Cultural Corridors: An Analysis of Persistence in Impacts on Local Development

A Neo-Weberian Perspective on South-East Europe

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Abstract

Culture matters for economic development. This postulate has been tested and confirmed in several quantitative studies on developed countries, such as the USA, Germany and Italy. In less developed regions with a wealth of cultural heritage, in particular South-East Europe, this postulate is still an underexplored issue from the perspective of advanced econometric approaches. The aim of the present paper is to examine the impact of so-called South-Eastern European cultural corridors on the welfare – and especially on total employment – at local or regional level. Next to gross value added and sectoral specialization, the effect from such corridors is examined   by considering the distance to a cultural corridor, namely, the East Trans-Balkan Road (crossing Romania, Bulgaria and Greece) as an explanatory factor for regional development – in particular, employment. Using the European University Institute (EUI) European Regional Dataset (ERD) as well as the geo-data from the Cultural Corridors of the South-East Europe website, we estimate a regression model using a 2SLS instrumental variable (IV) approach with a pooled dataset at a NUTS-3 level (Eurostat) during the period 1980 till 2011. Next, we triangulate our results by using the distance to the cultural corridor concerned as a treatment effect in a propensity-score-matching and difference-in-differences exploratory analysis. Our findings confirm the importance of distance to the cultural corridor under investigation as a strong predictor for local socio-economic development. Moreover, our results lead to a caution against a cultural-deterministic perspective, since, next to a persistence effect, we are also able to trace cultural impact effects, associated with place-development life-cycle trends. In conclusion, culture matters; in particular, its slow evolution over time is likely to lead to the gradual emergence of new geographical cultural centers and a new cultural path-dependence built-up of persistence chains.

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; Tubadji et al. 2014; Schuetz 2014; Alesina and Giuliano, 2015). However, the definition of culture, the conceptual perspective on its impact, and the operational mechanisms for empirically testing it vary widely, so that cultural impact reflects sometimes a fuzzy understanding of this important source of socio-economic development.

Cultural impacts on socio-economic development have, from a sociological angle, been envisaged by three distinct and often mutually contradicting schools of thought (see Beugelsdijk et al. (2006) for a more detailed presentation of these three 'schools' of thought). First, there is a Marxist perspective, which argues that culture is mainly a by-product of economic development and that initially economically less developed places are likely to achieve a similar level of cultural value development as more developed localities, once their economic welfare reaches the same level (see Marx, 1867).

The reverse perspective is found in cultural determinism, which regards culture as a determinant of initial developmental conditions, reflecting a source of a persistent effect over time and space (see Putnam 1994). Persistent effect refers here to an exogenously determined effect that, once occurring, acts like an initial condition and becomes a characteristic that continues to exist 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.

Finally, an intermediate approach can be found in the Inglehart (1977), Fukuyama (1992) and Hofstede (2001) sociology of culture, in which culture is interpreted as a locally-specific 'programming of the mind', which may or may not allow for certain developments under the same

socio-economic conditions. This is the path-dependence 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 essentially a product of a coordination game.

The above three paradigms have left profound traces in economic thinking. For example, a Marxist -oriented approach is often a basis for a total neglect of the relevance of cultural factors (Solow 1999; Glaeser 2001). In contemporaneous research, it tends to reoccur in a mild form in various studies on the economics of culture, where the focus of research lies on culture and artistic industries, often termed creative industries (but in a slightly different sense from Richard Florida's notion[1]); culture is here understood as a source of income, and its value creation function as a by-product and a positive spill-over of its production process. In the same vein, research on cultural tourism considers often cultural heritage as a source of a particular economic sector specialization and smart development (for related research, we refer to Throsby, 1994; van Duijn and Rouwendal, 2013; Abe, 2014; Campo and Alvarez, 2014).

Next, the cultural-deterministic approach can be found in a variety of modern historical-economic studies on culture, or even in modern econometric models using an instrumental variable approach. In this approach, a historical event – or the distance to a historically significant location – is interpreted as a factor with a direct economic meaning 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).

