Culture-Based Development in the Regions of China

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Is culture a relevant factor for the development of the Chinese regions and is this culture different from the institutional settings of China? The Culture Based Development paradigm has been collecting evidence from the Western world about the impact of local cultural capital (a quantitative expression of culture) on the productivity of places throughout EU and US. The current paper aims to replicate the CBD approach for the first time for the institutional setting of China. It does so by using a unique panel dataset for Chinese provinces over a seven-year period (2013-2019), which contains over 60 cultural indicators and employing factor analysis, 3SLS and k-mean clustering estimation techniques. The main contribution of the paper is the distinction that it draws conceptually and empirically between culture as a proto institution and the rest of the institutional settings in a country. Revealing part of the differences and interaction between culture and institutions, this study sheds light on many important still unanswered in the economic literature questions about culture and local development in China and in a context-free (i.e. value-free) generalizable manner per se.

Keywords: culture, cultural capital, living culture, cultural heritage, social capital, productivity, China

JEL classification: Z12, Z18, R12, R23

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1 Introduction

Elinor Ostrom famously said: "The power of a theory is exactly proportional to the diversity of situations it can explain," (Ostrom, 1990). What is the theory of culture? Alesina and Giuliani (2015) in the seminal paper "Culture and Institutions", provide a profusion of examples for empirical illustration of the impact of institutions, delivered in a New Cultural Economics methodology, but leave largely theoretically undefined as to what culture is and how is it different from institutions. Elinor Ostrom engaged culture from the perspective of commons. Ostrom (1990) has provided the important insight that important collective decisions as the use of natural resources and commons are strongly dependent on local cultural rules. Recently, Rose (2019) proposed that culture is a common good as it is essential for cooperation. But Culture-Based Development (CBD) disagrees with this take for two reasons. First, the text-book difference between commons and public goods is that commons are rival and non-excludable while public goods are non-rival and non-excludable (Mankiw and Taylor 2017). CBD points out that culture is not the same thing as the cultural products especially cultural heritage monuments that may as well be cultural commons. The rival cultural products consumed are not the same as the culture (i.e. the attitude and idea) that generates the cultural impact. It is the non-excludable idea or blue-print behind the products that is the culture. The idea and attitude it embodies is what once there affects the society as a piece of its collective knowledge. Economic factors may interfere with the diffusion of cultural products and create endogeneity of culture but cannot turn it into a rival good since an idea or attitude can belong to unlimited number of people once they manage to get access to it. Same with Taj Mahal – I may not be allowed or able to visit it, but the idea of it fascinates me and makes me proud, if I am building my identity on it. Also, unlike commons, which already exist naturally, culture (and culture of cooperation in particular) has to be provided like a public good has to – but it is specifically provided not by the government but by the other agents in the local system where an agent operates[1]. Second, culture is not just a mere good (not even a public good) per se – culture is rather a form of public capital – termed by CBD: local cultural capital. Culture is not simply the end product of cultural industries that is to be consumed, but a productive input composed of cultural ideas and attitudes (relatively easily observed as they are expressed in the cultural industry products) – but importantly a productive input into the socio-economic productive process.

Hence, the Culture-Based development (CBD) paradigm suggests a cultural-attitudes-based institutionalist take on the question of cultural impact on economic development. Namely, CBD postulates that: culture is a proto institution (Tubadji 2012, 2013, 2021a,b). In particular, the novel institutional angle of the CBD paradigm is that according to the CBD this proto institution generates a stock of its expressions, accumulated locally over time and space, called local cultural capital (Tubadji 2012, 2013). This stock is a form of capital for the locality, because in important Neo-Weberian ways it affects socio-economic productivity through various channels of economic choice, in the operation of which this capital generates a crucial for the outcome 'cultural bias'. The notion of cultural capital was first introduced in cultural theory by Pierre Bourdieu (1986) on individual level (as capital inherited by individuals from their parents), but CBD has adapted this notion for use on aggregate

[1] Culture, as an idea and attitude, can also be thought of as a club good, that one is entitled to only by club membership. But again – this is not the natural characteristic of culture – it is one way to create this time social endogeneity of the access to culture and its diffusion. Yet, if I choose, I can embrace an idea even if the club that identifies with it rejects my access to it. Moreover, my self-selected affiliation to the idea may have the power to cause a cognitive dissonance in the club members and persuade them towards cooperation even if I am not from their club. That is the natural power of culture.

regional level and has termed it: local cultural capital. CBD has defined culture as a complex entity and has reduced its complexity to two main components of local cultural capital: cultural heritage (CH) and living culture (LC), from which it also isolates separately the social capital as it is the important transformer of CH and LC to an impact for the propensity to cooperation (see Tubadji et al. 2021). To show that this CBD theory is valid and useful, one needs to show it is powerful indeed over different institutional settings as a proto institution should be. CBD has done this in various Western contexts in the EU and USA.

China has important institutional differences with the Western world, being nowadays as it was termed a "free-market authoritarianism" (Harrison and Huntington 2000) or as recently described by Acemoglu and Robins (2021a): a despotic leviathan whose economic power bolsters the political regime and prevents its change. In the past, Weber has predicted that these differences in culture and institutions lead to negative aftermaths for development in China (1951), but some later research finds the exact opposite and even points China as an example for developing productivity and business that USA can learn from (Nevis 1983). The CBD paradigm has been tested mostly in Western institutional context for EU and USA and its validity will be importantly enhanced if it is confirmed at stake in the very seriously different Chinese context.

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The aim of this paper is to test the validity of the CBD theory for the different institutional context of Chinese regions. This study also offers a first of its kind alert on the relevance of disentangling the CBD cultural source of bias (cultural capital) from its interim products (the formal and informal institutions) in order to fully identify the source of cultural impact on socio-economic development.

To achieve its aim the paper draws on a unique dataset for Chinese provinces (31 in number) over the period of seven years (from 2013 till 2019), provided by the authors of Tubadji and Dai (2022) where this data was first used. This dataset contains a variety of regional indicators for China and most notably it contains 63 cultural indicators[2] that can help to properly quantify the complex entity culture through a multidimensional approach as strongly suggested by CBD. Also, if past empirical explorations of cultural impact queried if culture matters, this CBD exploration wants to explore how does culture matter as a mechanism and how this impact is related to the institutional context created by the proto-institution culture in the locality.

The structure of the paper is as follows. Section 2 reviews the literature on culture and economic development with application on China, starting from Weber (1951) and extending till most recent contributions to neoclassical and institutional economics. Section 3 presents an overview of the culture-based institutional paradigm Culture-based Development (CBD). Section 4 offers a strategy for implementing a CBD analysis for the Chinese Regions. Section 5 outlines the data and estimation methods used to implement this strategy. Section 6 presents the empirical results and their interpretation. Section 7 concludes.

[2] Some of the 63 indicators had missing values due to which observations with missing values were dropped to implement the factor analysis, as the power of factor analysis shows when there is a high number of observations. Thus, instead of 217 observations there are 119 available to estimate the effects. If the cultural variables with missings were not used, this would certainly have the benefit of more degrees of freedom, but will have the downside of addressing less efficiently the power of complexity reduction that is demonstrated in this paper. All presented estimations are replicated in the second manner and the results are consistent with the ones presented here. Tables with these additional results are available form the author upon request, for the sake of brevity.

2 Culture and Economic Development in China

The study of culture and economic development in China has been in focus during all different trends in Western sociological research on the topic of culture and economics – from Weber till the renaissance of the cultural paradigm by Inglehart and the Harvard school of cultural values and human action and its extensions nowadays. All contributions have always found consistency with the theories applied by them but this has led to conflicting conclusions about the development of China and its relationship to culture. Moreover, they have remained mainly disjointed from the economic studies on the development of China.

