for the attitude that a culture exhibits toward individual initiative.

The minimum spatial unit that these surveys permit us to aggregate is the *autonomous community*. However, if we took the autonomous community as a unit of reference, we would obtain only seventeen observations,[10] which is an insufficient sample size. For this reason, we attempt to find provincial variability by the inclusion of new cultural variables for which provincial aggregation is possible. For this purpose, we will rely on the work of Mota and Subirats (2000) who carried out a study about social capital in the Spanish autonomous communities. However, by using the same and similar updated sources, we can replicate their variables at a provincial level of aggregation. Their social capital indicator consists of the citizens' political involvement and their associative participation. Citizens' political involvement is measured by their interest in politics,[11] level of information about

[4]Tabellini computes the principal component from the four variables at individual level. As we use data from different surveys, we cannot apply the same methodology. First, we compute the provincial average of each variable and then we extract the principal component.

[5]From WVS, we use the waves from 1991, the first wave with Spain included, to 2005.

[6]From ESS, we take every available wave: 2002, 2004, 2006, 2008, 2010, and 2012.

[7]Using the same question from which Tabellini took obedience and respect as qualities to promote in children.

[8]From the literal question: "Now I will briefly describe some people. Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer. It is important to her/him to make her/his own decisions about what she/he does. She/he likes to be free and not depend on others." Options range from "very like me" to "not like me at all."

[9]From a similar question to the WVS' one: "Using this card, generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a score of 0–10, where 0 means you can't be too careful and 10 means that most people can be trusted."

[10]Autonomous cities of Ceuta and Melilla are not included.

[11]From the surveys: CIS (1992), CIS (1998), and CIS (2002). In the three of them, the same question is asked: "Generally speaking, would you say that you are interested in politics a lot, considerably, a little, or nothing at all?" We use the provincial percentage of people who answer "a lot" or "quite" and create a single variable from the principal component of all of them.

the government[12], and their information habits about politics[13]; from the principal component of that information, they obtain a variable called *citizen involvement index*. Associative participation[14] is measured by the participation in twelve kinds of voluntary associations, from which the variable *associative participation index* is obtained. Finally, a variable called *socialcapital* is obtained from the principal component of both indexes. This variable is built according to Mota and Subirats' procedure but is provincially aggregated.

Our main variable, *culture*, is made up from the principal component of these three variables (*trust*, *independence*, and *socialcapital*). In this form, we get a single variable about these cultural traits with provincial variation. The principal component analysis returns a normalized variable, so *culture* shows mean 0 and standard deviation 1. Its highest value is reached in Guipuzcoa (3) and the lowest one in Jaen (−1.64). Figure 1 shows the geographical distribution of the resulting variable (*culture*). This variable reaches its highest values in the north, especially in northeastern Spain.

2.2 Provincial Economic Performance in Spain

The highest levels of per capita GDP are also geographically located in the northeastern quarter of Spain. For our empirical analysis, we use the logarithm of

[12]From the surveys: CIS (1998) and CIS (2002). Both surveys ask this question: "Generally speaking, would you consider you are very informed, quite informed, a little informed, or not informed at all about the activities developed by your autonomous community's government? What about the activities of your autonomous community's parliament? What about your city council's activities?" We use the provincial percentage of people who answer "very informed" or "quite informed" and create a single variable from the principal component of all of them.

[13]From survey CIS (1992), we use the question "Could you tell me how often you read general information newspapers? How often do you listen to the news on the radio? How often do you watch the news on TV?" And from CIS (2010), we use the slightly different question "Now, I would like to ask you some questions about newspapers, radio, and television. How often do you listen or watch the news in the radio or television? Apart from news, do you listen or watch other shows about politics in the radio or television? Apart from sport press, do you read the newspaper (in paper or the Internet)? Do you use the Internet in order to get information about politics or society?" We use provincial percentage of people who answer "every day" and create a single variable from all media in both surveys.

[14]From CIS (1998). We obtain this information from the question: "From the following associations and organizations, can you tell me about each of these organizations whether you belong, whether you have ever belonged, or whether you never belonged to . . . ?" The kinds of associations listed are "sport associations and groups," "local or regional societies," "religious associations," "educative, artistic, and cultural associations and groups," "juvenile organizations or groups," "charitable associations," "ecologist associations," "labor unions," "political parties," "human rights organizations," "pacifist movement's association," and "feminist associations." We use the provincial percentage of people who answer that they belong or belonged to it for each case and extract the principal component from all organizations.

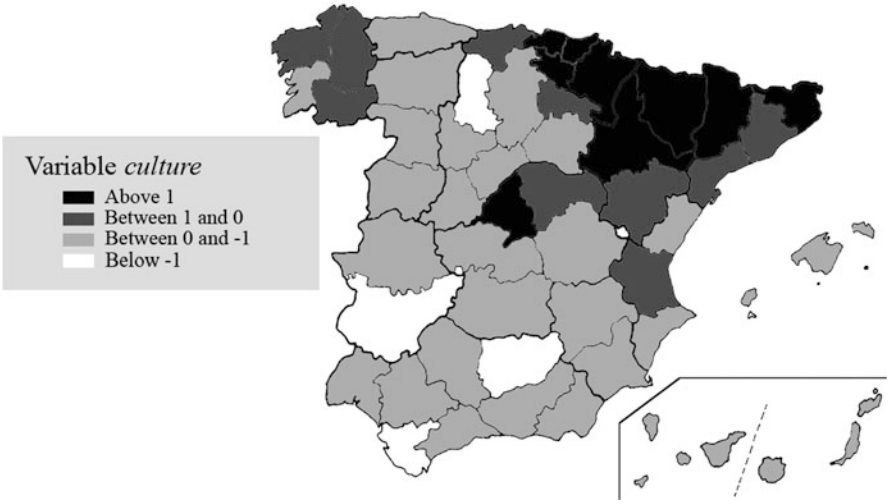

Fig. 1 Geographical distribution of the variable *culture*

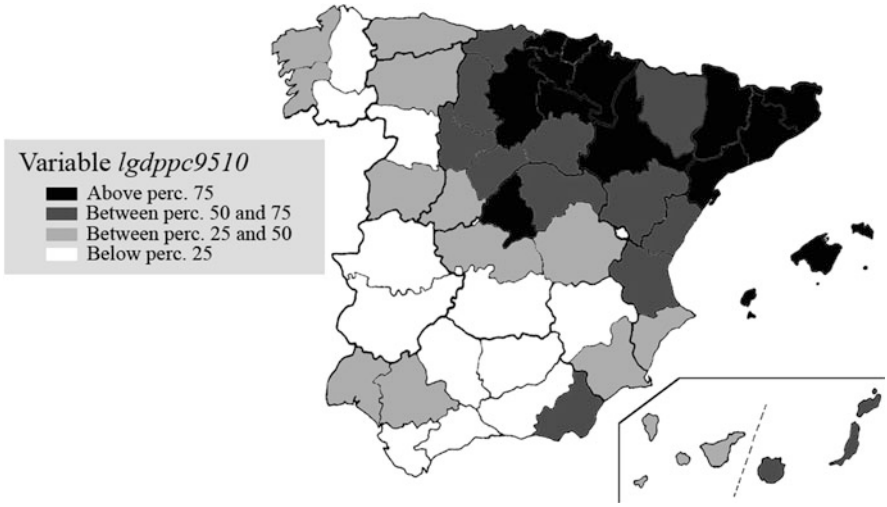

Fig. 2 Geographical distribution of the variable *lgdppc9510*

the average per capita GDP during the period 1995–2010 (*lgdppc9510*)—according to figures from *Instituto Nacional de Estadística* (INE)—as a measure of current economic development. This measure has a mean of 9.72, obtaining in Alava its maximum value (10.15) and Badajoz its minimum (9.39). Figure 2 illustrates the geographical patterns of economic developing according to our measure.