Finally, the Inglehart and Hofstede approach matches closely with what is known in economics as cultural relativity studies, where local socio-economic patterns vary due to different cultural values

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[1] Richard Florida (2002a,b, 2005) associates creativity with freedom to make a decision in one's practice. 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 refers to the artistic occupations, which are the object of economics of culture. These two notions are not necessarily disconnected, however, Florida claims that the concentration of Bohemians may prompt a concentration of workers from creative occupations. But the two notions are essentially definitionally different (see Moeller and Tubadji (2009) for more details).

and preferences, and where these preferences are understood as evolving over time on the basis of cultural interaction and/or migration. Illustrations of this stream of research can be found in: Tiebout (1956) – in particular, his notion of culturally-driven variety of public goods provision – the tunnel vision effects of poverty on preferences (Levine 1980); the Balassa-Samuelson price-effect model influenced by a home-bias driven inefficiency of trade markets (see Balassa, 1964; Samuelson, 1964), or in later research on the migration-diversity nexus (see, amongst others, Divino and McAleer, 2007; Ottaviano and Peri, 2005; Hudson, 2008; Vioglander and Voth, 2012; Tubadji and Nijkamp, 2014), as well as in more recent cultural transmission and proximity-related studies (see e.g. 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; Huggins and Thompson, 2015).

The present study belongs to the third stream of thought and is founded on the so-called Culture-Based Development (CBD) approach, which is a continuation of the Weberian understanding of local development as a function of spatially varying cultural attitude towards socio-economic development and progress. In general, CBD is a concept of individual and group cultural bias on human economic choice, resulting from the locally varying attitude influence on human preferences, which generates effects on individual and local socio-economic development in a persistent path-dependent manner (Tubadji, 2012, 2013; Tubadji and Nijkamp, 2014, 2015). The CBD conceptualization will here be applied to cultural corridors in the South-Eastern part of Europe. Thus, the focus of the research is not on a single point of interest, but rather on the distance to a cultural corridor, defined here as a vector of geographical centres of tangible and intangible cultural heritage dating back from different time periods. This CBD definition of culture will next be operationalized in the context of an explanatory 2SLS regression analysis complemented with an instrumental variable approach (and other relevant econometric methods). This CBD-inspired model is operationalized by employing a uniquely created geocoded database on

the South-Eastern European cultural corridors, which has been especially designed for our study. Our research addresses in particular the East Trans-Balkan cultural corridor, which passes through Greece, Bulgaria and Romania. The places, whose geo-locations were collected, have been explicitly selected and mapped by international expert groups of UNESCO, ICOMOS, the Council of Europe, and affiliated academic institutions. Thus, our statistical information originates from a refined historical and meaningful representation of the tangible and intangible cultural memory of relevant connected centres of socio-economic development in the past. Our aim is to explore the effect of this complex (accumulated over time) latent factor of cultural-historical significance on current local-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 may be undergoing its own evolution.

The structure of the present paper is as follows. Section 2 introduces the Culture-Based Development (CBD) definition for cultural corridors as a source of socio-economic development and a basis for the channels of impact on local employment and productivity, while it also formulates hypotheses on plausible positive or negative effects that can be expected from this particular source of cultural impact. Section 3 presents then our unique database containing geo-coded information about the East Trans-Balkan South-Eastern European Cultural Corridor (ETB SEE CC), and shows how it can serve to operationalize the CBD definition and to contribute to a manageable applied approach. Next, Section 4 provides our econometric estimation results and their interpretation. Finally, Section 5 offers concluding remarks on our empirical findings in the context of socio-economic development, cultural persistence, and regional development of 'urban centres' related to such cultural corridors.

2 Culture-Based Development: Cultural Corridors and Socio-economic Development

2.1 Definition of a Cultural Corridor

Culture-Based Development (CBD) is a recently emerged concept, targeted at explaining place-based development discrepancies and other economic irregularities/inefficiencies through their cultural bias on individual and aggregate economic choice or action. In particular, CBD defines culture as an entity composed of tangible and intangible cultural assets and expressions of values, which are additionally subdivided into living culture (observed in the current time period) and cultural heritage (generated in previous time periods) (see Tubadji 2012, 2013). This broader conceptualization of culture allows encompassing its different manifold aspects of a complex latently present entity, which is often associated with a locality or a particular ethnic group[2]. Empirically, CBD introduces culture as a latent variable, that is quantifiable as a vector of cultural components (generated, for example, by means of a principal component analysis (see Tubadji and Nijkamp, 2014)) or to be estimated through partial-least-squares path modelling and related non-parametric techniques (see Tubadji and Nijkamp, 2015). In the present study, we argue that the notion of a cultural corridor offers an interesting possibility for operationalizing the CBD concept in a geographic framework. A cultural corridor may provide an even more refined approach than the above mentioned statistical methods for a quantification of the latent notion of culture, since in our study the components of a cultural corridor were (qualitatively) selected by the expert opinion of cultural historians, architects and experts on local institutions of values and meaning.