Applying his religion and economics approach to China, in his second book of the series on religion and economics, Max Weber (1951) suggests that the family-introvertive Confucian attitude is what explains the developmental lag in China unlike the boost that extroversive Protestant attitudes benefit to the development of certain parts of the western civilization. Confucian family values in business have been pointed as barriers to business development in China, which was lately explained among others as due to family culture creating nepotism (a negative form of social capital) (Chau and Wong. 2021). Later on, however, collective Confucian morals have been pointed as a hierarchy of needs to learn from China and import in the US management of the firm to increase productivity (Nevis 1986). Thus, as fairly noted by Harrison and Huntington (2000), it seems that differences per se are assigned to culture, but this leads to conflicting conclusions as sometimes the differences are in the advantage and in other cases in the disadvantage of the group with a particular cultural marker. Harrison and Huntington (2000) have proposed the modulation in the cultural paradigm that culture changes over time and place. Acemoglu and Robins (2021a) however highlight that Fetzer and Soper (2012) find no evidence of decay of Confucian culture in past Chinese colonies, yet find political action across past Chinese colonies which explains the differences in their economic development. Example for this from within China is also given by Lin (1995), who discuss the importance of the right to withdraw from an agricultural collective, which when abided in the 1940es lead to flourishing agriculture, when this right was no longer respected the Chinese agriculture collapsed and the big famines of the 1959-1961 followed, and when the household reform of agriculture was introduced the agricultural development recovered its positive developmental path. What causes the political differences however remains largely unexplained in these studies.

Meanwhile, economic studies embraced the Jacobean analysis rebaptized by Richard Florida in a narrower sense as the creative class approach and evidence for the effect of the creative industries on the innovation of Chinese regions was provided, using a panel on regional level for China for the period 2003 - 2010 (Hong et al. 2014). Similarly, cultural heritage benefits for the regional development of rural China, such as a traditional textile culture of production batik popular among the Miao people, were found in line with literature on appraisal of tourism and cultural heritage as a source of economic benefit for local productivity (Chen 2021). Yet, other economic theories did not find the same confirmation for China, especially the problem of lack of convergence among the rural areas of China for the last 40 years of reforms (Gong 2020). The fact of this lack of convergence is what the study documents and the reasons and solutions for the latter are largely left as subject of educated guess and speculations.

Yet such pertinent economic studies are largely often void of incorporation of the cultural element altogether (Chow and Li 2002). While many of them raise culturally

sensitive economic choice questions, they do not comment on their cultural determinants. For example, Heckman (2003) shows that human capital investment would be beneficial for China according to endogenous growth theory but why this is not practiced is not addressed in the study. We know from other studies that cultural propensity to education is closely linked to the development of human capital (see for instance Botticini and Eckstein 2012). Studies of the effect of migration and remittances on local productivity also confirm the standard economic models are valid for China (Rozelle et al. 1999), yet the differences in managing migration in China and the rest of the world are discussed in other studies but not in relation to this one and the two questions up to my knowledge have not been put together in one study yet.

Thus, while it has been previously pointed that culture is the mother and institutions are the children (Harrison and Huntington 2000), this view seems to have faded away and mostly institutions and their impact on local development is modelled in economic studies (Lin 1995; Alesina and Giuliani 2015) including and especially those about China. Acemoglu and Robins (2021a) for instance accept that it is not Confucian culture, but local Despotic Leviathan type of political institutions lead local development by having the current regime bolstered by the economic development itself. Studies have certainly shown that institutional factors affect the monetary policy in China (He and Jia 2020). What however does not become clear is how rules can be imposed to a society without a revolution and how is this not related to the cultural attitude of this society. How is the introvertive Confucian collectivism and family-orientation related to another aspect of the cultural attitudes such as docility and respect of hierarchy? Importantly, the link between culture and the development of the legal institutions in China has been documented in recent work about China (Li et al 2021).

The latter developments in the literature seem to ignore the conceptual work like the one my Wright (2008) that points to the emotive role of culture in human behaviour and economic decision making as well as the theoretical work by Olson (1965; 1982) on the importance of group characteristics for the success of collective action, demonstrated on the fundament of static games. These studies do not require determinism about culture and do not exist in conflict with the claim of Acemoglu and Robins (2021a) that fluid cultures or any type of culture are not bad or good per se but context dependent on the economic problem at stake in front of the decision maker. Culturally sensitive studies actually have asserted that culture and informal institutions can have their limits of impact (Cunningham and Dibooglu 2020). However, they importantly underline why institutions and their survival might be dependent on the emotion and cultural background of its citizens that may tolerate these institutions even when the individual or collective interest is harmed by the institutions, as it is the case for instance with the Alibaba e-commerce business development in China which can be seriously politically regulated against its interest and kept within public planning, even though it may even attempt to use shadow channels to pursue its private interests (Siu, 2021). A cultural economics paradigm for the link between culture and institutions can be very beneficial for the disentanglement of the controversies about the ambivalent interpretation of the effect of Confucianism for regional development in China and the presence of certain types of institutions in the country. The current study aims to summarize such a paradigm, so far tested in the Western world, and to test the validity of its fundamentals for the case of Chinese regions.

3 The Culture-Based Development (CBD) Paradigm

The Culture-Based Development is a research paradigm which offers a specific economic philosophical foundation for modelling the impact of culture on economic choice. The CBD paradigm can be applied on individual and local level, because its philosophy suggests that culture originates on individual level as decision maker's cultural attitudes, which then are aggregated into a local cultural milieu through collective choice and system behaviour (and can change the cultural milieu over time and space) (Tubadji 2012, 2013). This local cultural milieu is not a simple sum of the individual attitudes but an intensified version of them (as according to the agent-based model of Schelling type have clarified) (Tubadji 2021a). That is why this cultural milieu can be used itself to explain the impact of local culture on the socio-economic development of places in a particular moment in time, without looking at its micro fundament. For simplicity, when only aggregate data is used, the local cultural milieu is simply referred to by CBD as culture. Yet, this culture can change over time. The CBD philosophy entails understanding culture as a dynamic stochastic source of influence on all types of local socio-economic outcomes.

CBD defines culture as a complex composite entity of attitudes (Tubadji 2012, 2021a). In this sense, the CBD paradigm classes itself as a neo-Weberian paradigm, following in the steps of Max Weber (1904) and his approach to religion and economics where cultural attitudes (approximated through religion) are conceptualized as the main factor for differences in productivity across space.

The CBD paradigm takes the classical Weberian understanding of culture one step further methodologically, by accentuating that all cultural attitudes (and not only religion for example) should be jointly accounted for during empirical quantification of culture in order to avoid under-specification of the culturally-augmented economic model by under-quantification of the cultural factor in it (Tubadji 2014). Yet, to handle the complexity of culture and avoid redundancy by the over quantification of the cultural factor, the CBD paradigm applies various statistical methods for meaningful reduction of the complexity in the cultural factor for development, such as principal component factor analysis (Tubadji 2012, 2013), partial least square path modelling (Tubadji and Pelzel 2015) and the use of entropy measures (Tubadji 2022). Notably, to guide the complexity reduction procedures, CBD offers also a conceptual notion of local cultural capital, which has components that can serve as an orientation for the number of factors that can be expected to be found among the cultural attitudes in order to group them and reduce the complexity in the cultural data. CBD builds its notion of local cultural capital on the foundations of the classical cultural theory work by Pierre Bourdieu. Bourdieu (1984, 1986) develops his paradigm of cultural capital on individual level. CBD offers an interpretation closely matched to Bourdieu's but adapted for use on aggregate (regional) level and economic decision making (see Tubadji et al. 2021 for a summary).

