Cultural Persistence Chains and Local Employment

Economic Impact Evaluation of the South East Europe Cultural Corridors (SEE CC)

Annie TUBADJI
University of Bologna,
Rimini, Italy
University of the Aegean,
Chios, Greece
atubadji@hotmail.com

Peter NIJKAMP
VU University
Amsterdam, The Netherlands
Adam Mickiewicz University,
Poznan, Poland
p.nijkamp@vu.nl

Abstract

The fact that culture matters for economic development has been established mostly with cases from the western part of the world – USA, Germany and Italy. Another exceptionally rich of cultural heritage region – South East Europe – has remained on this matter largely unexplored with modern econometric approaches. The aim of the current paper is to examine whether the distance to the historic South East Europe cultural corridors (SEE CC) produces an effect on total employment on NUTS3 level. In particular the effect on total employment from the gross value added and sectoral specialization is examined jointly with the cultural factor approximated with the distance to the East Trans Balkan Road (crossing Romania, Bulgaria and Greece), which is one of the nine SEE CC. Using the European University Institute (EUI) European Regional Dataset (ERD) and the geo-data from the Cultural Corridors of South East Europe website, we implement first a 2SLS instrumental variable (IV) estimation with a pooled dataset on NUTS-III level from 1980 till nowadays. Next, we triangulate our results by using distance to the cultural corridor as a treatment effect in a propensity score matching and difference in differences exploration. Our results confirm the distance to the SEE CC corridor as a strong predictor for local socio-economic development. Moreover, our results caution against cultural deterministic perspective, since instead of a persistence, we trace a strong cultural impact, that however is associated with place development life-cycle trends. Thus, while culture matters, social change, even if slow, is likely to lead to the emergence of new geographical cultural centers and new cultural path-dependence built up of persistence chains in the long run.

Key words: culture, persistence, path-dependence, cultural corridor, place.
JEL classification: R32, R38, Z10, J60

1 Introduction

'Culture matters' is a generally accepted postulate in modern economics (see for example, Harrison and Huntington 2001; Marglin and Marglin, 1996; Sen, 1999, 2004; Ottaviano and Peri 2004, 2005, 2006; Guiso et al. 2006, 2014; Tabellini 2010; Acemoglu and Robinson, 2010; Falck et al. 2012, Alesina and Giuliano, 2015). However, the definition of culture, the conceptual vision about its impact and the mechanisms operationalized for empirically testing it vary so widely that cultural impact remains at a level of a largely fuzzy understanding of this important source of bias on modelling socio-economic development.

Cultural impact on economic development, as seen from sociologically relevant domain, falls at three large, mutually contradictive schools of thought about the impact of values on local development. The Marxist perspective argues that in a sense culture is a by-product of economic development and that less economically developed locations see in more developed localities a level of cultural/value development that is equal to their future cultural/value development that will be attained once their economic progress reaches the same level (see Marx, 1867). The reverse perspective is the cultural determinism, where culture is perceived as a determinant of initial conditions, a source of a persistent effect over the time and space dimensions (see Putnam 1994). Persistent effect means an effect that once occurring acts like an initial condition and is a characteristics that continues to exist infinitely beyond the process that generated it. In a sense this assumes that culture, especially from a past period, is an exogenous factor for current socio-economic development. A middle road is pursued by the Inglehart (1977), Fukuyama (1992) and Hofstede (2001) sociology of culture, which can be summarized as the understanding that culture is a locally specific programming of the mind which may or may not allow for certain developments under the same socio-economic conditions (see Beugelsdijk et al. (2006) for a more detailed presentation of the three 'schools'). This is the path-depenence school, which views culture as a 'bandwagon' which attracts more or less followers of a particular pattern based on the overall mass

of participants (therefore also known as network effect). Path dependence assumes that culture is an autoregressive term and a lagged regressor explaining socio-economic development. In other words, path-dependence is a product of a coordination game.

The above three sociological 'schools' have been reflected in the economic thinking in their own right. The Marxist approach is either a basis for total neglect to the cultural factor (Solow 1999; Glaeser 2001) or become the foundation adopted in the economics of culture, where the focus of research lies on culture and artistic industries, termed often creative industries (but in a sense slightly different than Richard Florida's notion)[1], and their economic performance, and understanding culture as a source of income and its value creation function as a by-product and positive spill-over of its production process. The same vein of research deals with cultural tourism where most often cultural heritage is a source of a particular kind of economic sector specialization and intensive development (for related research, see Throsby, 1994; Duijn and Rouwendal, 2013; Abe, 2014; Campo and Alvarez, 2014). The cultural deterministic approach lies within a variety of modern economic studies on culture, mostly belonging to economic history or adopting the deterministic approach due to its facilitation of modern econometric approaches, namely the workhorse of modern economics – the instrumental variable approach. In this approach a historic event or the distance to a historically significant location is interpreted as a factor with direct economic interpretation as a determinant of a phenomenon (see Baumann, 1928; Knack and Keefer, 1997; Dell, 2010; Peman, 2011; Alessina et al., 2013; Fritsch and Wyrwich, 2014; Grompone and Sessa, 2014; Caicedo, 2014; Andersson and Larsson, 2015). The Inglehart and Hofstede approach matches closely with what is known in economics as cultural relativity studies, where local socio-economic patterns vary on the basis of different cultural values and preferences, but these preferences are understood as themselves evolving over time on the basis of cultural interaction and migration. In this stream of research fall Tiebout (1956) and his notion of culturally

[1] Richard Florida (2002a,b, 2005) associates creativity with freedom to make a decision in once practice and his definition of creative professions spreads over a range of non-arts related occupations, such as surgeons, judges etc. Alternatively, when speaking of Bohemians, Florida genuinely infers the artistic occupations, which are the object of economics of culture. The two are not necessarily disconnected. Just the opposite, Florida's hypothesis claims that the concentration of Bohemians leads to the concentration of workers from creative occupations. But the two notions are essentially definitionally different. See Moeller and Tubadji (2009) for more details.

driven varying of public good provision, tunnel vision effects of poverty on preferences (Levine 1980), the Balassa-Samuelson price-effect influenced by home-bias driven inefficiency of trade markets (Balassa, 1964; Samuelson, 1964), later research on migration and diversity (see, among other, Divino and McAleer, 2007; Ottaviano and Peri, 2005; Hudson, 2008; Vioglander and Voth, 2012; Tubadji and Nijkamp, 2014 (altruism)), as well as more recent cultural transmission and proximity related studies (see as Rallet and Torre, 1995; Gertler, 2003; Callois and Aubert, 2007; Boschma 2005; Agrawal et al. 2008; Torre, 2008; Capello, 2009; Rodriguez-Pose, 2011; Acemoglu and Robinson, 2011; Rutten and Boeckma, 2012; Saez-Marti and Zenou, 2012; Cohen and Ackland, 2012; Beebe et al., 2013; Leon, 2013; Bayer et al., 2014; Tubadji and Nijkamp, 2015 (gravity); Huggins and Thompson, 2015).