The notion of a cultural corridor belongs to the realm of cultural historians and heritage experts. It has however, prominently found its place in international culture-oriented organizations, such as UNESCO, the Council of Europe, and ICOMOS[3]. Therefore, before addressing cultural corridors

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[2] It is plausible that a rather restrictive definition of culture, narrowed down to only one expression of culture (e.g., religion or arts), leads to incomplete information on this concept, and is therefore bound to lead to a biased estimation of the impact of culture on local development (see Tubadji, 2014). Clearly, a complete omission of the local cultural capital as a factor variable in an economic equation might lead to an even more serious bias of under-specification due to the elimination of information on a significant determinant of local development (see Tubadji, 2012, 2013, 2014)..

[3] Equally interestingly, from an empirical perspective, the same expert groups have implemented an impressively detailed and highly professional mapping of these cultural corridors for the case of the South-East European Region.

from a CBD perspective, we offer first the description given by the Council of Europe experts involved in the identification of the South-Eastern European cultural corridors: "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)[4]. 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)[5].

We can now offer a definition of a cultural corridor according to a CBD interpretation, as follows: "a vector of identified geographical locations of historically established and recognized centres, that cluster tangible and intangible cultural heritage as mutually connected carriers of memory for local meaning". By adopting this CBD definition of a cultural corridor, we can make several important assumptions on its expected impact, identifiable through this quantification of local culture.

It should be added that the expression 'centres' in our definition does not necessarily refer to urban centres, but may also include villages characterized by interesting types of church architecture as a result of local creative spirit and concentration of building construction talent. Clearly, the modern notion 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 may mirror the same, but then put and adapted in a historical perspective and context. The basic idea is that such centres function as pull and push forces of meaning and values that are essential for the socio-economic development in their times.

Operationally, a cultural corridor is defined in this study as a poly-line, formed by the precise latitudes and longitude points of nearly 280 locations of cultural points (including fortresses, important for craftsmanship villages, historic towns, churches and monasteries etc.). These locations were identified as the building elements of the East Trans-Balkan Road (one of the nine

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[4] See http://www.seecorridors.eu/filebank/file_272.pdf.
[5] The official website of the South East Europe Cultural Corridors provides another, slightly more precise and more informed 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#

South East Europe corridors defined by the ICOMOS team). The information about this corridor and the locations belonging to it, accompanied with detailed qualitative descriptions, were obtained from the website of the Cultural Corridors of South East Europe: http://seecorridors.eu/?w_p=23&w_l=2&w_c=6. The geo-coordinates of these physical locations were hand-collected for the purpose of this study from Google Maps.

After the above CBD interpretation of cultural corridors, the question arises: is there a persistence of tangible and intangible local development, or can local prosperity at a time be followed up by a local decline in a subsequent 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 or of cultural corridors as a whole. The next sub-section (Subsection 2.2) deals with an argumentation of these assumptions.

2.2 Cultural Corridor and its Mechanism of Impact

The notion of a cultural corridor expresses a deeply region-and-innovation related type of mechanism of impact by 'cultural milieu' on local development (see Jacobs 1961,Westlund et al. 2014, Trax et al. 2015, Huggins and Thompson 2015). Namely, local economic development is driven by a locally specific cultural attitude (in the form of: (a) social capital between people with homogenous attitudes to progress[6]; and (b) in the form of segregation resulting from clustering motivated with spatial proximity positive spill-over effects[7]. Naturally, culture-producing agent are attracted to economically prosperous places for the higher demand. However, as shown in numerous studies (see for most recent contribution Andersson et al. 2014), even when controlling for the demand factor, it is also the clustering of other artists that explains the concentration of artists in a locality. Thus, culture concentrates at places both due to their economic prosperity and due to their specialization as a cultural sector. The driver of economic development - innovation, on the other hand happens, especially destructive innovation, causes changes in the spatial concentration of economic growth. For instance, with the entering into the new Silicon-Valley-type