CBD defines local cultural capital as the locally accumulated material and immaterial expressions of culture classed into cultural heritage (CH) and living culture (LC) (Tubadji 2013). CH is the expressions that represent the stock of cultural capital associated with culture produced in the past periods in the particular locality. LC refers to the stock of culture currently produced in a locality. This distinction is particularly important in order to allow correct handling of the economic endogeneity of culture. The CH part has eventual persistence of the effect of local development from past periods, and of course it requires investment for its preservation. Yet, LC is the one most clearly dependent on current economic investment as the very appearance into existence of its expressions (cultural

products etc.) depends on this current investment. That is why CBD recommends reducing the complexity of culture importantly into CH and LC components.

Next, it is important to note that technically, culture includes the attitudes to cooperation as well and they can be classed as CH and LC. Yet, CBD recommends that the social capital component is isolated and quantified separately from CH and LC (see Tubadji et al. 2021). The reason for this is that according to the CBD philosophical setting, the CH and LC and, importantly, the local balance between in the complex entity cultural capital, determines the propensity in the local cultural milieu towards cooperation[3]. This is particularly important to distinguish, because the prevailing stock of CH is suggested to decrease the SC while the prevailing stock of LC is expected to increase the propensity to cooperation. This is due to the stronger social closure in places which are more attached to their past culture than interested in building their new contemporary culture. Then cooperation is a fundament for local economic development in various manners (Rose 2019 for an excellent summary). Notably, some very important mechanisms through which cooperation affects local development are the investment decisions regarding R&D (Tubadji and Nijkamp 2016), the redistribution decisions (Tubadji et al. 2021) and the appeal that a place will have for the attraction of human capital (Tubadji and Nijkamp 2015). These channels can be thought of as cases of culturally-based spatial fictions.

The importance of spatial frictions for the redistribution of growth are well known from the work of Rossi-Hansberg and Wright (2007). CBD contributes to this stream of literature by highlighting that culture is a dynamic stochastic source of spatial fictions in the redirection of migration and other factors of production and thus affects the redistribution of growth (Tubadji et al. 2021).

CBD has been accumulating empirical evidence how local culture affects human capital (through the channel of cultural gravity in migration) (Tubadji and Nijkamp 2015), how it affects R&D (through the channel of stochastic tastes for Shacklean uncertainty and its impact on innovation potential of a locality (Tubadji, Nijkamp and Huggins 2021)) and has documented the link between cultural capital components CH and LC for regional innovation and productivity throughout Europe (across all European regions on NUTS II and NUTS III levels and internally in the UK, Germany, Italy, Greece, Romania and Bulgaria) and the USA (see for example Tubadji, Osoba and Nijkamp 2015; Tubadji and Nijkamp 2018, 2019).

The current paper shall offer for the first time an application of the CBD paradigm for analysing the ultimate final outcome - the productivity across the regions – for the case of China. This application will be importantly insightful, not only because of the novel geography it will study, but also because of the political type of this country. Until now, the CBD paradigm was applied in mostly capitalistic democratic countries – i.e. largely similar political regimes. It is for the first time that this paradigm will be tried for explaining the development in a different political regime. The expectation is that culture itself determines all cooperation forms, including the political organization of a country, thus the effect from CH and LC should be expected to exist and behave similarly for China. Yet, some important differences and nonlinearities may occur when the CH and LC locally have created a SC generating a mode for local cooperation that has resulted in a different type of political regime than the one in the western world.

[3] In a sense, culture divides into attitudes to self and attitudes to relation with others, and social capital is the latter.

Finally, CBD postulates that the complex entity culture, quantifiable adequately in its reduced complexity with CH, LC and SC, creates important clustering of regions within local means, which are joined by shared variation of most of their attitudes. Each local mean clusters people with a culture that is very similar and they will create shared norms and related to them further institutional hierarchies to guard the group obedience to these attitudes like a mini-local political regime. The culturally created political regimes will differ across the different cultural means. Put differently, CBD suggests that clustering of people with similar culture creates local culture which has power to establish other institutions based on accumulated public mass supportive of its right and wrong value system. Thus, local culture acts as a proto-institutional power-accumulator, statistically expressed as clustering in proto-institutional sub-groups (Tubadji 2020). This is the main take of CBD that has been previously addressed in terms of differences of the mean-clustering of regions across different western countries. This paper will be the first of its kind to analyse the validity of culture as a locally spatially clustering proto-institution for an entirely different institutional context – the eastern context of China.

4 A strategy for a CBD analysis of the Chinese regions

In order to assess the relationship between culture and local development on regional level, the Culture-Based Development (CBD) paradigm requires methodologically the implementation of three strategic steps: (i) the aggregate measures quantifying the complex entity culture in a reduced complexity form (i.e. CH & LC) as well the extraction of the SC component from cultural capital should be implemented; (ii) the mechanisms of impact should be confirmed through a hierarchical model expressing the direction of impact from individual culture, to collective culture as proto-institution for local institutions; (iii) the neo-Weberian clustering of the socio-economic outcome of places due to their cultural similarity should be confirmed in order to validate the claim that there is significant nesting of the socio-economic outcome based on the cultural dynamics in time and space; there is an important distinction between having some presence of impact from culture on local development (ii) and causing regions to tip on different developmental trajectories altogether (iii). The latter is a sign of culture-based generated difference in the political regimes and the economic systems. In other words – shows that culture is indeed a proto institution locally.

Step I entails the pooling of the highest number of available variables approximating the local cultural attitudes and tastes in terms of material objects (such as relics or number of currently printed books) or immaterial entities (myths and legends and behaviours such as divorce (which breaks the old social norms), or volunteering, or body part donation etc.). These variables are then to be organized into proxies for CH, LC and SC according to their statistical correlation. Once obtained correctly, the factor variables CH, LC and SC are expected to sum up the conceptually meaningful and statistically important variation in the complex entity cultural capital. This is necessary in order to operationalize the impact of cultural capital (composed of CH, LC and SC) on any socio-economic outcome avoiding under and over quantification of the cultural factor. The classical ultimate CBD outcome of interest is regional productivity. Namely, the reduction of the complexity in the complex entity culture to three meaningful factor variables allows us to estimate the basic CBD model (1) stated below:

$$PRODUCTIVITY_{it} = f(L_{it}, K_{it}, HC_{it}, CH_{it}, LC_{it}\ SC_{it}) \quad (1)$$

where *i* stands for region, *t* for year, local productivity is denoted with *PRODUCTIVITY* and this is the outcome, which is a function of: local labour (*L*), capital investment (*K*), human capital (*HC*) and local cultural capital (i.e. its conceptually important to distinguish sub-components: *CH, LC* and *SC*). Put differently, this is a culturally augmented endogenous economic growth model. In this setting, CBD expects negative impact from *CH* (due to it being associated with higher social closure), positive effect from *LC* and case-dependent effect from *SC*. If *CH* prevails over *LC*, the effect from *SC* is expected to be negative and vice versa (see Tubadji 2022; Tubadji et al. 2021).

Step II of the CBD procedure entails verifying the above assumed mechanism of internal dynamics within cultural capital. Namely, the impact of *CH* and *LC* on *SC* is to be empirically confirmed, as well as the following impact of *SC* on various forms of cooperation (such as for example redistribution, or acceptance to foreigners or other forms of cooperation-dependent group-decision making) and ultimately the effect of this cooperation for the socio-economic main outcome of interest is to be cross-checked. The logic of this mechanism can be expressed through a recursive system of equations as the one stated in Model (2) below:

$$SC_{it} = f(CH_{it,} LC_{it,}) \quad (2.1)$$
$$COOP_{it} = f(SC_{it,} Z_{it}) \quad (2.1)$$
$$PRODUCTIVITY_{it} = f(L_{it,} K_{it,} HC_{it,} COOP_{it,,}) \quad (2.3)$$

where all determinants are as previously defined, *COOP* stands for a form of cooperation dependent on group decision making such as redistribution decisions and *Z* stands for relevant economic controls to account for the economic endogeneity of cooperation.