The current study belongs to this third stream of thought, by suggesting the Culture Based Development (CBD) approach. CBD enables us to define less-restrictively the source of cultural impact in a non-deterministic paradigm. Namely, not a particular event, neither the distance to a singular point of interest, but rather the distance to a cultural corridor – defined as a vector of geographical centres of tangible and intangible cultural heritage from different past periods – will be the object of exploration in our study. This CBD definition can next be operationalized equally successfully with instrumental variable approach and other relevant econometric methods, in a comparable to economic history and related to the deterministic approach research endeavours. Moreover, this CBD definition is directly operationalizable thanks to the uniquely created for the purpose of our study geocoded database about the South East Europe cultural corridors, in particular the East Trans-Balkan cultural corridor which passes through the territory of Greece, Bulgaria and Romania. The places, whose geo-locations we collected, have been explicitly selected and mapped by international expert groups of UNESCO, ICOMOS, Council of Europe and related academic institutions. Thus, our measure is not an abstract statistically derived vector, but is a historical meaning-embodying qualitatively refined quantification of the tangible and intangible cultural memory of intensively developing centres of local socio-economic development in the past.

Our aim is to explore the effect of this complex accumulated over time latent factor of cultural historic significance on current economic development. While we do presume a strong and persistent effect to be available in a fixed moment in time, we also expect that over time the source of influence might be undergoing its own evolution.

The structure of the remaining part of this paper is as follows. Section 2 provides the Culture-Based Development (CBD) definition for cultural corridors as a source of economic development and arguments for the channels of impact on local employment and productivity, finally proposing assumptions about the positive or negative effect that can be expected from this source of culture impact. Section 3 presents our unique database containing geo-coded information about the East Trans-Balkan South East Europe Cultural Corridor (ETB SEE CC) and how it can serve to operationalize the CBD definition and approach. Section 4 presents our estimation results and their analysis. Section 5 offers concluding remarks on our empirical findings in the context of economics, cultural persistence and regional development of 'urban centres'.

2 Culture Based Development: Cultural Corridors and Employment

2.1 Definition for a Cultural Corridor

CBD is a concept which defines culture as an entity composed of tangible and intangible cultural assets and expressions of values, which are subject to a temporal divide based on Hume's notion of taste and historic time distance and are thus delimited into living culture (observed in the current time period) and cultural heritage (generated in historically characterized previous time periods). This broader definition of culture allows to encompass the different aspects of a complex latently present entity, which is often associated with a locality or particular ethnic group. CBD argues that a more restrictive definition of culture, narrowed to only one expression of culture (such as religion for example or a unique historic event) leads to an incomplete information about the entity as a whole and therefor is bound to lead to biased estimation of the impact of culture on local development, even if it might be indeed a slightly better approach compared to the complete

omission of cultural variable per se in the economic model which leads to even more serious bias of under-specification due to omission of a significant determinant of local development (see Tubadji, 2012, 2013, 2014). Empirically, therefore, CBD recommends and implements the measurement of culture as a latently present variable, quantifiable as a vector of cultural components (generated for example with principle component analysis (see Tubadji and Nijkamp, 2014) or another version of latently present structural components, such as the ones estimated in partial least squares path modelling and related non-parametric techniques (see Tubadji and Nijkamp, 2015). In this study, we would argue that the notion of cultural corridor is especially suitable notion for operationalizing the CBD conceptual approach. In a sense, the cultural corridor is an even more refined approach than the above mentioned statistical methods for quantification of the latent notion culture, because the components in the cultural corridors are qualitatively selected by the expert opinion of cultural historians, architects and experts on local institutions of values and meaning.

The notion of cultural corridor is a cultural historians and heritage experts tailored term, which however has been prominently established in international culture related organizations as UNESCO, Council of Europe and ICOMOS[2]. Thus, before defining cultural corridors from CBD perspective, we must first infer the definitions given by the Council of Europe experts involved in the identification of the South East Europe cultural corridors, stated as follows: 'the traditional territorial axes in the region [of South East Europe] along which cultural values, ideas, innovations, and so on, have been circulating in constant continuity of links, influences and interactions', (Teodorescu 1974)[3]. Furthermore, the cultural corridor is 'a historical vector, a territorial axis evolved in time, along which there has traditionally been movement and exchange', (Krestev 2005)[4].

[2] Equally interestingly, from empirical perspective, the same epert groups have implemented impressively detailed and highly professional mapping of these cultural corridors for the case of the South East Europe Region.
[3] See http://www.seecorridors.eu/filebank/file_272.pdf.
[4] The official website of the South East Europe Cultural Corridors provides another, slightly more precise formulation of the same definition, which reads: "South East Europe has been a real crossroads of civilizations and religions through the centuries; a mediator between the East and the West, the North and the South, transpierced by internal connections and influences, bound up by common historical routes. As a result, in time, cultural corridors in the region have been formed - trans-national axes of century-old interactions – the living memory of the civilizations and strong connections between the peoples, which inhabit the region. Please, get to know these cultural roads, which have preserved their vitality from the ancient times until today!", see: http://seecorridors.eu/?w_p=23&w_l=2#

Based on the above, we can adapt the existing definition of cultural corridor in the CBD spirit, as: a vector of identified geographical locations of historically established and recognized centres, clustering tangible and intangible cultural heritage as carriers of memory for local meaning. Adopting this CBD definition of cultural corridors, we can make several important assumptions about the expected impact, identifiable through this quantification of local culture.

A close notion to the one of our geo-located historical centres is perhaps historic 'urban centres'. But this is more a modern time interpretation of local centres, as many of these SEE CC centres of local development are actually villages, where special forms of trade flourished for example or particularly interesting type of church architecture was implemented due to local creative spirit and concentration of construction talent. Thus, what nowadays stands behind the understanding of an urban centre (see Kramer and Diez, 2012; Nijkamp, 2008; Strauss, 2008; Arribas-Bel et al., 2013) as a focal point of socio-economic development is the same notion, put and adapted in a historic perspective and context. Thus, rather – we can adopt an alternative notion unifying urban centres and historic centres of local socio-economic development as: centres of meaning and values essential for the socio-economic development of their times.

So – with this CBD definition of cultural corridors the question can be approached: is there persistence of tangible and intangible local development or can local prosperity at a time be associated with a local decline in a next period due to cultural persistence of values? If the latter holds true, cultural impact might serve to explain the fall and rise of local development centres. The next sub-section of Section 2 deals with argumentation of these assumptions.

2.2 Possible Impact of Cultural Corridors on Employment and Regional Development

Static and Dynamic Channels

A more complex notion of the cultural source of impact can be naturally expected to have a complex set of channels of impact. These can be however grouped into static (within a location) and dynamic (across location) effects on the economic choice of an individual.

The *static (within locations) impact channel* is related with the cultural impact on individual choice, when the individual is faced with any kind of decision making. Any individual choice is a subject to

rational choice cost-and-benefit reasoning and simultaneously subject to a locally specific cultural bias arising from the values related uncertainty about how cost and benefit are defined and perceived across cultures. Two very prominent embodiments of this static effect of culture is the one on trade and investment decisions. The existence of the so called 'home bias'[5] (preference for cultural proximity) on trade partner choice leads to the famous Balassa-Samuelson effect, expressed in having the same goods at different prices in different inefficient local markets (Gubler and Sax, 2011; Bordo et al., 2014). Additionally, research on foreign direct investment has led to identifying reverse relationship between cultural proximity, selected place for investment and the profitability of this choice (Head and Ries, 2008; Diyarbakirlioglu, 2011; Cervellati et al., 2008; Cervellati et al., 2011).

