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Urbanization in the Black Sea Ports: An Empirical Analysis

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Abstract

In this paper we proceed with an econometric analysis revealing the importance of specific spatial and economic characteristics for a commercially progressing urbanization process, especially in the shores of the Black Sea. Our estimation concludes on the factors that used to be significant for the development of Black Sea Ports. Linking this to the present situation in the area enables us to proceed with political hypotheses for a prosperous, collaborative future in a region that becomes more and more significant with respect to environmental, political and socio-economic aspects.

Keywords: Urbanization; Black sea ports; Cross-regional; Socio-economic linkages

Introduction

"[...] the plan and built form of the town are direct reflections of the nature of culture on the large scale…the town epitomises in its physical nature the complex of political, economic, and social forces which characterised the period of its creation" [1].

Relevant literature describes urbanization as a process governed by path dependencies on the one hand, shaped at the same time by crucial events and interventions, relative to the main characteristics of the type of the arising city [2,3]. According to Volker Nitsch, in modern city formation models, given the multiple feasible equilibrium situations, random events that took place in earlier historical stages may determine the type and the dynamism of each urban centre, while Bluestone et al. argues that the urban development of a city and its potential depend on five key factors: 1) Trade and transportation costs, 2) Agglomeration economies, 3) Internal economies of scale, 4.) The size of urban markets and 5) Technological evolution [3,4].

In our article we focus on the origins of modern Black Sea port-cities, checking whether their urbanization, from their commercial/economic primacy perspective, during the period late 19th-20th century, depended on which economic, geographical, institutional or political factors. Our analysis builds upon our previously published works[1], where we study the socio-economic and political significance of urban systems and cities in the area of Eastern Europe and the Black Sea, as well as the historical processes that led to their creation and the evolving of their socio-economic linkages, beyond the contemporary national borders[2].

We concentrate our study on port-cities, since they are key places which, apart from the goods' transportation, host industries and services, attract tourism and welcome different cultures, ways of life and of working. Port-cities could be characterized as "cosmopolitan places" having, economic strength[3], at least most of them, and concentrating competitiveness[4], human capital, population and migration processes [5,6]. The port-cities act as junctions of international trade networks, affected by "global transformation processes". Through the years, the economic and technological development affected port-cities worldwide, altering their structure, their image and representation, their citizens' way of life and of working and of course the relation between the city and the port [7].

During the year 2011 the 19.8% of the goods arrived in Europe by the sea, arrived through the three European ports of Rotterdam, Antwerp and Hamburg, while this percentage reached 20.3% in 2016. Contrary to the West European Ports, only the 2.5% of the international maritime trade took place through the Back Sea ports during the last decade. An explanation to that may be the fact that the area's advantages, regarding its geographical position and its role as a junction between Africa, Asia and Europe have not been exploited yet [8]. However, during the period 19th-20th centuries and through the years of the Ottoman Empire decline, the port-cities of the Black Sea region showed great development and fast rate of growth. To that contributed mainly the grain trade Harlaftis along with trade of spices, cotton, wool, tobacco and coal [9]. The Greek, Jews, Armenian, Albanian and Bulgarian merchants, the region's main merchant community, exported their goods to Livorno, Genoa, Marseilles and England [10].

In the present article we study which factors enhanced the trade primacy and thus the urbanization of the Black Sea port-cities of the late 19th-20th century and which made it harder. To that point it is crucial to mention that the period studied was a historically precarious period, since the Balkan Wars (1912-1913) that led to great movement populations, the two World Wars that followed and the Cold War (1945-1989) created turbulence in the region and led to its decline. However, from the end of the Cold War the situation started changing and there was created suitable conditions for the re-emergence of the

[1]Lyratzopoulou D and Zarotiadis G (2014) Black Sea: Old trade routes and current perspectives of socioeconomic co-operation. Procedia Economics and Finance 9: 74-82.