Step III entails accounting for the hierarchical nesting of the local outcomes based on the cultural characteristics of the place. The outcomes themselves are expected to be substantially clustering in space in relation to the local culture in spite of the impact of all other inputs such as *L, K, HC*. Accounting for this clustering of the outcomes in a culture-dependent manner means fully documenting the culture-based nature of the socio-economic developmental process in space. This final step serves for disentangling the cultural institutional difference that emerges as a classification of the regions according to the type of culture they experience and the resulting politico-economic regime. It also allows to show the presence of cultural impact on development within a cultural context with particular institutional form and political regime, as culture remains to be a factor for the differences between homogenous regional entities within the same proto-institutional class.

The next section offers some comments on the estimation methods that can be used to implement these three steps of the CBD analysis of culture-based development on regional level for China. The next section presents the particular data and methods used to operationalize the here presented strategy.

5 Data and Method

Data were obtained from various sources to amass a total of 64 cultural variables for the regions of China for the period of seven years (from 2013 until 2019). These variables include information about libraries, museums, cultural participation, living practices in terms of volunteering, social work and divorcing, historic data on imperial exams (which is an indicator known in the literature) and many others. The observational level is the Chinese

province of which there are 31. This results into a panel with 219 observations. The data was obtained from the authors of Tubadji and Dai (2022), which contains a detailed description of each variable (descriptive table available upon request). We shall use this data to obtain the necessary measures of cultural capital CH, LC and SC through principal component factor analysis. The main outcome variables are the GDP per capita and the average urban wage as a proxy for the wage bill. Besides total employment (L), physical capital investment (K) and number of people with university or higher education (HC), there are also available relevant controls as number of population in urbanized areas, level of expenditure (in Chinese currency) and a Theil index (based on the difference between urban and rural wages). The level variables are transformed in natural logarithm form as the models are assumed to have a Cobb Douglas functional form. The descriptive statistics of the transformed variables are available in Appendix 1.

To implement the complexity reduction to CH, LC and SC in Step I, I will use factor analysis with principal component element, following Tubadji (2012, 2013) and Tubadji et al. (2021). This means that the correlation between the 63 cultural variables will be used to obtain the eigenvalues for each factor and a factor rotation matrix will allow me to identify the correct maximized loadings of variables on the main factors of interest. In other words, the data will be organized in *CH, LC* and *SC* factors according to its correlation. As CBD expects theoretically that these three factors are of interest and meaningful to retain, the standard statistical procedures of identifying the relevant number of factors to retain as well as the loadings of coefficients will serve to test the statistical identification and validation of these theoretically expected to exist factors. Next, Model (1) from Step I is to be tested as a pooled OLS with year and region fixed effects to account for the panel structure of the data. Two alternative approximations of *PRODUCTIVITY* will be used: the GDP per capita and the local average urban wage, used as a proxy of the local wage bill which is a traditional measure of productivity.

To estimate Step II, a 3SLS model will be used to estimate the hierarchical structure in Model (2). This is a procedure very similar statistically to the approach adopted by Rozelle et al. (1999) but imposing a recursive relationship on top of it. The fact that CH is from a past period justifies the hierarchical positioning of equation (2.1) and the logical dependence on cooperative decisions on social capital (even if a vicious circle and/or persistence exist, cooperation is a function of the propensity to cooperate if decisions are based on preferences), which justifies the position of equation (2.2). Local productivity may affect culture but it is clear that culture, which has a historic component, precedes in its entirety the current economic decision-making process. Thus, there is a theoretical and logical justification for Model (2) to be estimated as a recursive system of three equations, using a 3SLS. Year and region fixed effects are to be used to account for the panel structure[4]. Again, the two alternative quantifications of *PRODUCTIVITY* (GDP per capita and the wage bill proxy) will be used here.

To estimate Step III, various estimation approaches can be adopted. One known approach used by CBD is the use of hierarchical models (Tubadji 2020). In the current study, an alternative approach based on k-mean clustering technique will be employed for the first

[4] Note that CBD alerts against the use of fixed effects without the use of cultural variables, as this hides the effect of the important cultural factor from the analytical view of the researcher (Tubadji 2021b). However, this does not mean that fixed effects are not to be used per se, especially when the cultural component is clearly quantified, fixed effects can of course have a positive effect.

time for these CBD purposes. The reason for this lies in the potent predictive power of k-means clustering and their role in decision trees of machine learning algorithms (see Eslami et al. 2022). The current study will demonstrate the applicability of the k-means clustering in CBD paradigm settings, thus revealing its way to be applied in AI for cultural solutions.

6 Results

Step I is implemented with the use of 63 variables, from which 10 had missing values and the corresponding regions had to be omitted from the analysis. The factor analysis confirmed that the first three factors indeed were relevant to keep as important statistical variation in the measurement of the complex entity culture. Moreover, the meaning of these three factors as CH, LC and SC was confirmed when the loadings after rotation were consulted, meaning that the variables clustering according to correlation of each factor grouped meaning-wise into cultural heritage-related variables, living culture-related variables and social capital-related variables. To illustrate the evidence in this direction the following four figures are offered.

A Scree plot of the eigenvalues will confirm whether these three factors are meaningful and sum up substantial part of the statistical variation in the data (Figure 1). A loadings plot will allow to ensure that the factors indeed load according to the theoretical expectations in CH and LC (Figure 2). A score plot can demonstrate whether there is evidence for clustering of regions in particular types of cultural milieus (Figure 3). The geographical spread of CH and LC and their spatial coincidence with the two alternative measures of local productivity (GDP and wage) are shown in the maps in Figure 4.

As seen from Figure 1 below, the Kaiser's rule advising the retention of factors with eigenvalue above unity defines all 11 first factors (out of 63) as having an eigenvalue above 1. There is however a notable kink (elbow shape) after the first three factors. As seen from Table 1 as well, the first three factors are the only ones with individual weight in the variance of culture accounting individually for above 10% of the total variation. Finally, if kept together, the first three factors can account for way beyond half of the total variation in the cultural variables at our disposal. Thus, these findings jointly confirm the theoretical expectation that three main factors will be able to meaningfully summarize the complexity in the entity culture.

{insert Figure 1 and Table 1}

Figure 2 demonstrates the loadings of variables into factors after rotation. Specifically, it compares how the variables load with regard to the first two factors – CH and LC. As we can see, the first factor attracts higher loadings of variables associated with heritage such as: Quyi dynasty nobilities (Quyi_person). Meanwhile, the second factor has variables such as modern readers' book circulation or current volunteering behaviour loading on it. Similar loading analysis for the third factor confirms that not only there are statistically three important factors that sum up the variation in culture, but also that the meaning of these three factors is as expected by CBD: CH, LC and SC. The loadings for the factors and each variable are available upon request from the author.

{insert Figure 2}

Figure 3 below summarizes the variation in the scores of the cultural factors (CH, LC and SC) in terms of the internal dynamics they create in each region. In specific, Figure 3 shows how CH and LC prevail across provinces for the year 2014 in specific. As seen from Figure 3, some regions have a relatively balanced presence of CH and LC. There are however regions with clear dominance of the one factor over the other. This means that there is an important difference in the dynamics of culture across the regions of China (potentially in terms of cultural entropy) which merits further analysis, which will be partly adressed in Step III.

{insert Figure 3}

Figure 4 offers an optical examination of the geographical spread of CH and LC and the main outcome variables of interest GDP per capita and average urban wage (approximating the wage bill). As seen from Figure 4, there seems to be significant overlap between the concentration of CH and LC across the country – which concord with the above seen image in Figure 3. However, this leaves us with unclear expectation as to what will be the predominant effect and whether it will fulfil the CBD expectations and why. To explore this, we first estimate the basic Model (1) to establish association between culture and local productivity, and then the full mechanism behind it as expressed in Model (2) and illustrated in Figure 5.