A much more global perspective on the latter static effects is actually provided by Weber (1905) in his Protestant Ethics opus magnus. While easily confused with the profusion of religion-and-economics research (such as among many others, in Becker and Wößmann, 2009), Weber's hypothesis is much more general and concerns attitudes as determinants of local choice and local development, and is therefore relevant for a broader context that religion which is only one aspect, a suitable approximation, of culture and values entity. Namely, Weber's main proposition is that locally relative cultural values shape different occupational and skill-development preferences. This of course can be expected to mirror next in different levels of human capital development, different sectoral specialization in culturally different localities (all these given the same or very similar economic endowments and incentives) (see Becker and Wößmann, 2009; Tubadji, 2015).

So, to sum up the static source of cultural bias, the higher proximity to a certain cultural belonging is related with particular cultural bias on the rational choice (i.e. a culturally driven uncertainty of the outcome exists) for decisions on trading, investment, occupational choice and economic structure, which naturally powerfully influence the local socio-economic productivity and development.

[5] See Duru and Reeb 2002; Chan et al. 2005; Nijkamp et al. 2011; Guo 2004; Tihanyi et al. 2005; Lee et al. 2008; Lucey and Zhang 2010.

But besides this static effect for the person inside the locality, there is also a *dynamic (across locations)* channel of impact – which related with migration of self-selecting workers. The relationship between migration and culture has been approached from many perspectives. There is a profusion of literature nowadays on the impact of cultural diversity on productivity, even if sometimes the empirical results point in conflicting conclusions. Yet, instrumental for understanding the dynamic channels of cultural impact is mainly the most traditional but least empirically tested channel known as the cultural cost of migration proposed by Harris and Todaro (1970). Namely, while wage incentives stimulate an out-ward migration from a place with lower wage, the cultural belonging to this place adds a cost to leaving the place, thus acting in a direction opposite to the economic stimulus for the emigration choice. Another, further advanced interpretation of the cultural cost of migration is the notion of cultural gravity (Tubadji and Nijkamp 2015), according to which, in Inglehart and Hofstede tradition, different local cultures lead to different size of cultural distance between incumbent and immigrants, therefore the cultural cost of emigration for the same person to different localities varies according to the local culture in the recipient localities. From the point of view of the locality, this assumes different pulling power (cultural gravity) of the locality for people of different cultural backgrounds. The most essential part of this dynamic process of reallocation of human capital through culturally biased self-sorted emigration is the fact that culturally different economically comparable localities end up accumulating different types of human capital and values and this changes might influence the nature of the local culture over time if a critical mass of holders of a different value system manage to gain bargaining power over the currently dominant cultural value system

Types of Generated Impact

The static and dynamic channels lead to a culturally driven concentration of human capital in a locality and are the reason behind different choice outcomes given comparable economic input in these localities. There is a more structured manner of explain the preference mechanism behind the essence of the cultural effect recorded by Inglehart as a kind of culturally driven spatial sorting. This is the relationship between spatial sorting and cultural belonging. Inglehart and Welzel (2005,

2010) demonstrates that culturally close groups of people tend to locate close to each other. This idea has been revisited and augmented in many significant economic contributions such as Arrow (1951, 1963), Axelrod (1997), Schelling (1696, 1978) and ultimately postulates that there is a link between location and cultural milieu of values, i.e. the clustering of predominant local cultural preferences, which in short is a good approximation of local culture (for recent empirical inquiries in this direction see for example Kreiser et al., 2013).

Besides the obvious link between the notion of cultural corridor as a past point of cultural significance which can be associated with local cultural capital with a specific cultural gravity property, there is one more essential summing up observation from the above proposed reasoning. In specific, what seems to unite all mentioned main channels of impact is the nexus of human capital, migrating workers and in short – the cultural effect is exercised primarily on local labour force and thus it produces a secondary effect on local economic productivity.

This nexus points to an existing important interplay between the static and dynamic channels. The static channel – the cultural cost of migration – might be a cause for inefficient redistribution of human capital. Thus, places which are less endowed with cultural capital and incur lower cultural costs of migration may in time loose easier their human capital due to migration outflows under economic shocks. Thus, their cultural profile will also change slower if at all and their cultural isolation will remain for a long period (Fafchamps and Shilpi, 2009; Hall and Wiley, 2014). This will finally result in that higher traditionality will turn into a source for a vicious circle of impoverishment due to a loss of human capital and inability to attract new human capital as the local closedness of the encapsulated not-changing local milieu incurs higher cultural costs for migration to this place from human capital outside this locality (see cultural gravity index, dealing with cultural closedness, cultural milieu and cultural gravity effects Tubadji and Nijkamp 2015). Put differently, particular lack of cultural endowment might lead to the development of a negative cultural gravity in a locality and this can lead to a vicious circle for economic development of the place due to loss and lack of ability to attract new human capital. In the context of the cultural corridors: higher distance to the culturally vivid axis of the cultural corridor might lead to a cultural

encapsulation and result in a later period in concentration of lower human capital, lower gross value added and respectively ultimately lower share of local employment. And still the new capital locations exert agglomeration effects so this process is not completely deterministic, yet might be expected to have a strong path-dependence influence (see Bendar et al. 2012).

A Testable Model

We can summarize the above propositions into a testable CBD operational model for the proximity to a cultural corridor. Namely, we can examine the below model (1):

$$
\begin{aligned}
HC_{i(t-1)} &= \beta_1 CG_{it} + e_1 \\
HC_{it} &= \beta_2 HC_{i(t-1)} + \beta_3 GVA_{it} + + \beta_4 X_{1it} + e_2 \\
IS_{it} &= \beta_5 HC_{it} + \beta_6 X_{2i} + e_3 \\
Empl_{it} &= \beta_7 IS_{it} + \beta_8 GVA_{it} + e_4 \qquad (1)
\end{aligned}
$$

where *i*, denotes the particular locality, and $_t$ stands for the current historic period, while *t-1* denotes the period before the current immigration of external human capital to the locality; *HC* stands for the share of human capital in the locality, *GVA* denotes the gross value added understood as the investment potential in the locality; X_1 denotes a vector of the standard economic incentives for migration such as wage, cost of living etc.; *CG* is the source of cultural gravity; *IS* is the sectoral specialization, X_2 denotes the economic and natural endowments of the locality, *Empl* stands for local employment, and *e* denotes the standard error of the respective equation of the system.

The above model (1) depict that in a particular time and locality concentrates a certain type and level of human capital. In an Inglehart-Axelrod sense, certain human capital clusters around a particular cultural capital. And also (in Weberian tradition) it can be expected that this clustered human capital carries a culturally specific skill and occupation related preferences (equation 1). Thus, the once gathered human capital decides based on their skills and preferences how to exploit the local economic resources. At the next period, given their skills, the economic endowments, generated productivity and wage distribution this place starts to attract human capital from outside

as well (equation 2). Thus the locally generated and the attracted from outside human capital in the second period naturally determines together with the local economic endowments the economic structure of the place the sectoral specialization (equation 3)[6]. Next, local employment is a function of local sectoral specialization controlled for the local productivity of the human capital (equation 4)[7]. The source of cultural gravity in this context i.e. the cultural factor influencing the model can be approximated among others with the distance of a locality to a historic cultural corridor. This particular operationalization of model (1) is presented in the next section[8].