[2]Lyratzopoulou D and Zarotiadis G (2014b) Feraios Revised:Inter-regional Cross-national Socio-economic Cooperation in South and Eastern Europe. International Relations and Diplomacy 12: 829-835.

[3]14 out of 20 most economically strong cities in the world are port-cities (The Economist-Economist Intelligence Unit, 2012).

[4]36 out of 50 most competitive cities in the world are port-cities (The Economist-Economist Intelligence Unit, 2012).

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region [11]. We were mainly motivated by the urbanization process of the city of Vienna, the Central European Metropolis, described in the study of Volker Nitsch, "Does History matters? The case of Vienna" and the way the writer is converting the empirical results into theoretical arguments [4].

Nitsch tests the importance of path dependency versus historical major incidences in the case of Vienna, after the dissolution of Austro-Hungarian Empire in 1918 [4]. The city of Vienna experienced a modification of its role and character: being suddenly oversized in relation to the total country's population, the city started having a greater international role, converting into a trade node close to West Europe and/or becoming an internationalized administration centre hosting the seat of international organisations.

We proceed with an econometric analysis similar to the one applied by Nitsch in the above discussion, that reveals the importance of specific spatial and economic characteristics for the urbanization and the development of a port city [4]. Placing the time period and the geographical/territorial scene of the study, we are located in the Black Sea region in the second half of the nineteenth and early twentieth century (from 1850-1915). During that time the region was politically composed by the Ottoman Empire, the Russian Empire (that had the control over Georgia, Ukraine and Crimea Peninsula) and the new independent states of Bulgaria[5] and Romania[6]. The great powers of that time, West European ones included next to the regional empires of the Ottomans and the Russians, feuded over the Black Sea, shaping by their competition the evolution of the region.

During the period studied, the crucial historical facts setting the scene in the Black Sea port-cities' development were: The Treaties of Adrianople (1829) and Hünkâr İskelesi (1833) that recognised the extended rights of the Russian vessels on the Black Sea and their free passing through the Dardanelles [12-14]. Furthermore, the Sultan conceded more territories in the North coast to Russia [15]. The Crimea War that started in 1853 and ended with the Treaty of Paris in 1856 that meant the end of an epoch in the Black Sea, as West European Powers expressed their interest for the future of the Ottoman Empire and its balancing protection over the Russian Empire. The safe passing through the Danube River and the Straits liberated foreign trade and opened the Black Sea to the West.

Furthermore, the important physical changes that took place from late nineteenth to early twentieth, such us the construction of the dam of Dnepr, the Volga-Danube canal, the coastal roads and railway networks that linked the ports with the inland, concluded the rising importance of the region and enhanced the port-cities development. The Russian Turkish War (1877-1878) that led to the recognition of Romania as an independent state in 1877 and of Bulgaria in 1908, and the Balkan Wars (1912-1913). Finally, the industrial revolution that evolved primarily in the Western and Central part of the continent during the second half of the eighteenth and the nineteenth century was also significantly affecting the role of the Black Sea port-cities as it intensified the necessity for (primary, secondary and final) goods' transportation from and to the East.

Continuing with an overview of the following pages, we proceed with an econometric analysis that reveals the importance of specific spatial and economic characteristics for the urbanization and the development of a city. In the parts that follow we present the data set studied and the methodology used and we present the estimated coefficients according to the different combination of methods. In the last part we discuss the empirical results found and we conclude on with the implications for today and the proposals for further research.

Data and Methodology

In order for us to shape our model, we take into consideration Nitsch's approach of studying the forces forming the evolution of Central European cities [4]. Nitsch considers an equation of the form:

$$PRIMACY_i = a + \beta \mathbf{Z}_i + \gamma AUSTRIA + \varepsilon_i \quad (1)$$

where, he is regressing the share of the largest city (*PRIMACY*), in total urban population, against a vector of control variables (*Z*) that might potentially affect a country's urban concentration. Additionally, in consideration are also taken the theoretical arguments of J. Vernon Henderson: (i) Economic geography variables, such us the per capita income, urban population, the land area and whether the largest city is a port; (ii) Whether the primate city is also the country's capital; (iii) Policy variables, such as trade openness, the density of navigable waterways and road density[7] [16].