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[6] See Inglehart (1977), Inglehart and Welzel (2005, 2010) and Hofstede (2001).
[7] See on sorting Arrow (1951, 1963), Axelrod (1997), Schelling (1696, 1978), and on cultural proximity - Head and Ries, (2008), Diyarbakirlioglu, (2011), Cervellati et al., (2008), Cervellati et al., (2011), Kreiser et al. (2013)..

of innovation age, the economic significance of spatial foci of previous industrial economic development (such as mines) decline. The social capital however that they have concentrated and the artistic output and milieu that they have created remains at these now declining spatial foci as a form of capital – local cultural capital (as defined by Tubadji 2012, 2013). Naturally, the further back in time these foci are identified, the more pure measure of cultural capital they are nowadays. The spatial concentration of such past foci of interest drives a mechanism of two components: (i) local cultural capital creates cultural cost of migration and thus keeps in the locality part of its human capital that otherwise would have been washed away by economic incentives (see Sjaastad 1962; Harris and Todaro 1970; Falck et al. 2014); (ii) these past foci of development are also related to concentration of transportation networks. The latter is partially endogenous to current economic development factor, but its significance to economic development is essential as new investments in transport infrastructure are costy, even if possible and realistic investments (see Mori and Nishikimi 2002; Celbis et al. 2014). Thus, a cultural corridor unites in itself previous foci of interest which are both proxies of past cultural activity and lie on past significant trade and communication roads. Nowadays, neither culture nor transportation are concentrated primarily there any more. That is why in a purely classical Weberian sense, these cultural corridor foci carry the identification of places where people's attitude towards economic development was shaped in a particular direction and according to certain understanding of technology and progress. The historical relevance of the meaning of the corridor as a proxy to attitudes is the same as the approximation of attitudes with religion or distance to Wittenberg (see Weber 1905, Becker and Woessman 2009). The cultural corridor however is further augmented with its relationship to the idea of transportation economies of scale or put differently economies of scale due to connectivity between places which used to concentrate the highest human capital and economic prosperity at a certain time period, which was operating under a particular set of attitudes and ideas for production and development. Human capital, even if incentivize economically will be decentivized to leave places with vigorous cultural milieu and high social capital. Therefore, the spatial shift of employment and skilled people due to technological innovation, urbanization and the arizal of new foci of socio-ecoomic development is likely to happen at a closer distance to the past cultural

corridor of socio-economic development in a locality. They will try to locate their new businesses close to the previously existing roads and social capital and the new foci of development will locate in a closer visity to the old ones, as much as the resources for the new technology allows for that.

2.2.1 *A Testable CBD Model for Cultural Corridors*

We can now summarize the above propositions into a testable operational CBD model for the proximity of locality centres to a cultural corridor. Therefore, we specify the following model (1):

$$HC_{i(t-1)} = \beta_1 CG_{it} + e_1 \qquad (a)$$

$$HC_{it} = \beta_2 HC_{i(t-1)} + \beta_3 GVA_{it} + + \beta_4 X_{1it} + e_2 \quad (b)$$

$$IS_{it} = \beta_5 HC_{it} + \beta_6 X_{2i} + e_3 \qquad (c)$$

$$Empl_{it} = \beta_7 IS_{it} + \beta_8 GVA_{it} + e_4 \qquad (d) \qquad (1)$$

where i denotes a particular locality i, and t stands for the current period of time; $t-1$ denotes the period before the current influx of external human capital to the locality; HC stands for the share of human capital in locality i; GVA denotes the gross value added to be interpreted as the investment potential in the locality at hand; X_1 denotes a vector of the standard economic incentives for labour 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 the volume of local employment, and e denotes the standard error of the respective equation of the system.

The above model (1) suggests that in a particular time and locality a certain type and level of human capital is concentrated. In an Inglehart-Axelrod sense, specific human capital clusters emerge around a particular cultural capital. And also (in a Weberian tradition), it can be expected that this clustered human capital carries culturally-specific skills and occupation-related preferences (equation (a)). Thus, the available human capital decides – on the basis of its skills and preferences – how to exploit the local economic resources. In the next period – given these skills, the economic endowments, the embodied productivity and the wage distribution – a certain centre starts to attract

human capital from outside as well (equation (b)). Thus, both the locally generated and externally attracted human capital in the second period determines – together with the local economic endowments and the economic structure of the place – the sectoral specialization (equation (c))[8]. Finally, local employment is a function of local sectoral specialization controlled for local productivity of human capital (equation (d))[9]. The source of cultural gravity in this context, i.e. the cultural factor influencing the model, can be approximated amongst others by the distance of a locality to a historic cultural corridor. This particular and novel operationalization of model (1) will be presented in the next section[10].