It is noteworthy that this geographical distribution, despite long periods of convergence, remained similar for most of the twentieth century. There is a

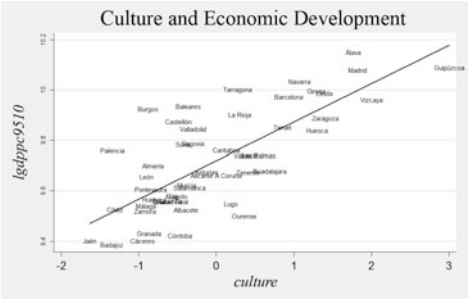

Fig. 3 Scatterplot: *lgdppc9510* versus *culture*

correlation of 0.7 between provincial per capita GDP in 1930 and that in 2000 (Alcaide 2003). The remarkable political and economic transformations of those 70 years barely altered the geographical patterns of development.

A key fact for this work is that the processes that led to this distribution seem to have occurred during the nineteenth century. The nineteenth century started with a very different distribution, where, for instance, Extremadura and Andalusia were among the richest regions and País Vasco, La Rioja, and Aragón were below the average. In the early twentieth century, these positions were already inverted and remained until nowadays.

The correlation between *lgdppc9510* and *culture* is 0.76. Figure 3 displays a scatterplot relating both variables. However, no causal conclusions can be drawn due to the endogeneity of *culture*. Because of this, instrumental variables will be used in order to account only that persistent component of *culture* that is due to historical factors and is exogenous with regard to current economic development.

3 Historical Institutions in the Development of Civic Culture

This section is devoted to historical facts that may be associated to the development of these cultural traits and can be used as instruments for the variable *culture*. We pursue two different lines of argument that, although likely related, exhibit distinct geographical distributions.

3.1 Constraints on the Executive

The first of them is the proposal made by Tabellini (2010) regarding this issue. He considers differences in political institutions and education to be the key historical facts to explain current disparities in these cultural traits. However, in accordance to the concrete course of Spanish history, we do not consider education as an exogenous factor that brought about the cross-regional variation

on these cultural traits, and the results will support this decision. Thus, we only rely on his approach of past political institutions as an instrumental variable for *culture*.

Regarding the effect of political institutions on the development of these cultural traits, he argues that "an autocratic and corrupt regime that survives thanks to a strong hierarchy of privileges and that subjugates the population with the arbitrary use of force [...] will foster mistrust of unfamiliar people, limited as opposed to general morality, a sense of individual helplessness, and resignation"; being the opposite in the republic regime, "where productive entrepreneurs or traders participate openly in the political organization of society, the rule of law is respected, and supreme authority is constrained by checks and balances." [15] He evaluates past political institutions with regard to their constraints on the executive in the years 1600, 1700, 1750, 1800, and 1850. Data on political institutions are collected from Polity IV Project and Acemoglu et al. (2002), and when regional disaggregation is required, as in the case of Spain, Tabellini carries out his own assessment on the basis of their methodology.

Tabellini (see Tabellini's 2005 working paper), following Polity IV's methodology, assigns values from 1 to 7 to his evaluation of constraints on the executive, 1 being "unlimited authority" and 7 "accountable executive, constrained by checks and balances." Therefore, a higher value corresponds to higher institutional constraint on the decision-making powers of chief executives. Between both extremes, other situations are defined: it takes a value of 3 if the executive has to face real but limited constraints (e.g., a legislative body with more than consultative functions), and it takes a value of 5 when executive power is subject to substantial constraints (e.g., a legislature that often modifies or defeats executive proposals for action or refuses funds to the executive). Even values—2, 4, and 6—correspond to transitions between these political situations.

Tabellini (2010) assigns a higher value to current autonomous communities of Aragon, Catalonia, and Valencian Community in years 1600 and 1700 due to the presence of strong Courts (*Cortes*), as opposed to those in Crown of Castile and the equivalent body in Kingdom of Mallorca. We take his variable *pc_institutions*, the principal component of all the periods assessed, just as he built it in his work. In Fig. 4, these two groups are represented. The variable *pc_institutions* takes value 1.98 for Aragon, Catalonia, and Valencian Community and 0.495 for the rest.[16]

However, Tabellini's perspective does not account for the special political situation at that time in the regions of Basque Country and Navarre. They also had a *pactist* relationship with Spanish central power. *Fuero General de Navarra*, *Fuero de Vizcaya*, *Fuero de Guipúzcoa*, and *Fueros de Álava* had to be sworn by the

[15]This perspective is obtained from Putnam et al. (1993).

[16]The original values for this principal component in Tabellini (2010) from his sample of five countries are different, since here we compute a new principal component from a sample reduced to only the Spanish regions.

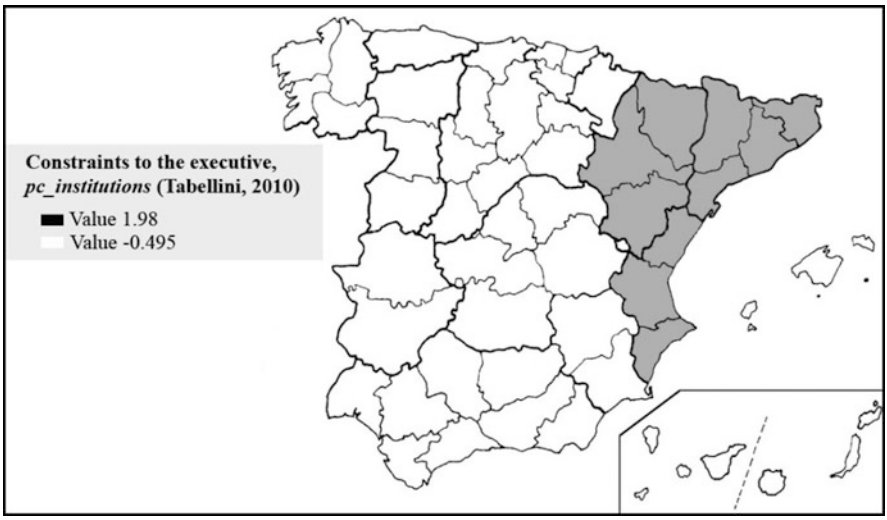

Fig. 4 Constraints to the executive, 1600–1850. *Source*: Tabellini (2010)

king—just as *Fueros Generales de Aragón*, *Furs de Valencia*, and *Constitucions de Catalunya*—and *Cortes de Navarra*, *Juntas Generales de Vizcaya*, *Juntas Generales de Guipúzcoa*, and *Juntas Generales de Álava*, respectively, were in charge of their administration and protection. We thus create a new variable that accounts for this situation (*pc_instit_mod*), being a modification of the one by Tabellini.

According to our approach, Navarra and Basque provinces take a value of 3 in 1600, 1700, 1750, and 1800. This situation officially remains until 1841 in Navarre and 1876 in Basque Country. However, central power's aspirations had been gradually eroding their autonomy from time before; for this reason, we assign to Basque provinces in 1850 the same value as the rest of the regions. Our variable *pc_instit_mod* is made up from the principal component of these modified measures of constraints on the executive for years 1600, 1700, 1750, and 1800—there is no variation in 1850. The geographical pattern of the resulting variable is shown in Fig. 5.

3.2 Municipal Autonomy

The other publication we draw on is Guiso et al. (2008a), who, following Banfield (1958) and Putnam et al. (1993), consider that in order to explain social capital regional disparities in Italy, it is necessary to refer to their free city-state experiences in the Middle Ages. According to their perspective, the particular autonomy of free

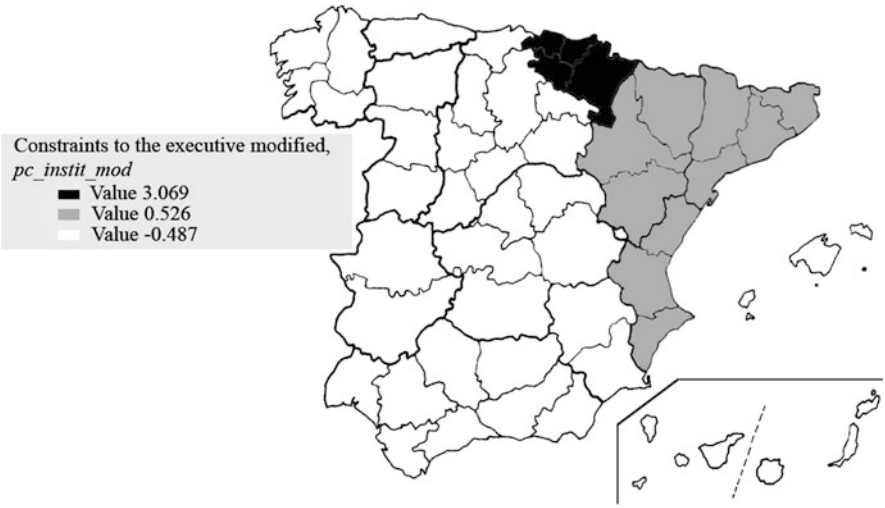

Fig. 5 Modified variable on constraints on the executive *pc_instit_mod*

city-states in the North of Italy permitted the communities to develop this set of civic features.