Davis and Henderson measure the degree of urban concentration by primacy [17]. Here primacy equals the share of the largest city in national urban population and it is given with the form:

$$\text{primacy}_{jt} = \alpha_0 \ln(\text{national urban pop})_{jt} + \alpha_1 [\ln(\text{national urban pop})_{jt}]^2 + \alpha_2 \ln(\text{GDPpc})_{jt} + \alpha_3 [\ln(\text{GDPpc})_{jt}]^2 + \alpha_4 X_{jt} + \delta_t + \mu_j + \varepsilon_{jt} \quad (2)$$

where, the independent variables are the national urban population and income (the contemporary factors of primacy), both in quadratic forms to allow non-linearities in the case of urban population and to represent the Williamson effect in the case of income. The X_{jt} co-variates include a variety of policy measures, such as openness, transport infrastructure measures and institutional variables on political regimes. The X_{jt} measures are geographic and cultural, including regional indicators, land area, latitude, and waterways per square km, ethno linguistic fractionalization[8] [18], religious affiliation and French legal origin. The δ_t term represents time shocks and trends across countries. The μ_j term represents the country fixed effects and control for cross-country time invariant factors which are unobserved, such as aspects of geography and culture [17].

Motivated by the above thoughts, our logic is reflected in the equation below:

$$(X_C + M_C)/GDP_L = a_o + a_1 POP_C/POP_L + a_2 POP_C + a_3 GDP_{pc} + a_4 RW_L + a_5 RW_L/AREA_L + a_6 DV_L \quad (3)$$

The main difference of our approach to the already mentioned above literature and the one existing is our concentration on the urbanization process of the port-cities urged by their trade activity and their possible emergence as trade centres [19-24]. Given that, we proxy the degree of urbanization in relative trade terms, measured by the port-city's trade openness (the value of exports plus imports from and

[5]Bulgaria was finally recognized as an independent state in 1908, after years of consultations since the end of the Russian-Turkish war of 1877-1878 and a number of Treaties.

[6]The state of Romania gained its independence from the Ottoman Empire in 1877.

[7]Nitsch uses an almost complete set of reliable historical data (city population, the openness ratio, the railway density, the total country population and the real per capita income) for a sample of twelve European countries (Austria, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden and Switzerland) and the period 1870-1900 in ten year intervals.

[8]The index of ethno-linguistic fractionalization (ELF) is the measure of ethnic diversity, used in the empirical literature almost universally. "ELF measures the probability that two randomly drawn individuals from the overall population belong to different (predefined) ethnic groups" (Bossert et al., 2011)

in the city's port X_C+M_C over the GDP of the respective land GDP_L). According to the existing literature, other things equal, more open economies are more urbanized [25,26].

Our intention expressed in equation (3) is to estimate the factors that affected the commercial activity of the late 19th-early 20th Black Sea port-cities, in order for us to conclude to a number of results for their urbanization during the period studied. Consequently, our equation tests whether the size of a port-city's trade openness, and thus its degree of urbanization, depends on the share of the port-city POP_C in national urban population POP_L, the port-city's population itself, the country's per capita GDP_{pc}, the railway extent of the country RW_L and its ratio to the total area of the country $Area_L$.

Explaining our logic even farther, urbanization is a process of population gathering that takes place either with the multiplication of the gathering points, or with the increase of the size of each single gathering [2]. Given that, by including the term POP_C in our equation we intent to examine whether the city population affects a port's trade activity as it affects its urbanization process. The national per capita GDP, an indicator of a country's wealth and internal development, constitutes, according to Davis and Henderson, an economic variable and one of the contemporary factors of primacy [17]. The RW_L term, indicating a country's railway density, is the main policy variable used in our equation, since the train was the main means of goods' transportation by land of that time. By including the term $RW_L/AREA_L$ in our equation we are examining the percentage of the total country's area covered by railway network.