3 Empirical Analysis of the SEE CC Economic Impact

3.1 Database

To empirically address the essence of the hypothesis behind our model (1), we use two datasets, one of which is uniquely created for this research purposes. The first dataset, is the European University Institute (EUI) European Regional Dataset (ERD) which offers an unbalanced panel for Greece, Romania and Bulgaria on NUTS3 level for the period 1980 – 2011. From this dataset we obtain indicators about total employment, employment per sector and gross value added, on the basis of which we further obtain our main explanatory variables. The second dataset contains the estimated shortest distance from each NUTS3 region to the East Trans-Balkan South East Europe Cultural Corridor. This information was obtained by first finding the centroid of each NUTS3 region. Next, collecting the geo-location coordinates for each of the listed 280 items of the East Trans-Balkan South east Europe Cultural corridor. Finally, the shortest distance is estimated as distance from a

[6] The cultural diversity that occurs due to the inflow of people with different values creates a disruption of the local cultural milieu. Yet, till a tipping point is reached, when the local cultural milieu will no longer be predominant in decision making, the local culture will have a persistent effect.

[7] Local cultural gravity and its effect on interaction between culturally distant agents still influences the efficiency of local productivity by a dominant effect of local culture.

[8] This process might seem at first deterministic when considered for one period of time. But put in a dynamic perspective, the model (1) assumes that even if much slower than economic events take place, local culture will also evolve based on the cultural capital belonging to the incoming foreign capital. Migration is economically driven, but is strongly a subject to cultural gravity and interaction between cultures. Thus, the process of cultural change is determined by the culturally driven reallocation of human capital between localities. According to cultural gravity, a more culturally open milieu will change faster, but will also attract more human capital and this develop into an important centre of development, and if it stays open the effect may persist, while if it turns towards over-dominance (which normally is the threshold of every power-accumulating entity (the 'empire effect'), this will less human capital concentrating in this locality and gradually the locality will lose its economic power. Thus a break in the chain of the persistence of the cultural effect on local development will happen in this locality.

point (the NUTS3 centroid) to a poly-line (formed by the geo-locations of the cultural corridor items). The source of the elements of the corridor is the South East Europe Cultural Corridor website www.seecorridors.eu, and their geo-locations were identified and hand-collected from google maps, which provides the longitude and latitude either of the particular fortress for example or the nearest geographic location identifiable.

Next, in order to obtain sector specialization we implement several transformations of the EUI variables. Namely, as in Angulo et al. (2015), we obtain the local shares of sectoral employment as a ratio of the share of total employment in this locality, using the formula:

$$SI = (Es/Est)/(Er/Et) \quad (3)$$

where *SI* represents the specialization index, *Es* stands for local employment in the given sector of interest, *Est* represents the employment in this sector in the country; *Er* stands for total local employment in all sectors and *Et* denotes total employment in the country. Using the sectoral indices, for every sector, we construct a dummy variable, equal to 1 when the SI index for the specific sector exceeds 1. That is how we ultimately have available as regressors six dummy variables denoting specialization in respectively: *si_agri_d* - agriculture, *si_ind_d* - industry excluding manufacturing, *si_constr_d* - construction, *si_trade_d* - wholesale, retail, transport and distribution, communications, hotels and catering, *si_fin_d* - financial and business services, and *si_non_m_d* - non-market services.

The overall number of observations in our final compiled dataset ammounts up to 2850 observations covering the period 1980 – 2009 for Greece and the period 1990 – 2009 for Bulgaria and Romania. Each year is fully informed for all NUTS3 regions of the three countries. The years of the crisis after 2009 are excluded due to the specific shock conditions that might bias the results (this especially with view of the fact that 2009 was the benchmarck year for the crisis related developments that happen in Greece). The next section presents how we plan to approach this data as a pooled dataset in order to test the main hypotesis behind our mode (1).

3.2 Estimation Strategy

The data that we have allows us to test the main hypothesis underlying our model (1). To sum it up, the working hypothesis on which model (1) is based can be stated as:

H01: In a particular moment in time, the historic cultural factor still (even if moderated by the immigration in the locality) affects local sectoral specialization in a locality in the current moment and thus ultimately partially predicts the level of employment in this locality.

For testing our hypothesis and obtain a robustness check of the results, we will subject the hypothesis to two alternative methods of estimation (i.e. applying the Cambridge recommended mixed-method of triangulation, see Downward and Mearman (2007)). We will first use an instrumental variable approach with 2SLS and second, we will conduct several types of propensity score matching and difference in differences in order to identify the impact of culture on local employment.

In particular, the 2SLS IV will have two alternative operationalizations. The first operationalization, following the trade and home bias rationale, we will use the distance to the cultural corridor as an instrument for the culturally biased specialization in trade and we will conduct a just-identified 2SLS estimation of this specification. As a second alternative, following a Weberian proposition that through culturally driven occupational preference actually all sectoral specializations are proxies of local cultural preferences bias, we use all the dummy variables for specialization in all sectors as instruments for distance to the cultural corridor, which will be used as a regressor, together with local gross value added, aiming to explain local level of employment. This second alternative represent an over-identified 2SLS estimation with 6 instrumental variables for the culture related regressor distance to the cultural corridor.

Finally, we still triangulate the results obtained through the 2SLS by using propensity score matching and difference in differences approach. We define distance to the cultural corridor in three alternative ways – as up to 10km (treatment 1), up to 15km (treatment 2) and up to 20km (treatment 3). We use a probit model to estimate the propensity of levels of employment and for difference in differences – the propensity of the differences between each two consecutive years for each NUTS3 region available in our dataset (1 year difference defining the before and after state in our data set).

Next, we match the scores alternatively for the three treatments using comparison-wise the matching methods: nearest neighbour matching, kernel matching and stratified matching, presenting in addition a simple t-test and test with control variables and common support intervals.

In all types of estimations conducted, both IV and propensity score related, we always use controls for year, country and capital city.

4 Results

The first glimpse at the data is presented in summary statistics format, as seen in Table 1a below. Sharing a mean and standard deviation that are going close, total employment (emp_t) and gross value added (gva) explain almost completely each other. This means that the rest of the variables are a suitable field for our intended investigation for the additional cultural impact.

+++ insert Table 1a about here +++

Our first part of the empirical analysis uses 2SLS instrumental variable approach. The main motivation behind using instrumental variable is that we attempt to explain a model where total employment is explained by economic capital (approximated with gva) and economic structure (our sectoral index dummies). But, both total employment and sectoral employment according to the Weberian claim for cultural impact on productivity and occupational choice are culturally endogenous. Therefore, we need to extract the cultural bias from the regressor – the sectoral specialization – by finding an instrumental variable related to this regressor but not with the error term of the regression itself. Our strategy is to use the distance to a historical corridor – the East Trans-Balckan cultural corridor in specific. As we know from urban economics, distance to the urban centre is one of the main determinants of the economic specialization of production. Next, specialization is related to occupational choice and besides natural endowments occupational choice in a locality depends on the cultural preference. Thus, if there indeed are traces of cultural persistence they might be a reason for enough correlation between the past and present centres of development and therefore the distance to the cultural corridor might be expected to be correlated

with the urban centres today. As we see from Table 1b, such correlation exists indeed Yet, it is not that high, indicating that while cultural impact is not completely determining the process.