Italy's case is deeply studied and provides us with some guidance. During the eleventh century, "the Normans invaded the part of the country south of Rome and formed a feudal monarchy, which continued in some forms or another until the Italian unification in 1861" (Guiso et al. 2008a). This regime, highly hierarchical and bureaucratic, precluded the formation of independent city-states; even "any glimmerings of communal autonomy were extinguished as soon as they appeared" (Putnam et al. 1993:123), preventing, by that, the development of these civic features. However, in northern city-states, "those who governed the communal republics acknowledged legitimate limits on their rule. Elaborate legal codes were promulgated to confine the violence of the overmighty. In this sense, the structure of authority in the communal republics was fundamentally more liberal and egalitarian than in contemporary regimes elsewhere in Europe, including, of course, the South of Italy itself [...] The practices of civic republicanism provided a breadth of popular involvement in public decision making without parallel in the medieval world" (Putnam et al. 1993:125). It is understood that the effects of these distinct historical institutional configurations have persisted until the present day by way of culture.

Guiso et al. (2008a) found empirical evidence that supports the causal statements. They not only demonstrate that different historical experiences between North and South led to different levels of social capital but also find differences within the North. Those northern cities that had free city-state experience exhibit nowadays significantly higher levels of social capital than those that had not. We do not find in Spain free city-states cases in the Italian sense, but we do have other kinds

of autonomy experiences at municipal level during the High Middle Ages that presented clear regional disparities.

During the process of the so-called *Reconquista*, the Iberian Peninsula lived a peculiar period in terms of sociopolitical organization. Significant events of this time, like the existence of a weak central and integrative power or the needs to repopulate the new conquered areas, gave rise to a wide range of political and legal arrangements at local level throughout medieval Spain.

The fact that will help us to assess municipal autonomy in the High Middle Ages is the capacity of the town to develop its own legal order. We counterpose two situations: the official adoption of the *Liber Iudiciorum* and the development of an own customary law.

The ancient Visigothic code, *Liber Iudiciorum*, regulated the "particular relations of all kinds, procedural and criminal" (García-Gallo 1978:259). It was an extensive and ambitious legal order that, given its Romanist roots, granted the power to legislate to the king (Gacto et al. 2009:188; Orduña 2003:108). The validity of this code implied generally the impossibility of developing an entire legal tradition based on the customs of the population and evolving according the new requirements.[17]

During the High Middle Ages, *Liber Iudiciorum* ruled in a territorial scope within Kingdom of Leon and Kingdom of Toledo but was extended as local legal order to a multitude of major towns in southern Spain. With the catalog of medieval texts of local law by Barrero and Alonso (1989), we can locate clearly where this legislation officially ruled at that time. This information helps us to build a dummy variable (*liberiudiciorum*) that takes value 1 in the current autonomous communities of Galicia, Extremadura, Andalusia, Asturias, and Canary Islands, along with the provinces Leon, Palencia, Zamora, Salamanca, Toledo, Ciudad Real, Murcia, and Alicante. Figure 6 shows the presence of this code in the Middle Ages.

According to García-Gallo, "in stark contrast to the Visigothic system, centered on the validity of *Liber Iudiciorum*, we find what we could characterized as free law; that is, non-formulated legal order, within which the norms to be applied are freely seek for each case, and for any dispute judges judge freely according to their free will" (García-Gallo 1978:377). "With regards to the expansion of this judicial creation of law, it had deep roots in [Kingdom of] Castile, in Navarra and in Aragon" (Gacto et al. 2009:121–122).

Although not necessarily by the judicial process, in Basque provinces (Gacto et al. 2009:204) and Catalonia (García-Gallo 1978:445), custom-based legislation was also developed.

[17] In some places of the so-called *Extremadura leonesa* – Zamora and Salamanca – some legislative flexibility was permitted, even when *Liber Iudiciorum* was the official legislation. Local law was complemented in order to adapt local organization to frontier conditions. However, we are not going to equalize this legal flexibility to the custom-based law of northeastern regions.

Fig. 6 *Liber Iudiciorum* in High Middle Ages

Fig. 7 Presence of custom-based law

We thus take into account here the regency of a custom-based legislation, either by written codes or by judicial creation of law. We build a dummy variable (*customary*) that takes value 1 in the current autonomous communities of Cantabria, Madrid, La Rioja, Basque Country, Navarra, Aragon, and Catalonia, along with the provinces of Burgos, Valladolid, Avila, Segovia, Soria, and Guadalajara as we see in Fig. 7.

Not all the provinces fit on this dichotomy: there exist some places that neither got *Liber Iudiciorum* nor were ruled by a locally developed customary law. Since the absence of *Liber Iudiciorum* did not necessarily imply the development of an own custom-based legislation, we test both cases in our empirical analysis. Due to this fact, we will be able to assess whether there are statistical reasons to conclude that the formation of these cultural traits is more related to one historical fact over the other.

4 Empirical Analysis

4.1 Methodological Approach

The present study aims to causally associate in an econometric exercise the historical institutions to current economic development, considering these cultural traits as the link that relates them.

Figure 8a illustrates how history would affect current economic performance through two different ways: formal institutions and culture. The dark arrows warn the presence of reverse causation. This fact raises serious difficulties to draw causal conclusions. However, in the concrete Spanish case, although there exist distinctive political histories across the regions, formal institutions are currently constant within the nation, preventing them to be variation transmitters. In this way, current culture and economic performance turn to be isolated from the effect of current formal institutions, as Fig. 8b shows. Nevertheless, a channel of retrocausality still remains, the effect that economic development theoretically has on these cultural traits, in accordance to modernization theory. In a case of reverse causality, exogeneity assumptions are violated, thus making the OLS estimator biased and inconsistent.[18] In order to overcome this problem, sources of cultural exogenous variation, i.e., instrumental variables, must be sought. History plays here a fundamental role, inasmuch as in it we will be able to find key facts associated with the development of these cultural traits and exogenous from the effect of current economic development.

We thus perform a two-stage least squares regression, relating economic performance to cultural traits and instrumenting the latter by historical variables. However, in order to ensure the validity of our model, we must take certain precautions in our identification strategy, by controlling possible effects that go through other channels than the considered.

In the left-hand side column of Fig. 9, we find the relevant historical variables and in the other one their current equivalent. The theoretical difference that we establish

[18]Proof can be seen in Wooldridge (2010, chapter 16).