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 combined datasets, one of which is uniquely created for our research purposes. The first dataset, based on the European University Institute (EUI) European Regional Dataset (ERD), offers an unbalanced panel of local productivity and regional employment by economic sector for Greece, Romania and Bulgaria on a NUTS-3 level for the period 1980 – 2011. From this dataset, we obtain indicators about total employment, employment per sector and gross value added, which serve as the basis for our main explanatory variables. The second dataset contains the estimated shortest distance from each NUTS-3 region to the East Trans-Balkan South-Eastern European Cultural Corridor. This information was obtained by first finding the centroid of each NUTS-3 region. Next, we determine

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[8] 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.

[9] 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.

[10] This process might seem at first glance deterministic when considered for one period of time. But put in a dynamic perspective, 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 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 will 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 an every power-accumulating entity (the 'empire effect')), this will lead to 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.

the geo-locational 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 the distance from a point (the NUTS-3 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; their geo-locations were identified and hand-collected from Google maps, which provides the longitude and latitude, either of the particular cultural endowment (e.g., a fortess) or more generally the nearest geographic location identifiable (i.e., the closest village to a fortress). Moreover, in the presence of very high ethnic, religious and linguistic homogeneity in the countries under investigation[11], any familiar measure for culture such as religion or language will be powerless to capture quantitatively the cultural capital differences in these localities.

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

$$SI = (Es/Est)/(Er/Et) \tag{3}$$

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. In this way, we ultimately create 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 amounts to 2850 observations covering the period 1980 – 2009 for Greece and the period 1990 – 2009 for Bulgaria and Romania.

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[11] In particular in Greece there is about 99% of the population in the same religious belonging. Further, Cypriot Greeks for example share the same religion and language, officially, but are carriers of group-specific attitudinal characteristics, known mostly from anecdotal evidence as often opposing to the average Greek attitude. In Bulgaria, linguistically and religion-wise the population has been submitted during different historic periods to forceful conversions and change of names etc., so it is highly latently heterogeneous a notion what a Bulgarian Muslim is for example and how this category has to be identified adequately as a carrier of a particular cultural attitude.

Each year covers fully all NUTS-3 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 a view of the fact that 2009 was the benchmark year for the crisis-related developments that happened in Greece). The next section will present the data handling procedure, through a pooled dataset in order to test the main hypotesis behind our model (1).

3.2 Estimation Strategy

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

H01: In the course of time, historic cultural factors (even if moderated by immigration in the locality) affect local sectoral specialization in a locality in the current moment and thus ultimately shape (partially) the level of employment in this locality.

For testing our hypothesis and obtaining a robustness check of the results, we will examine the hypothesis through two alternative estimation methods (i.e. applying the Cambridge recommended mixed method of triangulation, see Downward and Mearman (2007)). We will first use an instrumental variable (IV) approach combined with a 2SLS regression, and second, we will conduct several types of propensity-score-matching and difference-in-differences methods 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, will use the distance to the cultural corridor as an instrument for the culturally-biased specialization in trade[12] and will conduct a just-identified 2SLS estimation of this specification. As a second alternative, we will follow a Weberian proposition that there exists a culturally-driven local occupational preference. Based on this premise, actually all sectoral specializations can be considered proxies of local cultural preferences. Therefore, we will 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 a local level of employment. This second alternative represent an over-identified 2SLS

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[12] For a recent contribution on the mechanisms behind the significance of trade in specific as a factor for regional development see Dascher and Haupt (2011).

estimation with 6 instrumental variables for the culture related regressor distance to the cultural corridor.