+++ insert Table 1b about here +++

To identify our 2SLS IV model we again consider Table 1b. As we see, we have positive and relatively good correlation only between specialization in trade and distance to the cultural corridor. Theoretically, however, we could expect that all the specialization variables are related with this distance. Therefore, we follow alternatively first the statistical and then the theoretical rationale in order to be sure that our estimation model is not under-identified theoretically. Put differently, first we use a just-identified 2SLS IV model, where distance to culture is the instrument for the only statistically seemingly (from Table 1b) likely to be endogenous to culture (together with the historic variable of distance) specialization of trade. If however the theoretical claim that all specialization is culturally endogenous is true, then we might be venturing an under-identification problem with more endogenous variables than instruments. That is why, alternatively, second, we estimate the same model of total employment explained by gva and cultural impact on occupation and specialization, but this time the latter is approximated directly with distance to the cultural corridor. The dummy variables for specialization are used here only as instruments for distance to the cultural corridor. We can statistically and theoretically afford this specification, because gva already almost completely explains the total employment and also specialization might explain total employment but not the other way around, which is the first reason why we use the specialization as a regressor on the right hand side. Thus, our alternative specification of a 2SLS IV is an over-identified, theoretically consistent and statistically reasonable one.

The success up to which we have managed to tackle the potential problems around our instrumental variables and their suitability for the model is further examined afer the main estimations with the standard tests: Hausman test for endogeneity (comparing the OLS and the IV estimates), the B-W-H tests for exogeneity (checking if cov(xe) is different than 0), and over-identification test for the second alternative where we have more than one instrumental variable. Additionally, weak instruments tests were conducted as the correlations, especially between some of the specialization

dummies and the distance variable are low. Last test here was to conduct a special probit based instrumental variable estimation for the case when our dependent endogenous regressor is a dummy for trade specialization (i.e. for our just identified specification). The main IV estimation results and the mentioned post-estimation tests are described in detail below. Table 2 presents the just-identified specification where distance to the cultural corridor is an instrument for specialization in trade. Table 3 presents the alternative over-identified specification, where distance to the cultural corridor is instrumentalized with the six dummy variables for specialization.

+++ insert Table 2 about here +++

As we can see from Table 2 above, first in OLS and then in a just-identified 2SLS IV specification, when we regress total employ on gva, the impact of gva is strongly statistically significant and positive. The impact of sector spacialization varies, however, and especially after the instrumentalization of specialization in trade with the distance to the cultural corridor, the effect from specialization in trade on total employment changes sign and becomes negative. This is a clear indication that indeed specialization in trade is culturally endogenous. The impact from the other specializations remains relatively stables across methods, only specialization in agriculture loses its significance under the IV procedure. For the remaining sectors: specialization in construction is stable positive factor for total employment, while specialization in finance, non-market activities and industry have a stable negative association with total employment indifferent of the involvement of our instrumental variable. These results are plausible, as post-communist period was marked with a decline of industry in Romani and Bulgaria, and respectively outflow of employment, while the other two sectors are respectively underdeveloped (the financial sector) and traditionally lower paid (non-market services) and therefore is natural to be associated with a negative effect on total employment in the countries of interest. Meanwhile, we have year, country and capital city controls, where the latter has a strong positive association with employment which is a good sign for the reliability of our results, capturing the expected agglomeration biases. The

main conclusion from this exercise is that indeed economic structure is culturally embedded, ie. Culturally endogenous and biased process[9].

The post-estimation tests for endogeneity also support the need for instrumentalization of specialization in trade with distance to the cultural corridor and find an F-statistics quite above 10 (194) which indicates that distance to the cultural corridor is not a weak instrument. Still, we are alerted by the loss of significance of specialization in agriculture in the presence of the instrument, which might mean that other specialization dummy, besides the trade related one, is endogenous to culture, even if the statistical characteristics of the agricultural variable do not suggest that. To secure triangulation of our results, in spite of the lack of correlation between distance to the cultural corridor and specialization in trade, and still having in mind that agriculture is the traditionally important in urban economics models sector and the Weberian hypothesis for cultural impact on occupational choice per se, we infer an over-identified alternative to the same model, by switching the place of endogenous factor under investigation and instruments from the first specification presented in Table 2. Table 3 presents the new over-identified specification results.

+++ insert Table 3 about here +++

Table 3 above presents an OLS and then a 2SLS IV estimation, where total employment is regressed on gva and distance to the cultural corridor and the distance is instrumentalized with the dummies for sectoral specialization. This over-identified specification presents the exact same results as the just-identified specification from Table 2 with regard to the relationship between total employment and gva, as well as the control variables year, country and capital city. The difference is however in the effect of the distance to the cultural corridor on total employment. As we see, this regressor changes sign after instrumentalization, which supports the endogeneity, but it has no association with the dependent variable total employment. This is actually a sign that indeed distance to the cultural corridor is a very good instrument in the setting of the just-identified specification. Moreover, this result demonstrates that there is no direct cultural persistence effect.

[9] The estimations with a probit model and instrumental variable were consistent as economic interpretation with the here presented results. Still, we would like to compare Table 2 and Table3 , and the latter over-identified specification follows the OLS, 2SLS presentation, therefore we present here the OLS vs 2SLS results for the just-identified specification as well.

The cultural impact exists only as a latent path dependence driver of a Weberian effect on specialization in trade. Yet, our post-estimation tests for endogeneity and over-identification as well as the weak instrument tests all perform satisfactorily. This means that still there is a reasonable support for the theoretical claim of Weber for specialization and culture relationship per se. Yet, this also means that our results based on the 2SLS need further empirical triangulation. That is why we direct ourselves towards the implementation of another endogeneity suitable estimation method: propensity score matching combined with difference in differences approach.

The propensity score matching is a method that will allow us to analyse the average effect of the distance to the cultural corridor (which is our treatment) for the total employment in the NUTS3 regions under investigations (which is the output). We divide these regions into two groups according to a maximal distance to the corridor. Regions within this maximal distance are considered as having received the treatment, the rest fall into the category of a control group. We try three alternative maximal distance definitions (10km, 15km and 20km), which are respectively noted as treatment 1, treatment 2 and treatment 3. The latter are three alternative quantifications of the distance to the cultural corridor as a treatment effect for local employment. The aim is to estimate a probit model $p(x) = prob(D = 1|x) = E(D|x)$, where x is a vector of the relevant characteristics of the regions such as gva and sector specialization. As we have observational data (and not a controlled experiment) it is essential that our matching is done on the basis of x and not only the output variable only). Put differently, we want to match NUTS regions that are comparable not only as output but also as gva and regional characteristics of the economic structure[10]. The matches for the treated observations among the propensity scores of the controlled observations and their characteristics will also be done only within a certain common support interval, meaning we restrict the comparison range and we will consider only the propensity levels inside the interval in which we have observations to match on. Under this setting, we will use three alternative methods of matching: nearest neighbour (identifying the closest propensity score for the treated observation among the controlled ones given the x characteristics), Kernel matching (which takes all propensity

[10] As mentioned previously, controls for year, country and capital city were used across all specifications.

scores, weighting then according to their best matching to the propensity score of the treated observation) and stratified matching (where the matching is done only with those control observations within the same strata as the treated observation in terms of propensity score stratification). Tables 4a,b&c depict the way treatment and control groups are statistically characterized under the three alternative definitions for maximal distance from the cultural corridor treatments 1,2 &3 respectively.