{insert Figure 4 and 5}

Table 2 presents the estimations of Model (1). Pooled OLS with year and region fixed effects confirms that cultural capital is an important predictor of local productivity, as generally the claim of CBD suggests. The model performs reasonably well, with all components of the economic growth model reporting the expected performance after the cultural augmentation. Particularly high R-squares are obtained, which is also partially supposed by the fixed effects for year and region, but is still a very good sign of stability. However, the impact from CH and LC has its specificities in the case of the Chinese regions. There are two main aspects of these specificities as seen in Table 2. First, the cultural variables perform importantly differently across specifications (1) and (2). While local GDP per capita is impacted positively by CH and not at all by LC and negatively from SC, when we use the alternative proxy for productivity – the average urban wage, we notice than now CH has the expected by CBD negative sign and is also the only cultural factor with statistical significance in the model. This finding is however in line with current findings that local development, especially rural development in China is associated with retreat to cultural heritage intangible practices (Chen 2021). While human capital is under invested and sensitive to human decision making as found previously by Heckman (2003), and here we show that this associates with higher traditionalism locally. Yet, evidence for little convergence between rural areas over the last 40 years of reforms (Gong 2020) raises serious doubts about the truism of the seeming positive association between CH and local productivity in a generalizable across space or causal locally terms. What is more likely as an explanation according to the CBD paradigm intuition is the fact that locally more traditional provinces are the ones benefitted by the local institutions with plans and investment in their socio-economic development, because the planning is in the hands of the more conservative CH-characterised government. Yet, the mechanisms behind this association need to be better unpacked in detail.

{Table 2}

Step II is reflected in the results presented in Table 3 below, which assesses the relevance of the main CBD mechanism of impact from culture on local productivity, as previously shown for the case of Italy (see Tubadji et al. 2021). The results suggest that perhaps the local productivity (as GDP per capita) in China is less sensitive to human cooperation and coordination and more related to central planning, in line with Heckman (2003), while the redistribution of wages is more a product of cultural coordination between people.

The results in Table 3 confirm both the significance and expected direction of the effect of CH (negative) and LC (positive) on the local SC levels. Next, the higher inequality is associated with lower levels of social capital, which clearly is logical to expect and CBD has this expectation based on previous research too (Tubadji et al. 2021). Finally, interestingly, the cooperation outcome (the redistribution decision measured in the Theil index) seems to be a significant predictor only for the wage and not the GDP per capita outcome. Moreover, the wage specification is the one which shows effect from HC as well, while the GDP_pc is clearly driven by physical capital investment and labour. This finding is in line with Heckman's (2003) alerts that China is not tapping on the endogenous HC source for economic growth. In addition these findings reveal the cultural aspect of this development. Namely, these findings confirm both that local development in China is a product of capital investment and not a process from bottom up, based on human capital decisions; (iii) in the case that human capital matters however, such as the redistribution of wages, the effect from culture and cultural capital in specific is exactly as expected by CBD. Thus, CBD is generalizable for any form of political regime, yet in more centralized political environment the cultural preferences of the human capital creates its special frictions only in the decisions which depend on the direct micro coordination between individuals. This is convincing as apparently institutionalization of a choice on aggregate level that legally supresses the individual preference can clearly impose a cultural tendency without the cooperation between the individuals to be able to easily redefine the institution and the course of its impact.

{Table 3}

Finally, Step III is implemented to demonstrate the culture-based nature of local trajectory of development in China. All 63 cultural variables are again used but this time their variation is used to classify the regions according to their overall cultural milieu. The number of classes for clustering (k) is determined based on our exploration of the score plot. Since the latter plot identified the presence of a cluster of low cultural capital disbalance and places with high cultural capital disbalance between CH and LC (i.e. places with high and low cultural entropy), thus we address the clustering in k-means for two clusters k. Euclidian distance is used for the clustering procedure, which grouped 17 provinces over the seven year period as essentially institutionally and on different developmental trajectories different than the remaining 102 provinces. Next, the sample is split according to the k-mean classification and the basic Model (1) is estimated for each class separately. The results are presented in Table 4 below. As seen from the table, once separated in the culturally identified institutional groups, within the same institution the institutionally homogenous provinces are sensitive to culture as a factor for local productivity along the CBD expectations. Note however that in class 1 there is a very low number 17 provinces. Yet, in class 2 the remaining 102 provinces are sufficient for the estimation and we see that in this case the separation of the data into institutional clusters has treated away important heterogeneity and the expected positive LC effect of culture on productivity is now indeed confirmed also for the case of the majority of

the Chinese regions. These results are clearly consistent with Figure 3 and the conclusion that some regions (indeed the majority) are more balanced while the extremes are few and also heterogenous themselves (some with dominant CH and other with dominant LC). The low number of the latter class and the unwanted heterogeneity in class 1 explain why we find effect only in the class 2 where there are both more numerous and more homogenous observations (homogenous in terms of internal cultural dynamics (prevalence of CH and or LC) in the region)[5]. In short, apparently, after accounting for institutional clustering, for the more culturally balanced provinces, LC affects local economic development inline with the CBD expectation. The disbalanced culturally regions need higher number of observations to clarify further the effect there statistically.

{Tables 4}

The above findings provide an important evidence regarding culture as a proto institution in China. They show that at first sight an over simplified model about culture and its impact on productivity in China seems to detect a present but somewhat different impact from culture in the different institutional setting of China. However, when the exact CBD mechanism of impact from cultural capital on cooperation and productivity is modelled, it becomes clear that the mechanism is clearly still in place as everywhere else, only enacts itself through the human capital sensitive wage-related decision rather than the more institutionally centralized capital investment one. When however, the proto institutional impact of culture on creating a local institutional trajectory is corrected for statistically with k-means clustering, the role of the proto institution culture on local productivity becomes clearly confirmed in identical direction of impact as expected by CBD. This can be interpreted as the power of the proto institution culture to impact human decision making in every institutional context it itself creates conditions to be imposed locally. That is a promising finding as it shows that local culture may allow for institutions to establish locally but may also transform and replace them over time as culture remains the root of the developmental process within established local institutional contexts. The dynamics of this process merits further analysis both in China and elsewhere.

7 Conclusion

This article makes a novel contribution to the cultural economics literature by demonstrating how cultural capital affects local institutions (such as redistributive ones). Using a especially culturally rich dataset for Chinese regions (2013 until 2019), the validity of the main cornerstones for the institutionally different that the EU and US Chinese context and offers some novel theoretical and empirical insights.

The two most interesting findings that can be added to the CBD conceptual and theoretical understanding are that: (i) culture creates the local institutional and developmental trajectory but (ii) it remains a potent drive of the development within the boundaries of this institutional context. This is a very positive news for it evidence the existence of chances for culture (as a proto-institution) to redefine the institutional context itself. In addition, we find

[5] The way cultural entropy can further sum up statistically the effect of the balance between CH and LC has ben shown in Tubadji (2022).

that, clearly, once established institutions can block some channels of cultural impact while others remain open – which finding is consistent with what the literature has asserted as the reason for which institutions are created at the first place – to suppress certain cultural behaviour through their norms and regulations (Veblen 1914; North 1990).

Especially for China, we find confirmation of previous work that alerted for under-exploitation of human capital as a source for economic growth and over accentuation on capital investment. We also show that local people themselves have through their agency an impact on redistribution and productivity through other channels where their cultural tastes for cooperation still can matter positively – as is the case of redistribution of wages. Ins pite of these institutional specificities of how culture matters, it is confirmed that when the institutional nesting is accounted for, CH has a detrimental effect on productivity, LC a positive one and the effect passes through the creation of SC (on the basis of CH and LC rebalancing locally) which ultimately affects some aspects of local productivity (at least those related with the wage bill). These findings rely among other on an important novel for CBD application of k-means clustering which allows to disentangle the institutional clustering in cultural-k-means and the presence of within cluster effects from CH and LC.