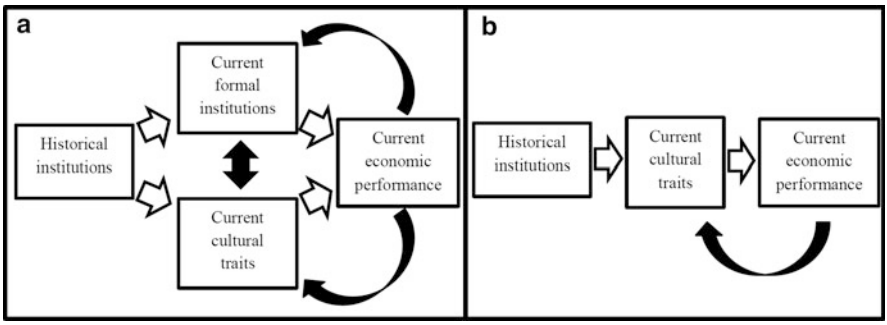

Fig. 8 Effect of history on current economic performance

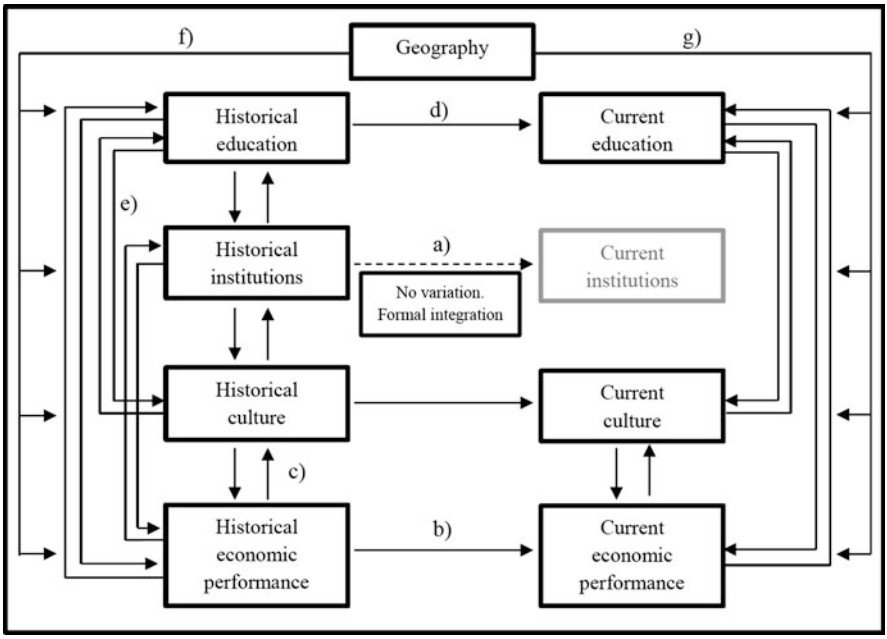

Fig. 9 Identification strategy

here between the historical period and the present one is determined by the very thick dividing line that marked two crucial historical events for our analysis:

1. The Bourbon centralization in the eighteenth century and the constitutional and administrative unification processes of the Liberal State in the nineteenth century. The former seeks to unify the Crown of Castile and the Crown of Aragon under the political institutions of Castile, centralizing the power in the figure of the king in an absolutist regime. In the nineteenth century, under the framework of the reforms toward the Liberal State, Basque and Navarrese autonomies are

gradually eroded until the complete official suppression of their particular laws (*fueros*): in Navarre with the *Ley de Modificación de Fueros* (1841) and in the Basque provinces with the end of the Third Carlist War (1876). However, these regions' autonomy was already substantially reduced after the enactment of *Ley de Confirmación de Fueros* in 1839.

2. The Liberal Revolution, i.e., when main institutional transformations from the Ancient Regime toward the Liberal State occurred. We locate these processes in the first half of the nineteenth century. According to Carreras and Tafunell (2003), in the economic sphere, the Liberal Spain can be considered to be "born between 1833 and 1839."

The first point is of fundamental importance, since it homogenizes the formal institutional environment for all regions. Thus, we do not consider formal institutions to transmit any variation since then.[19] The second one is crucial because it is the moment when main transformations toward a liberal institutional environment take place. As we mentioned in the introduction, these cultural traits are supposed to be favorable for economic performance within this liberal institutional environment. Therefore, for the purposes of the analysis, the theoretical difference between past and present will be determined by the thick and stylized temporal border of the unification processes and the Liberal Revolution.

As said above, in order to overcome validity problems, we assume the stylized fact that these regionally distinctive historical institutions no longer exist while their effects persist through these cultural traits. This is how we isolate culture and current economic distribution from the effect of current institutions. This assumption permits us to use historical institutions as valid instrumental variables for these cultural traits. The dotted-line arrow a in Fig. 9 indicates that no variability transcends through that channel. However, we must concern some issues with regard to three factors that we will need to take into account: the historical distribution of economic development, human capital, and geography.

With regard to the historical distribution of economic development, we should concern about its own persistence, in such a way that current distribution is simply a legacy from the historical one (arrow b) with cultural traits playing no role or even being a consequence of development (arrow c), as modernization theory asserts. In the model, regressions will be controlled for the provincial urbanization rate in 1860[20] (Tafunell 2005), understood as the proportion of population living in tows of 5,000 inhabitants or more, as a measure of historical economic development.

[19] In order to expedite the exposition of the problem, we ignored the distinctive civil laws of Catalonia, Aragon, Valencia, Basque provinces, and Navarre, which persisted somehow until nowadays. In Section 4.3, we will discuss and test the role of these regionally distinctive private laws in our model.

[20] 1860 is the first year for which we have complete data. This moment is effective after the Liberal Revolution, but 1860's series is very similar to that of 1787, showing a correlation of 0.88.

In 1860, the average provincial urbanization rate (*urban1860*) was 19.3 %. The most urbanized provinces were Cadiz, Seville, and Madrid, with 66 %, 61.3 %, and 60.8 % of their respective populations living in tows of 5,000 inhabitants or more, while the least urbanized ones were Ourense, Lugo, and Pontevedra, with 2 %, 2 %, and 2.7 %, respectively.

Human capital stands out as one of the fundamental causes of development (Glaeser et al. 2004; Gennaioli et al. 2013) due to its direct effect on productivity and its positive economic, political, and social externalities. Just as happened with historical economic development, human capital could affect both current economic development directly (arrow d) and the formation of these cultural traits (arrow e), as Tabellini (2010) claims. We must thus control this alternative, and we will do it by including past provincial illiteracy rates, contained in Vilanova and Moreno (1992). Unfortunately, the earliest available data are for 1887, when, according to our narrative, main institutional reforms were already implemented. We assume certain rigidity of individual and public investment in human capital and, thus, of the literacy rate's adaptation to new institutional circumstances during the first decades.[21] Under this assumption, this data can be used as reference to the provincial distribution of education level at the end of the Ancient Regime. The average illiteracy rate in 1887 (*illiteracy1887*) is 66.63 percentage points; the maximum was reached in Almeria (84) and minimum in Alava (35).

On the other hand, the so-called geography hypothesis is often highlighted as a powerful explanatory factor for international comparative development (Gallup et al. 1999; Diamond 1997). This perspective "emphasizes the role of geography, climate and ecology that determine both the preferences and the opportunity set of individual economic agents in different societies" (Acemoglu et al. 2005:399). We take Dobado (2006) as reference, who attempts to econometrically explain, among other things, Spain's regional economic inequality through geographical variables.[22] He uses provincial information about latitude, longitude, altitude, area, length of the coast, sun hours, and average temperature. The included variables in our model will be only the exogenous ones: *latitude*, *longitude*, *altitude*, and *densicoast*—length of the coast divided by province area. In Appendix 1, we list all the variables we use in our regressions with their descriptions and sources. Their main descriptive statistics are shown in Appendix 2.

[21] It makes sense if we consider that only first generations will withstand the differential due to the new institutional context; thus, the largest part of adult population will maintain its previous literacy level. This assumption implies a delay from the moment that institutional transformation is undertaken until the moment literacy rates are completely adapted in all age ranges of the population. But still we are ignoring many other important aspects that could delay this adaptation, like material possibilities to access education or the widespread low awareness of the importance of education (Ruiz 1988).

[22] *La riqueza de las regiones* by Rafael Domínguez (2002) is another work that also mentions geographical causes to Spain's current regional inequality.

4.2 Analysis and Results

4.2.1 OLS Estimates and First-Stage Estimation

In Table 1, several OLS regressions are performed, regressing economic performance directly on all these variables as if they were exogenous and orthogonal. The specifications in columns (1), (2), and (5) regress economic development on geographic variables, illiteracy rates in 1887, and *culture*, respectively. In column (3), current economic development is regressed on the provincial urbanization rates in 1860 (*urban1860*), being nonsignificant; this result invites us to rule out the alternative that current economic distribution could be a simple legacy of historical economic distribution (arrow b). In column (4), we test again the same fact but with another measure, the logarithm of per capita GDP of the autonomous community in 1800 (*lgdppc1800*) provincially imputed, getting similar results. In Equations (6)–(8), *culture* is controlled for combinations of geographic variables and historical illiteracy rates, making *culture*'s coefficient always significant and with expected sign. However, under these conditions, the endogeneity of *culture* invalids any causal argument.