+++ insert Table 4a&b&c about here +++

As we see from Table 4a,b&c, the treated group always has higher total employment, under lower gva than the control group and has higher specialization in trade, construction and financial services than the control group, while agricultural specialization is the same level for both treated and controlled groups. The latter might be explained with the fact that agriculture depends on the availability of land, while the other specializations are more a question of occupational choice preferences than physical endowments of the place. We also notice that the differences increase when we increase the maximal distance, but this might mean mostly that our number of controls will be decreasing as well as our common support interval. Yet, it also means that the distance to the cultural corridor is likely to be of significance for the propensity of total employment. At a next step we estimate the propensity scores for total employment controlled for the x characteristics (gva and sectoral specialization dummies) and the relevant year, country and capital city controls, and implement the three types of matching: nearest neighbour, Kernel and stratified matching, presented by treatment 1, treatment2 and treatment 3 in Table 5 below.

+++ insert Table 5 about here +++

Table 5 presents both a simple t-test where matching is based only on propensity scores, and a test where the propensity is controlled for the x vector of variables. Moreover, Table 5 presents the one period and two period (difference in differences) results. Namely, the first estimation looks on the available data as a pooled cross-section of treated and not treated regions and considers the level of total employment as an outcome variable. For the difference in differences estimation we take as an

outcome all the difference in total employment within 1 year for every year for which data is available in our dataset.

When matched on propensity score and x variables, as seen from column 1 in Table 5, we observe high positive significance of the treatment effect on total employment, which on average amounts to about 14, 15 and 30 thousand more employed people per treated region and this varies depending on method and treatment definition. This means that the regions closer to the cultural corridor experience higher level of total employment. Moreover, we see an interesting effect that with increase of the maximal distance actually we observe an increase of the effect, which means that there are no traces for the diminishing of the effect with distance. Put differently, the effect is very robust and better captured when a bigger sample is analysed as a treated group.

The difference in differences results in column 2 of Table 5 point to another interesting observation. The change in employment, i.e. the employment growth, is again significantly, but this time negatively associated with the treatment effect. This means that while enjoying higher total employment, these regions which are closer to the cultural corridor experience slower growth of employment. This evidence, if read from the perspective of entrepreneurial cultural milieu, which claims that in broader sense, past centres of productivity predict current centres of productivity and employment, we can interpret the observed results as an evidence for an economic life cycle of the regions. The regions closer to the cultural corridor are with higher employment as a long path dependent process of past times of productivity in a close distance. In a sense they experience a 'cash cow' life cycle stage, where their total employment is highest due to accumulated past history of socio-economic development. The newly growing centres of employment are elsewhere but they are still in developing stage and therefore still lag behind the cash cow life cycle regions. Put in further perspective, our result is supporting that culture is a source of certain persistence chain[11] (distance to the cultural corridor is associated with higher total employment) but there is a slow

[11] Persistence chain is termed a chain for analogous reasons as the term Markov chain, in the sense that a persistence chain characterizes a persistent process during a limited period of time. The economic processes happen much faster than social change. Thus the value change for a certain period of time is negligible. During this period a persistence-similar process endures. Put differently, in a cross-sectional environment a persistence effect can be traced due to the persistence chains existence. However, in a time-series or a panel environment with a long enough period of observation so that cultural change is captured (over 20 years – see Hausman 2014), then several path-dependence chains can be observed which actually build up the path-dependence phenomenon of cultural impact.

trend of change captured with the slower growth of employment in the treated regions, which means that over time new foci of socio-economic development might emerge, which are currently still accumulating socio-economic conditions that will trigger the new socio-economic geography only with a path-dependent character of their local development.

In general, our last result is consistent with the fact that the main assumption regarding the treatment effect significance (which we observe with regard to distance to the cultural corridor) and this is the assumption of partial equilibrium (see Nijkamp, 2007). In other words, the cultural treatment of interest does not directly control the observations, but conditional on independent current development assumptions, still holds as a factor of influence on total employment in the regions[12].

As a final comment on the robustness of the results, we should note that our common support interval is pretty big, which means we can use almost the whole control group for the matching exercise. This common support naturally decreases when we enlarge the treatment group, but it is interesting that the interval decreases first from above (when we increase the definition of maximal distance to the cultural corridor from 10kn to 15km) and then the interval decreases from below (when we increase further from 15km to 20km for treatment 3). This, even though remotely, can still be a sign for the dying off of the cultural effect, where the leading and the worst performing regions of the treated group do not find easily a match among the control group. Put differently, there are both 'cash-cows' and 'falling stars' life cycle regions among the treated regions.

Thus, our propensity score matching and difference in differences estimations had two functions. They triangulated and supported the results from the 2SLS IV estimations, confirming the cultural effect from distance to the cultural corridor on the local total employment. And also, they provided further insight on the pattern of cultural impact, which is characterized as a path-dependence related to social change and a chain of economic development, rather than to a fixed deterministic persistence effect. Never the less, the effect of the distance from the cultural corridor, in a fixed

[12] The other three assumptions of unconfoundedness (treatment doesn't act on the control group), overall existence assumption (i.e. there are suitable matches) and balancing assumption (comparable amount of matches per observation) are within acceptable margins of fulfilment with our data, though not in an ideal degree (especially with regard to the balancing assumption). Still, we implement robustness control and the reults overall consistency is a sign for a general reliability of the results.

moment in time and space, even if only a path dependent (persistence chain only) effect, is still a very strong predictor of local output. A spatial panel exploration or a generalized method of moments (GMM) panel estimation with varying cultural component can be possible continuations that will cast further light on the here reported findings regarding the cultural impact mechanism of persistence chains.

5 Conclusion

The current paper offers an innovative quantification of the cultural factor by adapting the cultural corridor definition to the Culture Based Development concept and its understanding of culture as a factor variable capturing the cultural milieu and related cultural assets clustered in a locality over time. Providing argumentation the conceptual acceptability of this quantification and using it for exploring the cultural effect on local employment in Greece, Bulgaria and Romania brings evidence in support to the generally accepted notion in economics – usually tested in other geographic localities – that culture matters. Thus, our study is both consistent with existing evidence and innovative in terms of its quantification approach and selected geographic area of analysis. Put differently, our results support our working hypothesis and demonstrate that the distance to the East Trans Balkan cultural corridor is associated with economic benefits (in terms of employment gain) for the regions with higher proximity to the corridor.

Meanwhile, interesting insights about the cultural effect as a process are evolving from the conducted analysis. First, sector specialization and past cultural development are confirmed to be both culturally endogenous which support the genera place-based development hypothesis and its relationship to the notion of local culture. Second, our results caution against a cultural determinism approach and rather suggest a cultural persistence chain (path dependence) to be viewed as the likely process describing the cultural impact on place development. Third, but especially interesting, is that it seems that the place socio-economic life-cycle is associated with historic cultural centres as a treatment effect. This means that indeed for a certain period of time the established cultural, socio-economic centres keep being source of culturally dependent prominence

of these localities and their closest vicinity, but social change, even if much slower than economic processes, still does take place and newly emerging social and economic centres are likely and possible to develop. Finally, fourth, the change and cultural impact on place development is highlighted as dependent directly not on the geographic proximity to the cultural corridor, but to the cultural choice approximated here with sectoral (and occupational) Weberian type of preference.

In addition, the consistent results over methods and specifications from this paper are inspirational for further work dealing with cultural impact on socio-economic development and in particular, development in the SEE region. Namely, the current work might be an interesting foundation for more methodological triangulations and inferences for the distance to the cultural corridors in South East Europe and elsewhere where cultural corridors exist. Furthermore, the current results give rise to questions for the effect of the distance to the cultural corridors in South East Europe with regard to other supposedly culturally sensitive processes as migration and innovation, the first giving rise to the shrinking regions phenomenon in these geographical areas and the second being a main source for economic growth and development per se.