The extensive literature on culture, institutions and local socio-economic development has its multiple streams: sociological (such as the work of Inglehart and the Harvard school), international institutions (such as the groups around the work of John Ruggie or Daron Acemoglu to name a few) or mainly quantitative political economists such as Alberto Alesina, to name a few. Yet, the wealth of this literature had always strived to over-focus only on culture or on institutions or on the aftermath from them without engaging with the origins of them as a process. The CBD approach puts these three logical components together: it looks into the internal dynamics of culture, acknowledging its structure and dynamics over time, next it explains the role of culture as a proto-institution for the formation of other institutions and demonstrates that culture keeps being a potent factor of development within the institutional settings which it has established. These main CBD settings have been empirically addressed by CBD in many studies and were confirmed here for the case of China.

CBD offers also studies across the West about the role of culture in the protest of those left behind and determining when the compliance with culture and the local institutions will reach a tipping point that will lead the relatively deprived individuals to redefine their culture (Tubadji 2022) and the groups to transform their institutions (Tubadji and Nijkamp 2019, Tubadji, Colwill and Webber 2020). These studies are worth replication for the Chinese context as well in further research.

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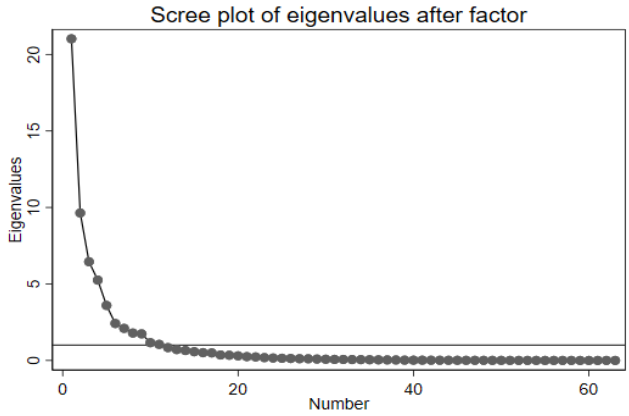

Figure 1: How many factors should be kept

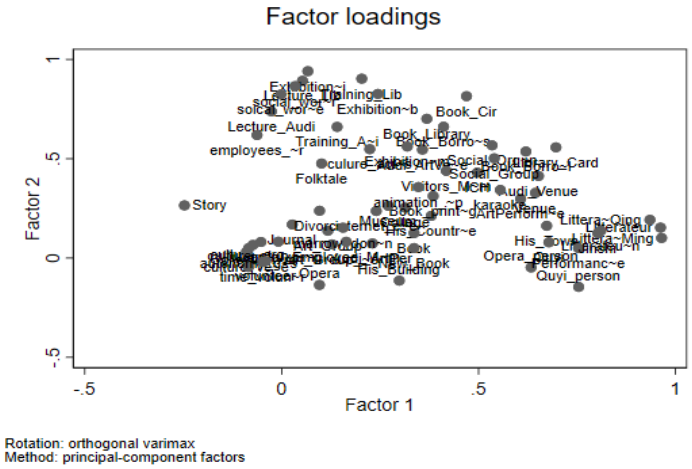

Figure 2: Dividing the cultural variables into cultural heritage (CH) and living culture (LC)