In Table 2, the first stages are displayed. In there, we can see the role that each instrumental variable—*liberiudiciorum*, *customary*, *pc_institutions*, and *pc_instit_mod*—performs in the development of current cultural traits (*culture*). All instrumental variables' coefficients are highly significant when they are individually used—regressions (1), (2), (3), and (4). However, when instrumental variables are combined in the same regression, some remain significant while others systematically lose their significance. Tabellini's variable about historical constraints on the executive—*pc_institutions*—loses its significance when combined with any of the instruments on municipal autonomy (Equations (6) and (8)). Our modified measure for constraints on the executive—*pc_instit_mod*—does remain significant when variables on municipal autonomy are included—(Equations (7), (9), and (10)). Equation (5) combines *liberiudiciorum* and *customary* in the same regression, being both significant, though *liberiudiciorum* only at 10 %. When the two variables on municipal autonomy are combined with *pc_instit_mod* (column 10), *liberiudiciorum* loses all its significance. Relying on these results, we will rule out *pc_institutions* and *liberiudiciorum* as instrumental variables and use only the combination of *pc_instit_mod* and *customary*—like in Equation (9)—for instrumenting *culture*.

It is important to remark that *illiteracy1887* loses its significance in all the specifications except in column (3). This fact means that illiteracy levels could have played no distinctive role in the unequal development of these cultural traits, at least in the Spanish case. Thus, this supports our initial doubts about including illiteracy rates in 1887 as an instrumental variable for *culture* and permits us to rule out arrow e of Fig. 9. On the other hand, among the geographic variables, only *altitude* remains significant in some of the specifications, ruling out almost entirely a hypothetic effect of geography on *culture* (channel f). In column (9), whose specification will be the first stage of our baseline model in Sect. 4.2.2, no variable on geography, historical education, or historical development is significant.

Table 1 Development, culture, education, and geography: OLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent var.	*lgdppc9510*							
culture					0.15	0.14	0.13	0.10
					(0.02)***	(0.02)	(0.02)***	(0.02)***
lgdppc1800				−0.05				
				(0.09)				
urban1860			−1.05					
			(1.76)					
illiteracy1887		−0.75				−0.49		−0.72
		(0.19)***				(0.13)***		(0.14)***
latitude	0.02						0.01	−0.01
	(0.01)**						(0.01)	(0.01)
longitude	−0.02						−0.02	−0.02
	(0.01)***						(0.01)***	(0.00)***
altitude	0.02						0.08	−0.02
	(0.08)						(0.05)	(0.05)
densicoast	1.46						1.01	0.99
	(0.50)***						(0.35)***	(0.28)***
cons	8.93	10.20	9.74	9.97	9.72	10.03	9.42	10.56
	(0.40)***	(0.12)***	(0.05)***	(0.43)***	(0.02)***	(0.09)***	(0.29)***	(0.31)***
Obs	50	50	50	50	50	50	50	50
Adjusted R^2	0.32	0.23	−0.01	−0.01	0.56	0.65	0.67	0.8

Notes: Standard errors in parentheses. *Significant at 10 %; **significant at 5 %; ***significant at 1 %. Estimation method: OLS

Table 2 First stage: role of instrumental variables in these cultural traits' development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent var.	*culture*									
liberiudiciorum	−1.4				−0.54	−1.28	−1.06			−0.37
	(0.325)***				(0.31)*	(.35)***	(0.30)***			(0.37)
customary		1.61			1.25			1.52	1.29	1.04
		(0.29)***			(0.33)***			(.33)***	(0.28)***	(0.37)***
pc_institutions			0.34			0.18		0.12		
			(0.17)**			(0.16)		(.14)		
pc_instit_mod				0.60			0.50		0.47	0.46
				(0.12)***			(0.11)***		(0.11)***	(0.11)***
urban1860	−9.52	−3.61	−13.79	−9.06	−3.30	−7.18	−3.07	−2.43	1.57	1.65
	(11.42)	(10.88)	(13.68)	(8.41)	(10.73)	(11.82)	(7.64)	(11.15)	(7.24)	(7.24)
illiteracy1887	−0.9	1.00	−3.64	−1.60	0.99	−1.20	0.05	0.71	1.59	1.56
	(1.38)	(1.32)	(1.37)**	(1.13)	(1.35)	(1.32)	(1.11)	(1.36)	(1.15)	(1.15)
latitude	0.02	0.042	−0.01	−0.02	0.05	0.03	0.02	0.05	0.043	0.05
	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.049)	(0.05)
longitude	0.05	0.02	−0.03	−0.03	0.05	0.07	0.07	0.04	0.048	0.07
	(0.05)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
altitude	−1.4	−0.92	−0.96	−0.47	−1.04	−1.21	−0.69	−0.82	−0.35	−0.44
	(0.48)***	(0.45)**	(0.60)	(0.43)	(0.46)**	(0.57)**	(0.39)*	(0.50)	(0.35)	(0.37)
densicoast	−1.40	1.68	2.13	1.80	0.60	−0.58	−0.15	2.04	2.18	1.43
	(2.18)	(1.60)	(2.28)	(2.29)	(1.66)	(1.95)	(2.10)	(1.50)	(1.87)	(2.01)
cons	1.23	−2.68	3.25	2.16	−2.41	0.58	−0.27	−2.87	−3.40	−3.20
	(2.85)	(2.94)	(3.03)	(3.06)	(2.92)	(2.84)	(2.79)	(2.88)	(2.77)	(2.77)
Obs	50	50	50	50	50	50	50	50	50	50
Adjusted R^2	0.43	0.51	0.28	0.49	0.52	0.44	0.60	0.50	0.66	0.66

Notes: Standard errors in parentheses. Equations (1), (2), (3), (5), (6), and (8) report robust standard errors; in the rest, errors are uncorrected. *Significant at 10 %; **significant at 5 %; ***significant at 1 %. Estimation method: OLS

4.2.2 Two-Stage Least Squares Regression

In Table 3, the results of the two-stage least squares regressions are presented, where *culture* (Equations (1) and (5)) and its components (Equations (2), (3), and (4)) are instrumented by *customary* and *pc_instit_mod*. In all specifications, the coefficient for cultural variables shows expected sign and is highly significant in the second stage.

It is worthy to note that *customary* is not significant when explaining *trust* (first stage of column (3)), and *pc_instit_mod* is not either when explaining *socialcapital* (first stage of column (4)). This might be due to two reasons. First, it could be that in the true model, the development of these separate components is actually more associated with one historical fact over the other. However, it may be due to the different aggregations of data—*socialcapital* is provincially aggregated whereas *trust* is aggregated by autonomous communities—along with the fact that *pc_instit_mod* does not show provincial variability while *customary* does. Therefore, it may be due exclusively to the defects of the own data.

Column (5) is interested in economic growth in a shorter term, being measured by the logarithm annual average economic growth during the period 1995–2010 (*lgrowth9510*). Once taken into account the initial provincial economic distribution of per capita GDP in 1995 (*lgdppc1995*)—included in the model as an exogenous regressor—*culture* is able to significantly explain economic growth during those 15 years.

With regard to the other variables, note that coefficients of *longitude* and *densicoast* in the second stage of the specifications (1)–(4) are significant, highlighting the possible importance of the proximity to the Mediterranean and continental Europe and, generally, the proximity to the coast. On the other hand, illiteracy in 1887, though it showed no significant role in the first stage, is always significant in the second one (channel d in Fig. 9). This could be of concern if historical educational levels were partly a consequence of the instruments, transferring variation from them to current economic development and thus violating the identification assumptions. This concern is evaluated in Section 4.3.

We perform several tests about three issues that may be of concern when using instrumental variables: the effective endogeneity of the endogenous regressor and the relevance and validity of the instruments. The specifications that use *culture* (columns (1) and (5)) show satisfactory results. The regression that contains *trust* (column (3)) shows validity problems when rejecting the null in the overidentification test. The F-statistics in the specification that contains *socialcapital* (column (4)) alerts for weak instrument problems.[23]

[23]The problem of weak instruments in column (4) is solved when *socialcapital* is instrumented only by *customary*. In the case of validity in Equation (3), when *trust* is instrumented solely by *pc_instit_mod*, the equation is only identified, so overidentification test cannot be used.