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Table 1a: Basic descriptive statistics of the compiled dataset

Variable	Obs	Mean	Std.Dev.	Min	Max
emp_t	2850	130.097	140.24	2.075	1124.790
loc_size	2850	0.024	0.02	0.003	0.165
sitrade_d	2850	0.379	0.49	0.000	1.000
gva	2850	235.699	325.52	10.770	4756.740
siagr_d	2850	0.526	0.50	0.000	1.000
siconstr_d	2850	0.384	0.49	0.000	1.000
siind_d	2850	0.445	0.50	0.000	1.000
sifin_d	2850	0.259	0.44	0.000	1.000
sinon_m_d	2850	0.474	0.50	0.000	1.000
capital	2850	0.014	0.12	0.000	1.000
country_d_bg	2850	0.196	0.40	0.000	1.000
country_d_gr	2850	0.509	0.50	0.000	1.000
distance~ast	2850	163623.400	185309.90	87.700	663000.000

The table presents descriptive statistics for the main explanatory variables used in our nalysis, namely: emp_t – total employment, loc-size – number of people in a locality, gva – gross value added; sitrade_d – dummy variable for specialization in trade; siagri_d – dummy variable for specialization in agriculture; siconstr_d – dummy variable for specialization in construction; siind_d – dummy variable for specialization in industry; sifin_d – dummy variable for specialization in finance; sinon_m_d – dummy variable for specialization innon-market services; capital – dummy variable for capital city; country_d_gr – dummy variable equal to 1 if country is Bulgaria; country_d_gr – dummy variable equal to 1 if country is Greece; distance_to_east – calculated distance from centroid of NUTS3 to the polyline composed of the geo-data of the points contained in the East Trans Balkan cultural corridor.

Source: Authors' calculations.

Table 1b: Correlations between main variables

	dist~ast	sitrad~d	siagr_d	sicons~d	siind_d	sifin_d	sinon_~d
distance~ast	1						
sitrade_d	0.21	1					
siagr_d	0.06	-0.49	1				
siconstr_d	0.13	0.26	-0.36	1			
siind_d	-0.37	0.11	-0.42	0.06	1		
sifin_d	0.11	0.08	-0.24	0.01	0.05	1	
sinon_m_d	-0.12	-0.05	-0.27	0.08	0.22	0.41	1

The table presents the correlation coefficients between the culturally endogenous variables (dummy variable for sectoral specialization listed in table 1a) and the intended instrumental variable – distance to the cultural corridor (described in detail in Table 1a).

Source: Authors' calculations.

Table 2: 2SLS IV – Just-Identified Specification

	OLS		2SLS			
dep.var.	emp_t		sitrade_d		emp_t	
	coef.	t-value	coef.	t-value	coef.	z-value
sitrade_d	14.2	5.34	-	-	-35.2	-3.26
gva	0.2	48.27	0.0002	8.97	0.2	42.60
siagr_d	27.7	9.30	-0.474	-25.79	3.6	0.60
siconstr_d	14.0	5.67	0.052	3.09	17.4	6.44
siind_d	-8.2	-3.28	0.022	1.25	-10.4	-3.90
sifin_d	-12.2	-4.29	-0.036	-1.86	-12.9	-4.29
sinon_m_d	-11.2	-4.51	-0.159	-9.48	-20.4	-6.26
distancetoeast	-	-	8.53E-07	14.25	-	-
capital	409.6	39.01	0.270	3.76	421.4	37.21
country_d_bg	-111.6	-34.96	-0.021	-0.98	-113.5	-33.56
country_d_gr	-223.4	-78.59	-0.167	-6.92	-221.6	-73.50
_cons	167.8	25.92	0.474	10.89	195.6	21.74
Year dummies	Yes		Yes		Yes	
F (or chi)	(38,2811) = 384.84		(38,2811) = 43.46		chi2(38) = 13195.83	
Prob>F (or Prob>	0.0000		0.0000		0.0000	
R-squared	0.8388		0.3701		0.8191	
Adj R-sqaured	0.8366		0.3615		-	
Root MSE	56.69		0.3877		59.644	
N	2850		2850		2850	
***D-W-H test for endogeneity						
	-		Durbin	chi2(1) = 25.1715		(p =0,0000)
			Wu-Hausma	F(1,2810) = 25.0394		(p =0,0000)
***exogeneity test - ols residual						
	-			F(1,2818) =	236.38	
				Prob>F =	0.0000	
***weak instruments test - estat						
	-			Robust F(1,2811)	Prob>F	
				194.2	0.0000	

The table presents the results from a 2SLS IV estimation where the endogenous variable is specialization in trade in the region and the instrument for this is the distance to the East Trans-Balkan cultural corridor. Post-estmation tests for endogeneity and weak instruments are presented.

Source: Authors' calculations.

Table 3: 2SLS-IV Over Identified Specification

	OLS		2SLS			
dep.var.	emp_t		distancetoeast		emp_t	
	coef.	t-value	coef.	t-value	coef.	z-value
distancetoeast	-7.01E-06	-0.80	-	-	0.0000241	0.00
gva	0.2	44.89	-45.8	-5.55	0.2	42.33
sitrade_d	-	-	78972.2	14.25	-	-
siagr_d	-	-	20841.2	3.36	-	-
siconstr_d	-	-	13310.7	2.59	-	-
siind_d	-	-	-75085.5	-14.38	-	-
sifin_d	-	-	27878.8	4.71	-	-
sinon_m_d	-	-	-15510.3	-2.99	-	-
capital	413.6	38.96	-53412.7	-2.44	407.2	35.23
country_d_bg	-119.2	-35.85	-16972.9	-2.55	-112.4	-30.49
country_d_gr	-216.8	-59.20	235539.2	39.81	-270.6	-38.52
_cons	184.6	31.65	60851.5	4.52	174.0	27.00
Year dummies	Yes		Yes		Yes	
F (or chi)	0.0000		0.0000		0.0000	
Prob>F (or Prob	(33,2816) = 391.93		(33,2811) = 111		chi2(33) = 11013.4	
R-squared	0.8212		0.6001		0.7862	
Adj R-sqaured	0.8191		0.5947		-	
Root MSE	59.646		118000		64.836	
N	2850		2850		2850	
***D-W-H test for endogeneity						
	-		Durbin	chi2(1) = 103.52		(p =0,0000)
			Wu-Hausma	F(1,2815) = 106.102		(p =0,0000)
***exogeneity test - ols residual						
	-			F(1,2813) =	960.09	
				Prob>F =	0.0000	
***overidentification restrictions						
	-		Hansen's J	chi2(5) = 163.192		(p = 0,0000)
***weak instruments test - estat						
	-		Robust F(6,2811)		Prob>F	
				79.7469	0.0000	

The table presents the results from a 2SLS IV estimation where the cultural factor impact (approximated with the distance to the East Trans-Balkan cultural corridor) is instrumentalized with the sectoral specialization across regions. Post-estmation tests for endogeneity and weak instruments are presented.

Source: Authors' calculations.