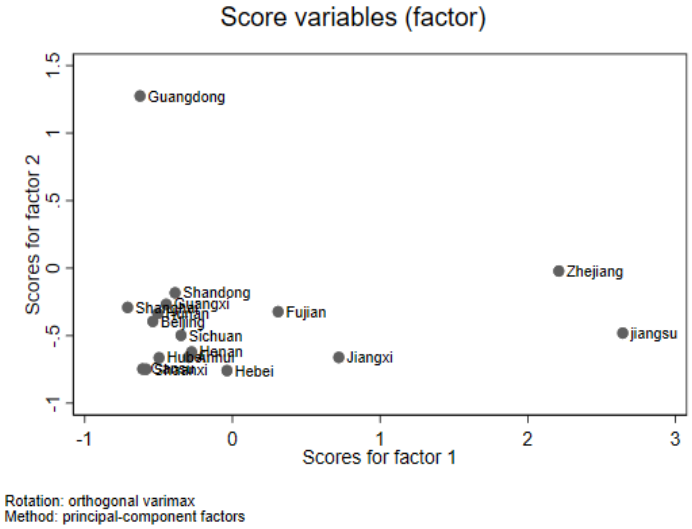

Figure 3: Balanced and unbalanced cultural capital composition by province

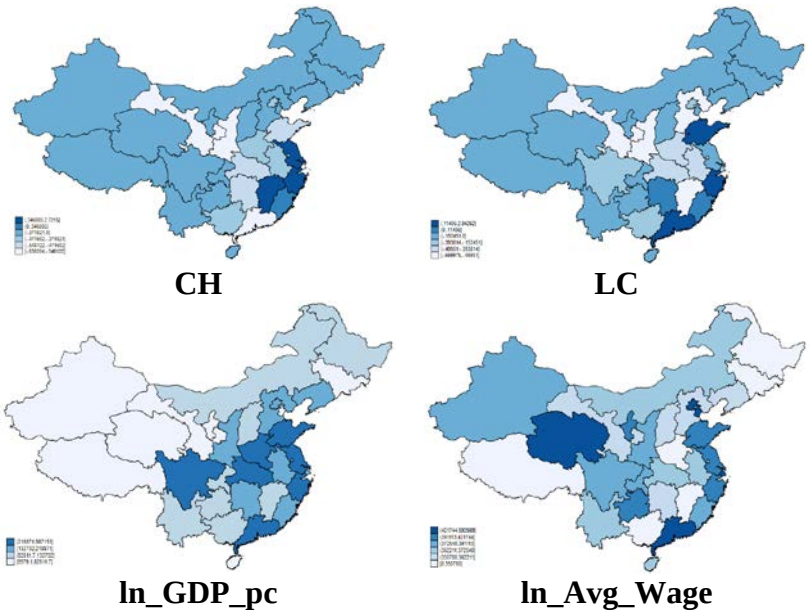

Figure 4: CBD across the Chinese regions

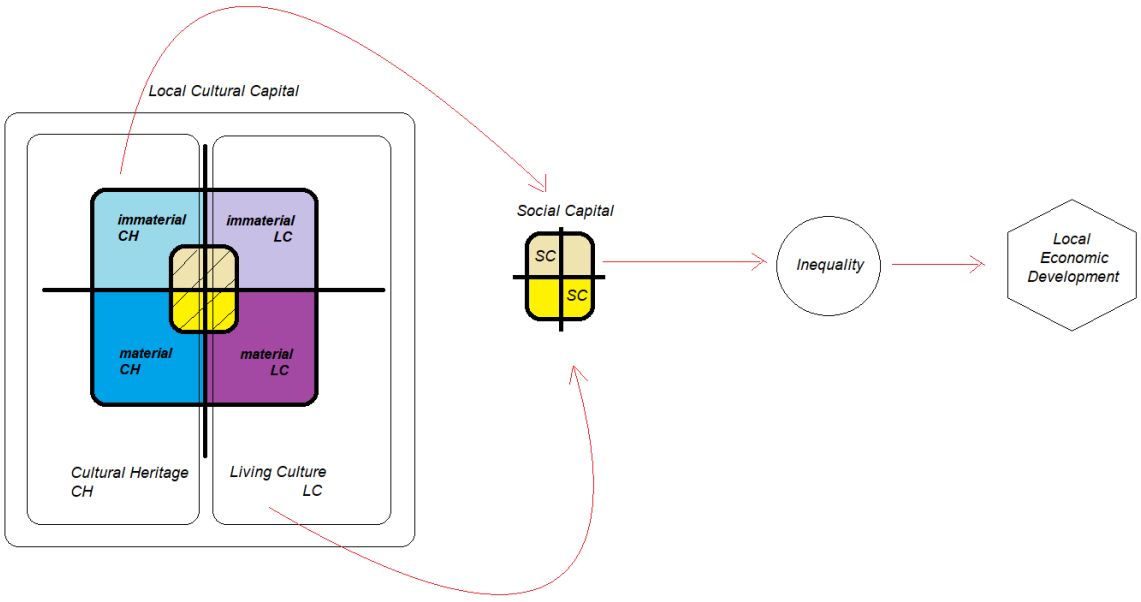

Figure 5: The Culture-Based Development (CBD) Model

Table 1: Eigenvalues of the Cultural Factors after Factor Analysis

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	21.03	11.39	0.33	0.33
Factor2	9.64	3.19	0.15	0.49
Factor3	6.45	1.20	0.10	0.59
Factor4	5.25	1.66	0.08	0.67
Factor5	3.60	1.18	0.06	0.73
Factor6	2.41	0.32	0.04	0.77
Factor7	2.10	0.30	0.03	0.80
Factor8	1.79	0.05	0.03	0.83
Factor9	1.74	0.58	0.03	0.86
Factor10	1.16	0.11	0.02	0.88
Factor11	1.05	0.21	0.02	0.89
Factor12	0.84	0.13	0.01	0.91
Factor13	0.71	0.06	0.01	0.92
Factor14	0.65	0.08	0.01	0.93

Note: The table presents and extract of the list of all 63 factors, to illustrate the application of the Kaiser's rule vis a vis retaining the factors from the principal component factor analysis up to the point where the eigen value is above unity.

Table 2: Direct Association of Culture on Local Productivity

VARIABLES	(1) ln_GDP_pc	(2) ln_wage_bill
CH	0.043***	-0.014***
	(0.015)	(0.005)
LC	0.024	-0.006
	(0.019)	(0.007)
SC	-0.109***	-0.000
	(0.031)	(0.013)
ln_L	-0.493***	-0.188***
	(0.079)	(0.040)
ln_K	0.103	-0.130***
	(0.079)	(0.031)
ln_HC	0.682***	0.324***
	(0.079)	(0.021)
Year FE	YES	YES
Region FE	YES	YES
Constant	9.149***	11.347***
	(0.477)	(0.200)
Observations	119	119
R-squared	0.888	0.951

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The table presents the estimations from a pooled OLS with fixed effects for year and region.

Table 3: A CBD Mechanism of Impact of Culture on Collective Allocation of Resources and Local Productivity

model		Model - GDP			Model - Wage	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	SC	theil_idx	ln_GDP_pc	SC	theil_idx	ln_wage_bill
CH	0.066			0.067		
	(0.078)			(0.078)		
LC	0.299***			0.294***		
	(0.087)			(0.087)		
ln_expeniture	-2.179***			-2.173***		
	(0.301)			(0.301)		
SC		-0.008***			-0.007***	
		(0.003)			(0.003)	
per_immigrant		-0.207***			-0.207***	
		(0.018)			(0.018)	
ln_L			0.128*			-0.408***
			(0.075)			(0.081)
ln_K			0.169***			0.039
			(0.026)			(0.028)
ln_HC			0.001			0.099***
			(0.023)			(0.024)
theil_idx			1.162			-3.862**
			(1.428)			(1.535)
Year FE			YES			YES
Region (p) FE			YES			YES
Constant	21.858***	0.129***	7.605***	21.796***	0.129***	13.415***
	(3.024)	(0.004)	(0.742)	(3.025)	(0.004)	(0.798)
Observations	119	119	119	119	119	119
R-squared	0.298	0.578	0.998	0.298	0.578	0.991

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The table presents the estimation of a recursive model with the use of a 3SLS integrative estimation.

Table 4: Cultural Impact within Institutional Clusters

	Model - GDP		Model - Wage	
	clus = 1	clus = 2	clus = 1	clus = 2
VARIABLES	ln_GDP_pc	ln_GDP_pc	ln_wage_bill	ln_wage_bill
CH	0.039	0.044	-0.015	-0.004
	(0.034)	(0.034)	(0.047)	(0.011)
LC	-0.005	0.144**	0.006	0.050**
	(0.005)	(0.065)	(0.007)	(0.021)
ln_L	-0.165	-0.693***	-0.082	-0.181***
	(0.183)	(0.092)	(0.248)	(0.030)
ln_K	0.157	0.107	0.038	-0.147***
	(0.142)	(0.082)	(0.194)	(0.026)
ln_HC	0.165*	0.617***	0.015	0.331***
	(0.076)	(0.064)	(0.103)	(0.021)
Year FE	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Constant	9.752***	11.120***	10.989***	11.452***
	(0.542)	(0.430)	(0.736)	(0.138)
Observations	17	102	17	102
R-squared	0.999	0.859	0.998	0.955

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The table presents pooled cross-sectional estimation with OLS fixed effects for year and region implemented for separate sub-samples into which the original sample of provinces was divided based on K-mean clustering based on all 63 cultural indicators to define the regional classes.

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Appendix 1a: Descriptive Statistics

Part of the CBD Model	Variable	Definition	Source	Obs.	Mean	Std. Dev.	Min	Max
Cultural Factor Variables	CH	Cultural heritage variable, obtained from principle component factor analysis with all 63 variables	Authors' caculation using principle factor analysis	119	0.00	1.00	-1.3	2.90
	LC	Living culture variable, obtained from principle component factor analysis with all 63 variables	Authors' caculation using principle factor analysis	119	0.00	1.00	-0.8	5.20
	SC	Social capital, obtained from principle component factor analysis with all 63 variables	Authors' caculation using principle factor analysis	119	0.00	1.00	-2.1	2.60
Economic Variables	GDP	Gross domestic product (100 million yuan)	China Statistical Yearbook	217	24974.20	20816.80	828.20	107986.90
	GDP_pc	GVA per capita in a province	China Statistical Yearbook	217	55342.24	27272.65	22825.00	164563.00
	K	Total investment in fixed assets (100 million yuan)	China Statistical Yearbook	217		12866.10	876.00	55202.70
	HC	Employed persons(10000 person)	Provincial Statistical Yearbooks from each Province	217	2671.00	1826.80	205.50	7150.30
	Mig_percentage	Percentage of immigrants (%), calculated with the percentage of people with permanent household registration elsewhere and away from their registration place for more than 6 months and the total population in a province.	Chinese Statistical Yearbook	217	0.20	0.10	0.01	0.60
	Avg_urban_wage	Average wage for urban employees (yuan), calculated with number of urban employees in public sector, average urban wage in public sector, number of urban employees in private sector, average urban wage in private sector.	China Statistical Yearbook	210	57215.60	14570.60	36356.00	129308.00
	Theil_index	Theil index of urban and suburb income, calculated with urban and suburb income data.	China Statistical Yearbook	217	0.09	0.04	0.02	0.19
	Expenditure	The average per capita expenditure (yuan)	China Statistical Yearbook	217	17280.80	7021.70	6307.00	45605.00

Appendix 1b: Cultural Descriptive Statistics

(available from the author but not recommended for publication here as it will be available in the Tubadji and Dai (2022) as well)