Table 3 Culture and economic development: Instrumental variables' estimates

	(1)	(2)	(3)	(4)	(5)
	Second-stage dependent variables: log GDP per capita 1995–2010 (*lgdppc9510*) and log growth of GDP per capita 1995–2010 (*lgrowth9510*)				
Panel A	*lgdppc9510*	*lgdppc9510*	*lgdppc9510*	*lgdppc9510*	*lgrowth9510*
culture	0.12				0.16
	(0.02)***				(0.04)***
independence		0.16			
		(0.03)***			
trust			0.12		
			(0.03)***		
socialcapital				0.16	
				(0.04)***	
urban1860	−1.15	−3.00	−3.24	−0.80	1.93
	(1.05)	(1.17)	(1.53)**	(1.76)	(1.17)*
illiteracy1887	−0.72	−0.46	−1.13	−0.74	−0.37
	(0.15)***	(0.18)***	(0.20)***	(0.24)***	(0.17)**
latitude	−0.01	−0.001	−0.02	−0.02	0.028
	(.007)*	(.008)	(0.01)**	(0.01)	(0.03)***
longitude	−0.02	−0.02	−0.03	−0.03	0.00
	(0.01)***	(.01)***	(0.01)***	(0.01)***	(0.00)
altitude	−0.03	0.05	−0.20	−0.00	0.03
	(0.05)	(.07)	(0.07)***	(0.09)	(.05)
densicoast	0.82	0.78	0.94	0.79	0.55
	(0.27)***	(0.29)***	(0.43)**	(0.45)*	(0.27)**
lgdppc1995					−1.03
					(0.21)***
cons	10.80	10.11	11.64	10.93	8.60
	(0.37)***	(0.44)***	(0.57)***	(0.60)***	(2.16)***
	First stage for endogenous variables of cultural traits (*culture*) and separate components (*independence*, *trust*, and *socialcapital*)				
Panel B	*culture*	*independence*	*trust*	*socialcapital*	*culture*
customary	1.29	1.18	0.30	1.202	0.84
	(0.28)***	(0.33)***	(0.39)	(.398)***	(0.28)***
pc_instit_mod	0.47	0.28	0.65	0.216	0.38
	(0.11)***	(0.13)**	(0.15)***	(.152)	(.12)***
urban1860	1.57	−4.00	11.95	−.001	5.10
	(7.24)	(8.70)	(10.16)	(.010)	(9.03)
illiteracy1887	1.59	−0.20	2.73	.0156	2.78
	(1.15)	(0.01)	(1.61)*	(.017)	(0.94)***
latitude	0.04	−0.04	0.10	0.058	0.07
	(0.05)	(0.06)	(0.07)	(.070)	(0.04)*

(continued)

Table 3 (continued)

Panel B	First stage for endogenous variables of cultural traits (*culture*) and separate components (*independence*, *trust*, and *socialcapital*)				
	culture	*independence*	*trust*	*socialcapital*	*culture*
longitude	0.05	0.01	0.04	0.066	0.10
	(0.04)	(0.04)	(0.05)	(.052)	(0.04)**
altitude	−0.35	−0.85	1.06	−0.001	−0.26
	(0.35)	(0.42)*	(0.49)**	(.001)	(0.28)
densicoast	2.18	1.91	1.02	1.751	−0.88
	(1.87)	(2.25)	(2.62)	(2.70)	(1.47)
lgdppc1995					2.42
					(1.12)**
cons	−3.40	1.36	−6.52	−3.867	−27.68
	(2.77)	(3.32)	(3.88)	(3.998)	(11.69)**
Obs	50	50	50	50	50
F-statistics	28.41	11.56	11.66	7.22	9.45
Endogeneity tests (*p*-value)	0.06, 0.08	0.01, 0.01	0.00, 0.00	0.00, 0.00	0.01
Overidentification tests (*p*-value)	0.87, 0.88	0.42, 0.46	0.04, 0.06	0.40, 0.44	0.47

Notes: Standard errors in parentheses, robust errors in column (5) and uncorrected errors in the rest. *Significant at 10 %; **significant at 5 %; ***significant at 1 %. Estimation method, 2SLS. Instrumental variables, *customary* and *pc_instit_mod*. *F-statistics* is *F*-test against the null that the instruments are irrelevant in the first-stage regression. *Endogeneity tests* report Durbin and Wu-Hausman tests' *p*-value for uncorrected errors and Wooldridge score test's *p*-value otherwise against the null that *culture* is exogenous. *Overidentification tests* report Sargan and Basmann tests' *p*-values for uncorrected errors and Wooldridge's score test *p*-value otherwise with the null being that instruments are valid

4.3 Robustness

Further tests are conducted in this subsection. We start by further testing the validity of the identifying assumptions in Sect. 4.3.1, and then we check the robustness of our results against the inclusion of additional variables in Sect. 4.3.2.

4.3.1 On the Identification Assumptions

The validity of the obtained results depends on the assumption that the instruments are not linked to current economic development through channels different than the cultural one. With regard to the exogeneity of the instruments, the overidentification test has obtained satisfactory results in the baseline specification—column (1) in Table 3. However, in this subsection, we carry out some additional tests about the identification assumptions.

The first one consists of regressing economic performance directly on instrumental variables—one at a time—in the presence of the endogenous variable, *culture*, instrumented by the other instrumental variable. If the instrumental variable is validly identified with the instrumented variable, instrumental variable's coefficient

should not be statistically significant. The results are presented in columns (1) and (2) of Table 4. This condition is accomplished for both specifications.

Another issue that could raise doubts on the validity of the instruments is the continuity of part of the historical formal institutions that were regionally distinctive and may have been a parallel channel. Formal differences in private law actually transcended, and we had not taken them into account in the stylized outline of the case. In order to isolate the instruments of the possible effect of these distinctive legal orders, we will use strategically reduced samples. These subsamples represent critical zones where we can observe variability of at least one of our historical instruments, *customary*, within a specific legal code. We assess the role of culture, instrumented by *customary*, in two subsamples:

(a) Those regions in which Castilian private code already formally ruled before the processes of unification: all the provinces under the Crown of Castile except Basque Country and Navarre. The geographic location of this critical zone of 35 observations is illustrated in Fig. 10a. In column (3) of Table 4, we can see how *customary* significantly explains *culture* in the first stage, and *culture*'s coefficient in the second stage remained significant.
(b) Those provinces of critical zone A plus Catalan provinces and Baleares are included here. Despite the unification of both Crowns under the political

Table 4 On the identification assumptions

	(1)	(2)	(3)	(4)	(5)
Panel A	Second-stage dependent variable: log GDP per capita 1995–2010 (*lgdppc9510*)				
culture	0.12	0.13	0.10	0.13	0.12
	(.03)***	(0.03)***	(0.05)**	(0.04)***	(0.04)***
customary	0.01				
	(0.07)				
pc_instit_mod		−0.00			
		(0.02)			
urban1860	−1.13	−1.14	−0.59	−1.02	−1.41
	(1.05)	(1.06)	(1.07)	(1.00)	(1.88)
illiteracy1887	−0.71	−0.72	−0.84	−0.77	−0.80
	(0.17)***	(0.15)***	(0.17)***	(0.16)***	(0.49)
latitude	−0.01	−0.01	−0.01	−0.01	−0.02
	(0.01)*	(0.01)*	(0.01)	(0.01)	(0.01)
longitude	−0.02	−0.02	−0.02	−0.02	−0.03
	(0.01)***	(0.01)***	(0.01)***	(0.01)***	(0.01)***
altitude	−0.03	−0.03	−0.03	−0.03	−0.05
	(0.01)	(0.05)	(0.07)	(0.06)	(0.12)
densicoast	0.83	0.81	1.34	0.81	0.80
	(0.28)***	(0.28)***	(0.48)***	(0.29)***	(0.29)***
castiliancode				−0.04	
				(0.09)	
cons	10.77	10.80	10.69	10.77	10.95
	(0.41)***	(0.38)***	(0.36)***	(0.37)***	(0.95)***

(continued)

Table 4 (continued)