In the explanatory variables is also included a dummy variable, determining a port-city's geographic position. Would that have any significant difference for its trade activity and thus its urbanization if the port-city is located in the West, the East, the North or the South coast of the Black Sea? In order for us to answer the question, we use a sample of twelve Black Sea port-cities grouped in two geopolitical categories: The West Black Sea Coast port-cities (Braila, Galati, Constanta, Varna and Burgas) and the port-cities of the North-East Black Sea Coast (Batum, Nikolayev, Rostov on Don, Mariupol, Odessa, Sevastopol and Theodosia)[9].In that case, the dummy variable DV_L takes the value 1 for the port-cities of the North-East Black Sea Coast (and consequently 0 for West Black Sea Coast port-cities).

A consequent goal of the present study is to investigate the economic, political and social situation of the Black Sea port-cities for the time-period including the second half of the nineteenth century till the beginning of the twentieth century. Data availability, however, allowed us to form a sufficient and reliable sample of data and to create a complete annual data set covering the time span from 1885-1899.

Valuable source for our data collection proved to be the database of the interdisciplinary and inter-university project "The Black Sea and its port-cities, 1774-1914: Development, convergence and linkages with the global economy", that provided us with useful information for the Black Sea port-cities [27]. From this database we collected the demographic and statistical data related to the population and the size of the imports to and exports from the ports studied, expressed in French francs. The information regarding the countries' population and the railway extent were extracted mainly by Brian Mitchell's volume entitled "International Historical Statistics:Europe 1750-2000" [28]. The historical data about the Gross Domestic Product (GDP) and the per capita GDP were mainly collected by Angus Maddison database and his monograph entitled "Contours of the world Economy, 1-2030 AD; Essays in Macroeconomic History", while other sources, numbered analytically in the bibliography, were also used [29]. Finally, data related to the area of the countries were collected by the database of the World Bank[10][30].

To sum up, in our current project we use a sample of twelve port-cities around the Black Sea coast. The data collected for fourteen years (from 1885-1899 time period) constitute a complete and reliable set and are represented in the form of panel data[11] in two different groupings: in the first grouping the data are given annually for the years 1885-1899, while in the second one we use the data of the respective decades, namely 1870, 1880, 1890 and 1900.

The coefficients of equation (3) will be studied first through an OLS estimation and following with the Generalised Method of Moments (GMM); thereby, we take into consideration any endogeneity of the independent variables, the possibility of causality (meaning the possibility of the independent variables to be related with the error term) and finally any relation between the geographic and demographic characteristics and the independent variables, in order for us to establish the robustness of the results. Following the indication of the Hausman test, in both estimations we apply the method of time fixed effects, as well as the method "period SUR", given that we believe that there exists timeless heteroskedasticity and correlation.

Estimation

In the following, we present the estimated coefficients according to the different combination of methods, starting with OLS for the annual and for the decade-data and following with the GMM estimation.

OLS estimation of equation

Our first OLS estimation with the annual data of the variables included has a very good fitting, sufficiently explaining the variation of the dependent variable in space and time (adjusted R-squared 87.22 percent). Specifically, the share of the port-city's population on the total population of the respective country, the per capita GDP, the country's railway extent and the geographic position of the port-city (dummy variable) are the independent variables that significantly affect the trade activity of the Black Sea ports. The per capita GDP reveals an unexpected significant negative effect, while the positive impact of the city's share on the country's population and the railway extent seems to be logical. Interesting is also the fact that the ports located in the North-East Black Sea coast have a weaker trade activity compared to those of the West coast, other things equal.

In order for us to ensure the causality of the estimated effects, we repeat the regression once more, defining a time lag of one year on the social-economic explanatory variables. A time lag on the variables RW_L and $RW_L/AREA_L$ would be of no sense, since the data of those variables present small changes through the years. Table 1 presents the relevant results.