Part of the CBD Model	Variable	Definition	Source	Obs.	Mean	Std. Dev.	Min	Max
Cultural Heritage	Intangible cult. Heritage	Intangible culture heritage (item)	Intangible Culture Heritage, http://www.ihchina.cn/	217	99	49	18	233
	Historic site	Major historical and cultural sites protected at the national level (unit)	National Cultural Heritage Administration, http://www.ncha.gov.cn/	217	172	117	34	538
	Historic town	Historical and cultural town protected at the national level (unit)	National Cultural Heritage Administration, http://www.ncha.gov.cn/	217	10	8	0	31
	Historic countriside	Major historical and cultural countryside protected at the national level (unit)	National Cultural Heritage Administration, http://www.ncha.gov.cn/	217	16	21	0	96
	Opera	Count of local variety of kinds of opera	*Zhong Guo Xi Qu Zhi*	217	17	11	2	41
	Opera celebrities	Local notable opera stars and contributors to opera art	*Zhong Guo Xi Qu Zhi*	217	129	95	9	399
	Quyi	Count of local variety of kinds of the Quyi art form	*Zhong Guo Qu Yi Zhi*	203	31	16	8	80
	Quyi_person	Local notablestars and contributors to the Quyi art form	*Zhong Guo Qu Yi Zhi*	203	83	56	7	265
	Litterateur	China ancient litterateurs (number of all persons)	*Zhong guo Li Dai Wen Xue Jia Zhi Di Li Fen BU*	217	121	228	0	970
	Litterateur- Qing period	China ancient litterateurs recorded in Qing dynasty (number of persons)	*Zhong guo Li Dai Wen Xue Jia Zhi Di Li Fen BU*	161	76	120	1	484
	Litterateur - Ming period	China ancient litterateurs recorded in Ming dynasty (person)	*Zhong guo Li Dai Wen Xue Jia Zhi Di Li Fen BU*	140	75	110	2	429
	Litterateur - Yuan period	China ancient litterateurs recorded in yuan (person)	*Zhong guo Li Dai Wen Xue Jia Zhi Di Li Fen BU*	154	23	33	1	149
	Ancient academy	Ancient academies in China (count)	*Zhong guo Shu Yuan Ci Dian*	217	253	254	0	989
	Story	Ancient stories (piece)	*Zhong Guo Ming Jian Gu Shi Ji Cheng*	217	628	185	219	1029
	Folktale	Ancient legends and folktales (piece)	*Zhong Guo Ming Jian Gu Shi Ji Cheng*	217	337	102	156	557
	Museum	Museums (unit)	China Statistical Yearbook	217	138	97	2	541
	Employee_museum	Employed persons at museums (person)	China Statistical Yearbook	217	2981	2124	75	9354
	Collections_museum	Collections at museums (piece/set)	China Statistical Yearbook	217	974104	932963	39895	4380555

	Exhibitions_museum	Regular exhibitions at museums (unit)	China Statistical Yearbook	217	974104	932963	39895	4380555
	Visitors_museum	Visitors to museums (10000 person-time)	China Statistical Yearbook	217	974104	932963	39895	4380555
	Jinshi	Emperial examiners in qing and ming dynasties (person)	*Ming-Qing Jinshi Timing Beilu Suoyin*	217	1615	1704	0	6390
Living Culture	Book	Number of publications (kind)	China Statistical Yearbook	217	9363	7007	520	30892
	New_book	Number of new publications (kind)	China Statistical Yearbook	217	4796	3564	237	16516
	Book_printing	Printed copies of books (100 million copie)	China Statistical Yearbook	217	2.20	1.60	0.10	7.50
	Journal	Number of periodicals published (kind)	China Statistical Yearbook	217	227	132	35	641
	Journal_priting	Printed copies of periodicals (100 million copie)	China Statistical Yearbook	217	0.60	0.50	0.00	3.10
	Art_group	Number of art performance troupes(unit)	China Statistical Yearbook	217	417	477	30	2859
	Art_group_performance	Performances of art groups (10000 time)	China Statistical Yearbook	217	76.90	112.20	2.90	646.60
	Audi_performance	Audience of demostic art performance (1000 person)	China Statistical Yearbook	217	34921.20	48947.60	1635.00	329685.00
	Venue	Art performance venues (unit)	China Statistical Yearbook	217	68	63	3	365
	Performance	Performances at art performance venues(10000 show)	China Statistical Yearbook	216	36.30	64.70	0.03	424.40
	Artperformance	Art performances at art performance venues(10000 show)	China Statistical Yearbook	216	5.10	6.10	0.00	42.00
	Audi_venue	Audience at art venues (10000 person-time)	China Statistical Yearbook	216	3608	4135	11	22371
	Audi_art_venue	Audience at art venues for art performances(10000 person-time)	China Statistical Yearbook	216	1236.10	1296.00	0.00	7640.00
	Library	Public libraries (unit)	China Statistical Yearbook	217	102	46	21	206
	Book_library	Total collection of books (10000 copie)	China Statistical Yearbook	217	2831.20	2203.90	100.30	10543.00
	Library_card	Active library cards distributed (10000 unit)	China Statistical Yearbook	217	177.40	277.40	1.00	1656.00
	Book_circulation	Book circulations (10000 person-time)	China Statistical Yearbook	217	21700000	23800000	110800	139000000
	Book_borrowing	Borrowing from libraries of books and periodicals (10000 person-time)	China Statistical Yearbook	217	778.70	695.70	3.62	3216.57
	Book_periodicals_lend	Books and periodicals lent to readers (10000 copies-time)	China Statistical Yearbook	217	1692.50	1802.00	7.00	8681.00

	Lecture_library	Lectures held in libraries (time)	China Statistical Yearbook	217	2166	1711	27	9996
	Lecture_audience	Participants to lectures at libraries (10000 person-time)	China Statistical Yearbook	217	40.00	65.70	0.24	793.76
	Training_library	Training classes held at public libraries (unit)	China Statistical Yearbook	217	1474	1678	24	12030
	Training_lib_audience	Participants to training classes at public libraries (10000 person-time)	China Statistical Yearbook	217	10.30	13.20	0.04	110.32
	Exhibitions_library	Exhibitions held at libraries (unit)	China Statistical Yearbook	217	828.20	717.10	19.00	5329.00
	Exhibitions_lib_participants	Visitors attended exhibitions at libraries (10000 person-time)	China Statistical Yearbook	217	193.80	269.30	1.43	2076.10
	Entertainment_institutions	Entertainment institutions (unit)	China Statistical Yearbook on Culture and Related Industies	217	2522	1867	125	8657
	Internet_bars	Internet bars (unit)	China Statistical Yearbook on Culture and Related Industies	217	4246	3219	151	12548
	Animation_enterprises	Comic and animation entterrprises (unit)	China Statistical Yearbook on Culture and Related Industies	211	19	19	1	77
	Employees_animation_ent.	Persons engaged in comic and animation enterprises (person)	China Statistical Yearbook on Culture and Related Industies	210	923	1421	5	11603
Social Capital	Culture_community_ins.	Cultural institutions (unit)	China Statistical Yearbook on Culture, Relics and Tourism	217	1431	888	228	4808
	Culture_community_venue	Cultural venues (unit)	China Statistical Yearbook on Culture, Relics and Tourism	217	107	51	17	207
	Culture_community_station	Cultrual stations (unit)	China Statistical Yearbook on Culture, Relics and Tourism	217	1324	844	207	4601
	Culure_community_activities	Cultural activities organized by cultural institutions (time)	China Statistical Yearbook on Culture, Relics and Tourism	217	33715	23863	1933	148863
	Autonomy_groups	Autonomous organizations (unit)	China Statistical Yearbook	217	21482	17451	2741	81285
	Divorce	Divorces (10000 couple)	China Statistical Yearbook	217	13.20	8.20	0.20	35.65
	Social_organization	Social organizations (unit)	China Statistical Yearbook	217	22799	17784	536	97013
	Social_group	Social groups (unit)	China Statistical Yearbook	217	10793	7639	478	38081
	Volunteer	Volunteers （person)	China Civil Affairs Statistical Yearbook	217	299844	1204786	5	12000000
	Time_voluneering	Time of volunterring activities (hour)	China Civil Affairs Statistical Yearbook	217	782416	3582259	0	43000000
	Junior social worker	Junior social worker (person)	China Civil Affairs Statistical Yearbook	217	1115	2131	2	22666
	Social worker	Social worker (person)	China Civil Affairs Statistical Yearbook	216	601	786	1	5953
Altruism	Marrow_donation	Marrow donation enlisted doners (person)	China Marrow Donor Program Annual Reports	217	5317	3458	0	17387