Finally, we triangulate (Downward and Meanman, 2007) the results obtained through the 2SLS by using a propensity-score-matching and difference-in-differences approach. We define distance to the cultural corridor in three alternative ways – 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 once in levels (of employment), and second time – as dependent variable difference the differences between the propensity in each two consecutive years for each NUTS-3 region available in our dataset (1 year difference defining the before and after state in our data set). The latter estimation serves as our difference-in-differences estimation. –Next, we implement a matching procedure for each of the above mentioned dependent variables (in levels and in differences) separately. To match the scores we use alternatively one of the three treatments using comparison-wise the following matching methods: nearest neighbour matching, kernel matching and stratified matching, while presenting in addition a simple t-test and a 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

4.1   Instrumental Variables and 2SLS Estimation

4.1.1   *Prefatory Remarks*

The first introduction to the data is presented in summary statistics format (see Table 1a). Sharing a close mean and standard deviations, total employment (emp_t) and gross value added (gva) explain almost completely each other. This means that the rest of the variables will be able to address in a meaningful model our intended investigation regarding the additional cultural impact.

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

Our first part of the empirical analysis uses a 2SLS instrumental variable (IV) approach. The main motivation behind using IVs is that we aim to estimate 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 are – according to the Weberian claim for cultural impact on productivity and occupational choice – culturally endogenous. Therefore, we need to extract the cultural bias from the regressor – the sectoral specialization – by finding an IV related to this regressor, but not with the error term of the regression itself. Our strategy is now to use the distance to a historical corridor – the East Trans-Balkan cultural corridor specifically. 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, while – besides natural endowments – occupational choice in a locality depends on cultural preferences. Thus, if there are indeed traces of cultural persistence, they might be a reason for a sufficient correlation between the past and present centres of development, so that the distance to the cultural corridor may be expected to be correlated with the urban centres today. As we can see from Table 1b, such a correlation exists indeed. Yet, it is not that high, indicating that cultural impact is not a 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 a positive and relatively satisfactory correlation only between specialization in trade and distance to the cultural corridor. Theoretically however, we may expect that all 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 specialization in trade. This is justified by the fact that specialization in trade is, as seen from Table 1b, the only statistically seemingly likely to be endogenous to culture variable (besides the historic variable of distance). 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, in the second place, 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 the 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 total employment, while 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 degree 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: the 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 the over-identification test for the second alternative where we have more than one instrumental variable. Additionally, weak instruments tests were also conducted, as the correlations, especially between some of the specialization dummies and the distance variable, are low. The last test here was to conduct a special probit-based IV 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 in Section 4.1.2.

4.1.2   Test with a Just-Identified 2SLS Model

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 shows a sign change and becomes negative. This is a clear indication that indeed specialization in trade is culturally endogenous. The impact from the other specializations remains relatively stable across methods, but only specialization in agriculture loses its significance under the IV procedure. For the remaining sectors: specialization in construction is a 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 the post-communist period in this region was marked by a decline of industry in Romania and Bulgaria, and, respectively, an outflow of employment, while the other two sectors are respectively underdeveloped (the financial sector) and traditionally lower paid (non-market services) and is therefore 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, i.e. a culturally endogenous and biased process[13].

The post-estimation tests for endogeneity also support the need for instrumentalization of specialization in trade with distance to the cultural corridor; they 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 an other specialization dummy, besides the trade related one, is endogenous to culture, even if the statistical characteristics of the agricultural variable do not suggest so. To secure triangulation of our results, we infer an over-identified alternative to the same model. We do this by switching the place of endogenous factor under investigation and instruments from the first specification presented in Table 2. We afford this approach in spite of the lack of correlation between distance to the cultural corridor and specialization in trade, because theoretically it is

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[13] The estimations with a probit model and instrumental variable were consistent in their economic interpretation with the here presented results. Still, we need to compare Table 2 and Table 3; the latter over-identified specification follows the OLS, 2SLS presentation, and therefore we present here the OLS vs 2SLS results for the just-identified specification as well.

justifiable that agriculture is the traditionally important in urban economics models sector and the Weberian hypothesis for cultural impact on occupational choice per se suggests link between cultural attitudes and any form of labour specialization[14].

4.1.3 Test with an Over-Identified 2SLS Model

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, while the distance is instrumentalized with the dummies for sectoral specialization. This over-identified specification presents exactly the 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 assumption, 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. 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: a propensity-score-matching method combined with a difference-in-differences approach.

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[14] It is noteworthy that the same IV estimation with alternative dependent variable – population density – register also a significant value of the cultural corridor in the second equation, after it has been cleaned from endogeneity a sa measure. This means that the effect from the cultural corridor is rather on population than on the skilled population in particular. Results available from the authors upon request.