Panel B	First stage for the endogenous variables on cultural traits (culture) and illiteracy rates in 1887 (*illiteracy1887*)					
	culture	*culture*	*culture*	*culture*	*analfab1887/culture*	
customary	1.29	1.29	0.99	1.13	−0.14	1.06
	(0.28)***	(0.28)***	(0.37)**	(0.35)***	(0.03)***	(0.22)***
pc_instit_mod	0.47	0.47			−0.01	0.45
	(0.11)***	(0.11)***			(0.01)	(0.11)***
urban1860	1.57	1.57	6.35	1.72	−2.99	−3.18
	(7.24)	(7.24)	(12.89)	(7.76)	(0.86)***	(6.44)
illiteracy1887	1.59	1.59	1.11	1.01		
	(1.15)	(1.15)	(1.33)	(1.41)		
latitude	0.04	0.04	0.06	0.03	−0.03	0.002
	(0.05)	(0.05)	(0.05)	(0.05)	(0.01)***	(0.04)
longitude	0.05	0.05	0.04	0.08	−0.02	0.02
	(0.04)	(0.04)	(0.06)	(0.05)	(0.004)***	(0.03)
altitude	−0.35	−0.35	0.01	−0.26	−0.14	−0.57
	(0.35)	(0.35)	(0.39)	(0.42)	(0.04)***	(0.32)*
densicoast	2.18	2.18	5.36	0.57	−0.30	1.71
	(1.87)	(1.87)	(3.91)	(2.2)	(0.25)	(1.86)
castiliancode				−0.90		
				(0.57)		
cons	−3.40	−3.40	−4.26	−2.14	1.91	−0.37
	(2.77)	(2.77)	(2.66)	(3.15)	(0.23)***	(1.70)
Obs	50	50	35	40	50	
F-statistics	19.86	21.87	7.17	10.36	15.81	34.85
Endogeneity tests (*p*-value)	0.18, 0.23	0.11, 0.15	0.54	0.18	0.16, 0.22	

Notes: Standard errors in parentheses, robust errors in column (3) and (4) and uncorrected errors in the rest. *Significant at 10 %; **significant at 5 %; ***significant at 1 %. Estimation method, 2SLS. Instrumental variables, *customary* or *pc_instit_mod. F-statistics* is *F*-test against the null that the instruments are irrelevant in the first-stage regression. *Endogeneity tests* report Durbin and Wu-Hausman tests' *p*-value for uncorrected errors and Wooldridge score test's *p*-value otherwise against the null that *culture* is exogenous. Columns (1), (2), and (5) present regressions on the complete sample of 50 observations, and columns (3) and (4) show reduced samples according to Fig 10a, b, respectively. In specification (5), there are two endogenous variables; thus, two first-stage columns are reported.

institutions of Castile, Mallorca and Catalonia maintained their civil code, unlike Valencia and Aragon—though Aragon recovered it in 1711. If we consider the very generalized assumption that the Catalan and Balearic legal orders share common roots, we could identify them as belonging to a common legal family within which we can observe variation in our instrument *customary*. This can make sense, since, according to Orduña (2003:147), "the conquest of Mallorca was an enterprise driven by the bourgeoisie of Barcelona, which conditioned the development of its legal order, because the repopulation was also carried out by Catalan people." The instrument *customary* shows variability across both areas—Castilian and Catalan-Balearic—as shown in Fig. 10b. In column (4), we carry out the same regression on this new subsample and control

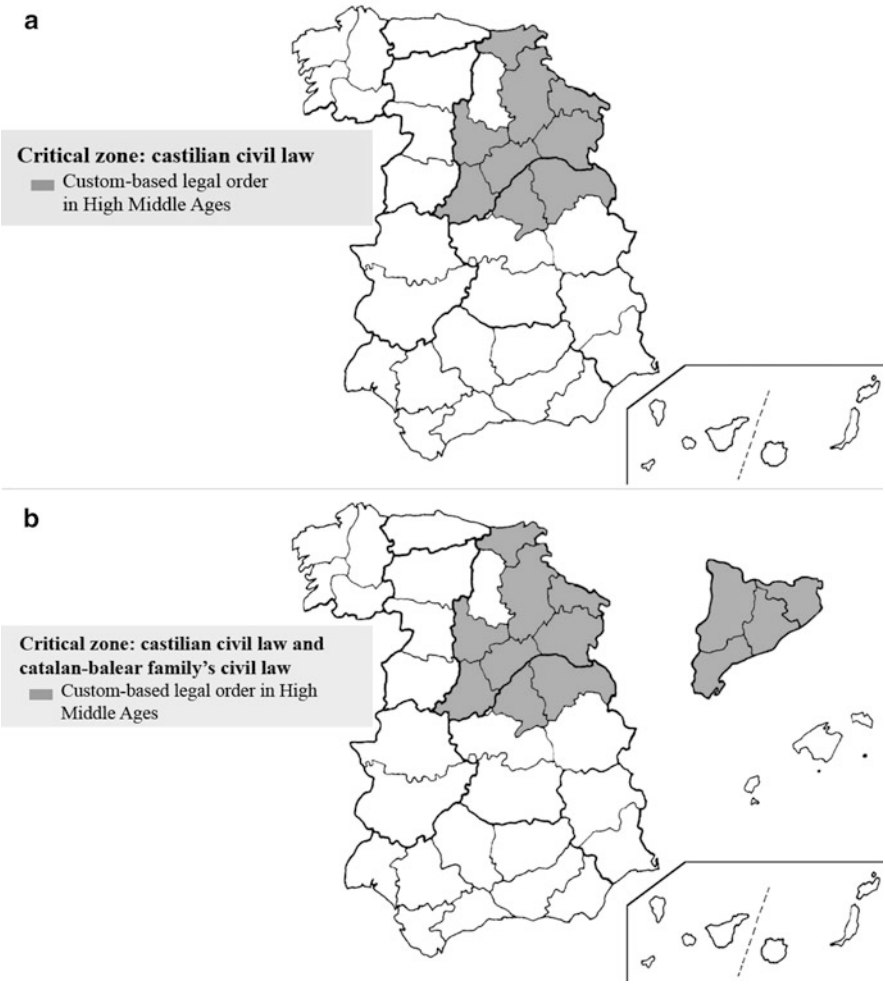

Fig. 10 Critical zones where instruments can be isolated from the effects of civil codes

for the fixed effects of these legal codes by including the dummy *castiliancode*, which takes value 1 in the critical zone A. Results are again satisfactory: *customary*'s coefficient is significant in the first stage, *culture*'s is significant in the second stage, and *castiliancode* never shows significance.

On the other hand, as we could see in Table 3, *illiteracy1887* showed no significant effect on *culture* in the first stage but did on current economic development in the second stage. If the different levels of literacy were partly due to the historical political regimes—something reasonable[24]—then effects from instruments to

[24]For instance, the *Ley 41 of Cortes de Navarra* of 1780–1781 provides for free and compulsory education to all the children between 5 and 12 years old (Ruiz 1988).

current economic development could have been transmitted through an alternative channel, thus violating the exclusion restrictions. This issue is tested in column (5), instrumenting *illiteracy1887* and *culture* by both instrumental variables. In fact, *illiteracy1887* seems to be explained by our political instruments in the first stage, but this part of the illiteracy rates' variation that is due to the instruments—i.e., instrumented *illiteracy1887*—is not significant in the second stage in the presence of *culture*. Therefore, the part of the illiteracy rate that is due to our historical political instruments has no distinctive effect on economic output once the cultural channel is taken into account.