The significantly estimated variables' coefficients are again those of the port-city's population relative to the total population of the country, per capita GDP, the geographical position of the port-city on the shore of the Black Sea (similarly to the previous estimation) and marginally the railway extent of the respective country.

[9]The Ottoman Empire and its port-cities will not be studied in the current project, due to significant lack of data.

[10]The data related to the areas of the countries studied are referred to the year 1961 and are given in squared kilometres.

[11]We use panel data estimation techniques in an attempt to extract more information from the data.

Consequently, we conclude that the causality does go from the independent variables to the dependent one, namely the black sea ports' relative trade activity.

Finally, as we tried to extent the time span of our analysis, given the lack of annually continuous data, we proceed with a grouping of the data in four decades, 1870, 1880, 1890 and 1900. However, as shown in Table 2 below, the arisen results restate the same findings as the above and do not add anything further to our research: still that and that are significant and the signs are the same.

GMM estimation of equation

As mentioned above, in order for us to proceed with taking into consideration any endogeneity of the independent variables (among other advantages), following the simply OLS model we applied the GMM methodology. In doing so we encountered multicollinearity caused by the DV_L and the rate of the country's railway extent on the country's total area $(RW_L/Area_L)$. To overcome this problem, we proceeded with the estimation of equation (4), where we remove the DV_L. As instrumental variable we use the dependent term of the equation $(X_C+M_C)/GDP_L$ with a two year time lag. This lead us to the important results presented in Table 3.

$$(X_C+M_C)/GDP_L=a_o+a_1POP_C/POP_L+a_2POP_C+a_3GDP_{pc}+a_4RW_L+a_5RW_L/AREA_L \quad (4)$$

Variable	Coefficient	Std. Error	t-statistic	Prob
Constant	0.7454	0.4502	1.6560	0.0999*
POP_C/POP_L	134.8794*	21.7884	6.1904*	0.0000*
POP_C	-0.0002	0.0006	-0.2954	0.7681
GDP_{pc}	-0.0007*	0.0004	-1.8544*	0.0657*
RW_L	2.14E-05	1.46E-05	1.4585	0.1469
$RW_L/AREA_L$	31.2520	39.9040	0.7832	0.4348
DV_L	-0.8612*	0.4034	-2.1348*	0.0345*
R-squared	0.8957			
F-Statistic	65.0814			
Adjusted R-squared	0.8819			
Prob (F-statistic)	<0.001			
Total Panel Observations	164			
Notes: For a 5 percent level of significance. with (*) are indicated the statistically significant estimations. The data are presented annually. lagged by one year.				

Table 1: Ols estimation of equation (3) with annual data.

Variable	Coefficient	Std. Error	t-statistic	Prob
Constant	-0.7275	0.6126	-1.1874	0.2441
POP_C/POP_L	101.5029*	16.3170	6.2207*	0.0000*
POP_C	-0.0004	0.0004	-1.0741	0.2911
GDP_{pc}	0.0003	0.0005	0.4787	0.6355
RW_L	0.0000	1.71E-005	1.6799	0.1030
$RW_L/AREA_L$	74.2864	58.2879	1.2745	0.2120
DV_L	-0.4574*	0.2515	-1.8186*	0.0786*
R-squared	0.8582			
F-Statistic	20.8469			
Adjusted R-squared	0.8170			
Prob (F-statistic)	<0.001			
Total Panel Observations	41			
Notes: For a 5 percent level of significance. with (*) are indicated the statistically significant estimations.				

Table 2: Ols estimation of equation (3) with decade data.