4.2 A Propensity-Score-Matching and Difference-in-Differences Approach

4.2.1 Propensity-Score-Matching 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 NUTS-3 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 in terms of output but also of GVA and regional characteristics of the economic structure[15]. 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 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

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

characterized under the three alternative definitions for a maximum 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 has always a higher total employment, with a lower GVA than the control group and has a higher specialization in trade, construction and financial services than the control group, while agricultural specialization is at 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 maximum 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. In the 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 at 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 the difference in total employment within one year for every year for which the data is available in our dataset.

When matched on propensity scores and x variables, as seen from column 1 in Table 5, we observe a 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 the method and the treatment definition concerned. This means that the regions closer to the

cultural corridor experience a higher level of total employment. Moreover, we see an interesting effect that with an increase of the maximum distance actually we observe an increase of the effect, which means that there are no traces for a decline 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.

4.2.2 Difference-in-Differences Approach

The difference–in-differences results in column 2 of Table 5 point at 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 a higher total employment, these regions which are closer to the cultural corridor experience a slower growth of employment. This evidence, seen from the perspective of the entrepreneurial cultural milieu which claims that in a broader sense past centres of productivity shape current centres of productivity and employment, interprets the observed results as a confirmation of an economic life cycle of the regions. The regions closer to the cultural corridor are with higher employment as expected from a hypothesis for a long path dependent process of cultural impact (i.e. from proximity to past times of socio-economic productivity). The effect is registered better for places closer in distance from the cultural corridor. In a sense, they experience a 'cash cow' life cycle stage, where their total employment is higher due to an accumulated past history of socio-economic development. The newly growing centres of employment are elsewhere, but they are still in a developing stage and therefore still lag behind the cash-cow life-cycle regions. Put in a broader perspective, our result is supporting the proposition that culture is a source of a certain persistence chain[16] (i.e.the distance to the cultural corridor is associated with a higher total employment). Yet, there is a slow trend of change captured with the slower growth of employment in the treated regions. The latter means that over time new spatial foci of socio-economic development may emerge. These new foci are currently still accumulating socio-economic conditions that will trigger the new socio-economic

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[16] 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.

geography only with a path-dependent character of their local development. These results corroborate with the findings by Cuberes (2011), in whose words: "At some point, the growth rate of this city slows down and the second-largest city then becomes the fastest-growing one. Eventually, the third-largest city starts growing fast as the two largest cities slow down"[17]. Moreover, we find a link between this pattern in the development of local centres and their proximity to what is termed here a cultural corridor.

In general, our last result is consistent with the fact that the main assumption regarding the treatment effect is significant (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 investigated here does not deterministically drive the observations in a constant manner, but is actually conditional on independent current development assumptions, still holds as a factor of influence on total employment in the regions[18].

4.2.3   Synthesis

As a final comment on the robustness of the results, we should note that our common support interval is rather 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.

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[17] The findings of Cuberes (2011) concern, among others, Bulgaria for the period 1888 – 1990, Bulgaria is one of the three countries through which our cultural corridor under examination in this paper passes through geographically. The last decades regarding Bulgaria in Cuberes's database coincide with the time period covered by our dataset too. And our dataset and this of Cuberes (2011) are from different sources. Therefore, we consider our result as an interesting triangulation of the result from 2011..

[18] 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 reulting overall consistency is a sign for a general reliability of the results.

In summary, 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[19]. Nevertheless, the effect of the distance from the cultural corridor, in a fixed 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 a varying cultural component may be a promising continuation that may cast further light on the findings reported here regarding the cultural impact mechanism of persistence chains.