4.3.2 Additional Controls

In Table 5, the results are tested against the inclusion of other additional variables that could be related both to current economic distribution and to some historical components and could be omitted in the model. We include, as if they were exogenous, some *proximate* causes of current economic development such as the average proportion of the active population with post-compulsory education during

Table 5 Additional controls

	(1)	(2)	(3)	(4)	(5)
Dependent variable	*lgdppc9510*				
culture	0.11	0.09	0.13	0.13	0.12
	(0.02)***	(0.02)***	(0.02)***	(0.02)***	(0.02)***
educ9510	0.25				
	(0.34)				
stock9510		0.05			
		(0.03)**			
stockpub9505			−0.03		
			(0.04)		
eqi				−0.10	
				(0.06)*	
congestion0410					0.08
					(0.20)
_cons	10.64	10.57	10.84	10.4	10.71
	(0.42)***	(0.31)***	(0.29)***	(0.46)***	(.44)***
Observations	50	50	50	50	50
F-statistics	20.47	16.99	26.17	21.82	30.64
Endogeneity tests (*p*-value)	0.11, 0.15	0.19	0.07	0.06, 0.08	0.03, 0.05
Overidentification tests (*p*-value)	0.85, 0.87	0.92	0.79	0.51, 0.55	0.91, 0.92

Notes: Standard errors in parentheses, robust errors in column (2) and (3), uncorrected errors in the rest. *Significant at 10 %; **significant at 5 %; ***significant at 1 %. Estimation method, 2SLS. Instrumental variables, *customary* and *pc_instit_mod.* Only the second stage is reported. All regressions are controlled for the geographic variables and *illiteracy1887. F-statistics* is *F*-test against the null that the instruments are irrelevant in the first-stage regression. *Endogeneity tests* report Durbin and Wu-Hausman tests' *p*-value for uncorrected errors and Wooldridge score test's *p*-value otherwise against the null that *culture* is exogenous. *Overidentification tests* report Sargan and Basmann tests' *p*-values for uncorrected errors and Wooldridge's score test *p*-value otherwise with the null being that instruments are valid.

the period 1995–2010 (*educ9510*) as a measure of current human capital, in column (1); the average stock of productive capital per capita during the period 1995–2010 (*stock9510*), in column (2); and the public stock of net capital per capita during the period 1995–2005 (*stockpub9505*), in column (3). Two proxies of subnational institutional functioning are also included: a subjective one, the *European Quality of Government Index* (*eqi*) (column (4)), and an objective one, the average rate of judicial congestion in the period 2004–2010 (*congestion0410*) (column (5)). The description and the source of these variables can be found in Appendix 1.

In the presence of any of these variables, *culture*'s coefficient remains highly significant, with expected sign, and does not change substantially with respect to that in the basic specification.

5 Concluding Remarks

This chapter was devoted to the role of certain past political institutions and their cultural legacy as a fundamental cause of the economic disparities between the Spanish regions. The obtained results support this cultural hypothesis and showed robustness against other potential fundamental causes. However, we cannot rule out the direct effect of geography and human capital on current economic distribution.

One of the main contributions of this paper is the review of Tabellini's historical narrative for the Spanish case. First, we chose to discard illiteracy rates as an exogenous cause of the uneven development of these cultural traits and consider only essentially political factors. We have also revised Tabellini's valuations about past constraints on the executive and proposed alternative political factors that have also been associated with the formation of these cultural traits in the literature.

We emphasized that in order for these cultural traits to have the expected positive effect, they had to be enveloped in a liberal institutional system. According to this perspective, these traits did not have their expected effect until the Spanish Liberal Revolution. This institutional transformation triggered the process toward the new regional economic distribution.

This work was aimed to present the causes of the *differences* among regions within a partially common situation. It should also be pointed out that while these differences had persisted somehow up to the present, they do not necessarily have to remain that way. The increasing regional mobility, favored by the uprooting of the new globalized economic order, and national mass media seem to create a climate of mutual influence or assimilation, capable of enhancing a cultural convergence at national level. Furthermore, institutional arrangements or new comparative opportunities may arise that could make more valuable other cultural traits in which other regions are richer.

We have not taken into account aspects related to social structure. Putnam et al. (1993), for instance, suggested that higher social capital levels are more likely to be found in more egalitarian societies as opposed to "vertically structured, horizontally fractured communities." Further research can address the role of social structure within this approach.

We cannot either rule out that deep and previous elements of culture had been a determinant for the adoption of the formal institutions that we have taken as instrumental variables. This would be solved if all regions had started from a homogeneous situation in a stage prior to the institutional divergence. However, Iberian Peninsula was a melting pot of cultures in the era prior to the *Reconquista*, and the subsequent migration movements further complicate the analysis. According to our narrative, as in Tabellini (2010) and Guiso et al. (2008a), historical institutions are treated as exogenous accidents that subsequently gave rise to cultural traits. But if culture and formal institutions were a product of mutual adaptation or even if the political factors were endogenous with respect to culture—reasonable possibilities—our instrumental variables would keep being valid if they meet the exclusion restrictions.

A.1 Appendix 1: Variables' Description, Aggregation, and Source

Variable	Description	Aggregation	Source
lgdppc9510	Log of annual average per capita GDP during the period 1995–2010	Province	INE
lgrowth9510	Log of annual average per capita GDP growth in 1995–2010	Province	Based on INE data
Variables on culture			
socialcapital	Principal component from information about citizen's political implication and associative participation, following Mota and Subirats (2000)	Province	Based on CIS data
independence	Principal component from variables on society's attitudes toward individual independence	Community	Based on WVS and ESS data
trust	Principal component from information about generalized trust	Community	Based on WVS and ESS data
culture	Principal component from last three variables	Province	Own

(continued)

Variable	Description	Aggregation	Source
Instrumental variables			
liberiudiciorum	Legal order based on Visigothic *Liber Iudiciorum* in High Middle Ages	Province	Based on Barrero and Alonso (1989), García- Gallo (1979) and Gacto et al. (2009) information
customary	Custom-based legal order in High Middle Ages	Province	
pc_institutions	Assessment of constraints on the executive during the period 1600–1850	Province	Tabellini (2010)
pc_instit_mod	Modified version of *pc_institutions*	Province	Own
Control variables			
urban1860	Urbanization rate in 1860	Province	Tafunell (2005)
lgdppc1800	Relative index of per capita GDP in 1800	Community	Carreras et al. (2005)
illiteracy1887	Illiteracy rates in 1887	Province	Vilanova and Moreno (1992)
latitude	Latitude degrees of the capital of the province	Province	Agencia Española de Meteorología (aemet.es) (2013)
longitude	Longitude degrees of the capital of the province	Province	aemet.es (2013)
altitude	Altitude in meters of the capital of the province	Province	AEMET (2012)
densicoast	Province's coast length divided by province area	Province	Based on INE (2003) data
educ9510	Average proportion of active population with post-compulsory education during the period 1995–2010	Province	Fundación Bancaja and Instituto Valenciano de Investigaciones Económicas, IVIE (2014)
stock9510	Provincial productive capital stock in tens of thousands of euros per inhabitant during the period 1995–2010	Province	Fundación BBVA and Instituto Valenciano de Investigaciones Económicas, IVIE (2013)

(continued)

Variable	Description	Aggregation	Source
stockpub9505	Provincial public stock of net capital in tens of thousands of euros per inhabitant during the period 1995–2005	Province	Fundación BBVA and Instituto Valenciano de Investigaciones Económicas, IVIE (2009)
eqi	European Quality of Government Index	Community	Charron et al. (2013)
congestion0410	Average judicial congestion during the period 2004–2010	Province	Consejo General del Poder Judicial, CGPJ

A.2 Appendix 2: Main Descriptive Statistics

Variable	Obs	Mean/freq.	Std. dev.	Min	Max
lgdppc9510	50	9.72	0.20	9.39	10.15
lgrowth9510	50	−0.01	0.154	−0.44	0.33
socialcapital	50	0	1	−1.84	3.19
trust	50	0	1	−1.69	1.90
independence	50	0	1	−2.00	1.80
culture	50	0	1	−1.64	3.00
liberiudiciorum	50	25[a]			
customary	50	20[a]			
pc_institutions	50	0	1	−0.50	1.98
pc_instit_mod	50	0	1	−0.49	3.07
illiteracy1887	50	0.64	0.13	0.35	0.84
urban1860	50	0.19	0.17	0.02	0.66
lgdppc1800	50	4.56	0.31	3.93	5.14
latitude	50	40.10	3.16	28.2	43.5
longitude	50	3.84	3.73	−2.82	16.25
altitude	50	0.37	0.368	0.01	1.13
densicoast	50	0.03	0.06	0	0.29
educ9510	50	0.75	0.05	0.57	0.83
stock9510	50	2.98	0.77	1.78	5.29
stockpub9505	50	1.16	0.35	0.70	2.52
eqi	50	0.11	0.32	−0.47	0.67
congestion0410	50	1.30	0.06	1.19	1.45

[a]Instead of mean, the frequency that the dummy variable takes value 1 is displayed

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