Table 4a: Descriptive Statistics for Distance to Cultural Corridor – Treatment 1 (10km)

	treatment1	Freq.	Percent		
	0	2,755	78.51		
	1	754	21.49		
	Total	3,509	100		
Variable	Obs	Mean	Std.	Dev.	Min
treatment1	0				
emp_t	2330	115.8802	121.785	2.075	908.895
gva	2330	246.7625	318.6188	13.145	4756.74
sitrade_d	2755	0.482396	0.499781	0	1
siagr_d	2755	0.615608	0.48654	0	1
siconstr_d	2755	0.479855	0.499685	0	1
siind_d	2755	0.474773	0.499454	0	1
sifin_d	2755	0.380762	0.485662	0	1
sinon_m_d	2755	0.550635	0.49752	0	1
capital	2755	0.010526	0.102075	0	1
country_d_bg	2755	0.126316	0.332265	0	1
country_d_gr	2755	0.536842	0.498731	0	1
treatment1	1				
emp_t	520	193.801	190.8637	43.955	1124.79
gva	520	186.1277	350.8864	10.77	2718.31
sitrade_d	754	0.543767	0.498411	0	1
siagr_d	754	0.611406	0.487754	0	1
siconstr_d	754	0.572944	0.494979	0	1
siind_d	754	0.820955	0.383645	0	1
sifin_d	754	0.462865	0.49895	0	1
sinon_m_d	754	0.65252	0.476486	0	1
capital	754	0.038462	0.192435	0	1
country_d_bg	754	0.615385	0.486827	0	1
country_d_gr	754	0	0	0	0

The table presents descriptive statistics for the treated (treatment 1 = 1) and control (treatment 1 = 0) groups for the case when treatment (treatment 1) is defined with maximal distance from the East Trans-Balkan cultural corridor equal to 10 km.

Source: Authors' calculations.

Table 4b: Descriptive Statistics for Distance to Cultural Corridor – Treatment 2 (15km)

	treatment2	Freq.	Percent		
	0	2,523	71.9		
	1	986	28.1		
	Total	3,509	100		
Variable	Obs	Mean	Std. Dev.	Min	Max
treatment2	0				
emp_t	2161	108.936	115.4554	2.075	908.895
gva	2161	251.9512	328.1005	13.145	4756.74
sitrade_d	2523	0.473643	0.499404	0	1
siagr_d	2523	0.60761	0.48838	0	1
siconstr_d	2523	0.48474	0.499866	0	1
siind_d	2523	0.472057	0.499318	0	1
sifin_d	2523	0.382085	0.485993	0	1
sinon_m_d	2523	0.544986	0.498071	0	1
capital	2523	0.011494	0.106614	0	1
country_d_bg	2523	0.114943	0.319016	0	1
country_d_gr	2523	0.574713	0.494485	0	1
treatment2	1				
emp_t	689	196.4683	183.7713	43.955	1124.79
gva	689	184.7262	312.0946	10.77	2718.31
sitrade_d	986	0.551724	0.49757	0	1
siagr_d	986	0.63286	0.48227	0	1
siconstr_d	986	0.53854	0.498766	0	1
siind_d	986	0.74645	0.435264	0	1
sifin_d	986	0.440162	0.496659	0	1
sinon_m_d	986	0.643002	0.479357	0	1
capital	986	0.029412	0.169044	0	1
country_d_bg	986	0.529412	0.499388	0	1
country_d_gr	986	0.029412	0.169044	0	1

The table presents descriptive statistics for the treated (treatment 2 = 1) and control (treatment 2 = 0) groups for the case when treatment (treatment 2) is defined with maximal distance from the East Trans-Balkan cultural corridor equal to 15 km.

Source: Authors' calculations.

Table 4c: Descriptive Statistics for Distance to Cultural Corridor – Treatment 3 (20km)

	treatment3	Freq.	Percent		
	0	2,320	66.12		
	1	1189	33.88		
	Total	3,509	100		
Variable	Obs	Mean	Std.Dev.	Min	Max
treatment3	0				
emp_t	2012	98.62157	98.54083	2.075	528.321
gva	2012	250.8117	332.9956	13.145	4756.74
sitrade_d	2320	0.4625	0.498699	0	1
siagr_d	2320	0.6125	0.487284	0	1
siconstr_d	2320	0.469397	0.49917	0	1
siind_d	2320	0.45	0.497601	0	1
sifin_d	2320	0.383621	0.486372	0	1
sinon_m_d	2320	0.530603	0.49917	0	1
capital	2320	0	0	0	0
country_d_bg	2320	0.0875	0.282627	0	1
country_d_gr	2320	0.6125	0.487284	0	1
treatment3	1				
emp_t	838	205.6693	188.4474	27.788	1124.79
gva	838	199.4151	303.9831	10.77	2718.31
sitrade_d	1189	0.560135	0.49658	0	1
siagr_d	1189	0.619008	0.485835	0	1
siconstr_d	1189	0.559294	0.496681	0	1
siind_d	1189	0.742641	0.437363	0	1
sifin_d	1189	0.42725	0.494887	0	1
sinon_m_d	1189	0.654331	0.475786	0	1
capital	1189	0.048781	0.215499	0	1
country_d_bg	1189	0.512195	0.500062	0	1
country_d_gr	1189	0.048781	0.215499	0	1

The table presents descriptive statistics for the treated (treatment 3 = 1) and control (treatment 3 = 0) groups for the case when treatment (treatment 3) is defined with maximal distance from the East Trans-Balkan cultural corridor equal to 20 km.

Source: Authors' calculations.

Table 5: Propensity Score Matching & Diff in Diff - Distance to Cultural Corridor as a Treatment for Total Employment

Treatment 1				
Est. method	Difference using 1 period data		Differences using 2 period data	
T-test	77.9208	*	-1.922724	*
Reg. , dummy&controls	9.497868	*	-2.044036	*
ATT nearest neighbour	3.587	*	-3.056	*
ATT Kernel matching	14.166	*	-2.191	*
ATT Stratified Matching	14.696	*	-2.278	*
common support				
	[.05320394,	.99136058]	[.05320394,	.99136058]
Treatment 2				
Est. method	Differene using 1 period data		Differences using 2 period data	
T-test	87.53229	*	-2.314724	*
Reg. , dummy&controls	17.22185	*	-1.762348	*
ATT nearest neighbour	15.366	*	-1.806	
ATT Kernel matching	15.28	*	-1.494	*
ATT Stratified Matching	15.254	*	-1.402	
common support				
	[.00913926,	.79163732]	[.00913926,	.79163732]
Treatment 3				
Est. method	Differene using 1 period data		Differences using 2 period data	
T-test	19.8	*	-1.496572	*
Reg. , dummy&controls	25.48063	*	-1.043016	
ATT nearest neighbour	34.522	*	-1.161	
ATT Kernel matching	30.381	*	-0.628	*
ATT Stratified Matching	38.504	*	-0.892	*
common support				
	[.02287165,	.88621778]	[.02287165,	.88621778]

The table presents the coefficients and significance level for the treatment, analysed with alternative methods for estimating the average treatment effect on the treated. The methods presented: t-test (repressing directly outcome on the propensity), a simple regression with controls, and next are the propensity score matching implemented with the methods: nearest neighbour, Kernel matching and stratified matching. The first column presents one period observations. The second column presents the difference in differences estimation for a change in employment over one year. The common support represents the interval of propensity within which the matching is implemented All propensity score matching implementations involve controls for sector specialization and gva on the NUTS3 level.

Source: Authors' calculations.