5 Conclusion

The present paper has made an attempt to offer a novel quantification of the analysis of the 'cultural factor', by including in a cultural corridor context the Culture-Based Development (CBD) concept. It aimed to enhance our understanding of culture as a factor variable capturing the cultural milieu

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[19] It should be noted that the notions of path-dependence and persistence are not clearly distinguished in the literature (see Freeman 2012). We follow here the CBD definitions for the distinction between the two notions. Schematically, this distinction can be described as follows. Persistence means a strictly repetitive over time effect of culture on choice. Under cultural persistence, over time a locality will always exhibit x% preference for consumption of say fruit over meat; x will be a constant. Under cultural path dependence x will change its value over time; thus the local preference for fruit over meat will have to be expressed as $f(\Sigma(\Delta x))$. Finally, a path dependence built up of persistence chains is a subcase of the latter. A cultural path dependence of cultural persistence chains is basically an analog of a Markov chain process. In this case $f(\Sigma(\Delta x))_{t(1 \text{ to } m)}$, where t denotes a time period and in t_1 to t_n, $x_{(1 \text{ to } n)} = a$, and a is a constant; in t_{n+1} till t_{n+m}, (m>0), $x_{(n+1 \text{ to } n+m)} = b$, and a and b are different. Thus, the cultural path dependence of cultural persistence chains reflects a process where change in the cultural factor happens very slowly over time and for some periods there is no change. Put differently, this path-denendence built up of persistence chains is a path-dependence of no-change periods which however have a beginning and an end and the level of the cultural attitude changes only over larger periods of time, within which series of economic changes take place. In a sense, this notion expresses that time flows slower for cultural change than for economic change. That is why some periods of economic development seem to happen under lack of cultural change, but this is only a temporary chain of persistence. The cultural effect on socio-economic development is actually deeper in time and is only path-dependent and not deterministically persistent.

and related cultural assets clustered in a locality over time. It provides an argumentation for the conceptual acceptability of this quantification and for using it for exploring the effect of a cultural corridor on local employment in Greece, Bulgaria and Romania. The paper gives clearly econometric evidence in support of the generally accepted notion in economics – usually tested in many geographic case studies – that culture matters. Our study is both consistent with existing evidence and original in terms of both its quantitative approach and the selected geographical scope 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 gains) for the regions or localities with a higher proximity to the corridor.

It should also be added that interesting insights on the cultural effect are evolving from the analysis conducted. First, sector specialization and past cultural development are confirmed to be both culturally endogenous which support the general 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 particularly interesting, is that the local socio-economic life-cycle likely is associated with historic cultural centres as a treatment effect. This would mean that indeed for a certain period of time the established cultural and socio-economic centres remain a source of culturally dependent prominence of these localities and their closest vicinity. Additionally, social change – even though normally much slower than regular economic processes – still does take place, while also newly emerging social and economic centres are likely (and possible) to develop. And in the fourth place, the change in and magnitude of cultural impact on place development is highlighted as being dependent not directly on the geographic proximity to the cultural corridor, but on the Weberian occupational cultural choice approximated here with the local sectoral specialization. The consistent results by means of the methods and specifications from our paper prompt the need for further work on cultural impact studies regarding the socio-economic local development, in particular, development in the SEE region. Clearly, the current work offers a promising foundation for more methodological triangulations and inferences on the distance to the cultural corridors in South East

Europe, and elsewhere, where cultural corridors exist. Furthermore, the current results give rise to intriguing questions on the effect of distance to cultural corridors in South-East Europe, in relation to other culturally-sensitive processes, such as migration and innovation, the first giving rise to the shrinking regions phenomenon in these geographical areas and the second one being a main driver for economic growth and development per se.

Finally, the very cultural corridors notion proposed here is a conceptual novelty that is worth further consideration in regional research. Cultural corridors, known in other disciplines and touching on economics mostly through cultural tourism and geography, offers a more spatially connected and realistic notion of cultural capital at a local level. Cultural variation exists on every level of aggregation from the individual level onwards: group, neighbourhood, region, country. There are, for example, undeniable local dialect differences in most countries, and this applies to many other historical cultural differences, even though less obvious at first sight. The cultural corridor tracks (records) the concentration of the cultural capital across space and time, and it recognizes its cumulative character and interconnectedness. Thus, the cultural corridor location can provide more meaningful information than the abstract distance to a singular geographic location, for example, especially given that different locations were culturally prominent in the history in different times for different reasons. It is difficult to argue which of them should be more important than the others. Furthermore, leading international experts in history, cultural heritage and architecture have already mapped out the existing cultural corridors across all localities of the countries members of the Council of Europe (see http://seecorridors.eu/?w_l=2). Yet, the information about these corridors remains till now, to our knowledge, unexploited in most applied quantitative spatial-economic and econometric research. Consequently, appropriate and comprehensive insight into cultural influences on the local – and regional - economic development in these localities is still insufficient.

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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.