Variable	Coefficient	Std. Error	t-statistic	Prob
$(X_C+M_C)/GDP_{L.\ t-1}$	0.3783*	0.0186	20.2940*	0.0000*
POP_C/POP_L	3.9500	4.4411	0.8894	0.3754
POP_C	0.0000	9.22E-005	-0.1671	0.8675
GDP_{pc}	-0.0006*	0.0001	-5.1829*	0.0000*
RW_L	0.0000*	1.85E-006	4.8102*	0.0000*
$RW_L/AREA_L$	-86.1588*	5.8765	-14.6615*	0.0000*
J-Statistic	69.1927			
Prob (J-statistic)	0.5386			
Total Panel Observations	139			
Notes: For a 5 percent level of significance. with (*) are indicated the statistically significant estimations				

Table 3: GMM estimation of equation (4) with annual data.

J statistic (69.19%) speaks for a "good fitting" of our model, where the independent variables explain the dependent one adequately. The ratio POP_C/POP_L has a positive but this time statistically insignificant impact. The coefficients of per capita GDP and the country's railway extent remain statistically significant, with a negative and positive effect respectively on the port-cities' trade activity and thus urbanization.

To that point, we would like to include in our analysis the earlier presented historical facts and their possible significance for the port-cities trade activity and thus urbanization. For that reason we regress the equation once more, including time DV_Ls this time (Table 4). Those historical facts, occurring in a specific point of time, will not be otherwise expressed by the rest of the explanatory variables.

All the coefficients of the time DV_Ls have positively estimated significant effects with the exception of the years 1892, 1893 and 1896. Regarding the rest of the results, the ratio POP_C/POP_L regains a statistically significant positive effect, while that of the per capita GDP gains a negative statistically insignificant effect (J-statistic remains at the same level indicating a similarly good fitting.)

Discussion of the Empirical Results

Urbanization is a process of population gathering that takes place either with the multiplication of the gathering points, or with the increase of the size of each single gathering. As long as the cities increase in size or multiply in number, the process progresses. According to Klaassen and Scimemi, urbanization constitutes the first phase of urban development, boosted by facts and conditions that make gathering possible and wanted and takes place with the population movement from the countryside to the cities [2]. In our analysis, we examine the urbanization process of the Black Sea port-cities in terms of their trade activity and their possible transformation into trade centres. Our research leads us to a number of expected findings and others unexpected.

To begin with, in the tables presented above the coefficient of the POP_C variable appears to be, in most of the cases, negative and statistically insignificant. This fact indicates that the variable of population does not seem to affect the dependent variable, meaning a city's primacy in trade terms and that a city's prominence as a trade centre is not necessarily related to the rest of its urbanization reflected in the size of its population. According to Peterson, a number of authors support a positive relationship between population and economic growth, while others a negative interaction [31]. Still others support that the empirical evidence for the relationship is affected by a country's level of development, the source or nature of the population

Variable	Coefficient	Std. Error	t-statistic	Prob
$(X_C+M_C)/GDP_{L,t-1}$	0.5197*	0.0143	36.1364*	0.0005*
POP_C/POP_L	9.7189*	3.4109	2.8494*	0.0006*
POP_C	-0.0001	0.0001	-0.8792	0.3123
GDP_{pc}	-0.0005*	3.78E	-12.8619*	0.0012*
RW_L	0.0000*	2.24E	10.9118*	0.0675*
$RW_L/AREA_L$	-16.0259*	7.4466	-2.1521*	0.0898*
@LEV[@ISPERIOD("1888")]	0.1122*	0.0345	3.2481*	0.0000*
@LEV[@ISPERIOD("1889")]	0.1125*	0.0318	3.5420*	0.0000*
@LEV[@ISPERIOD("1890")]	0.1150*	0.0276	4.1683*	0.0000*
@LEV[@ISPERIOD("1891")]	0.0502	0.0266	1.8839	0.0000
@LEV[@ISPERIOD("1892")]	0.0758	0.0460	1.6500	0.1009
@LEV[@ISPERIOD("1893")]	0.0492	0.0270	1.8228	0.0000
@LEV[@ISPERIOD("1894")]	0.1767*	0.0625	2.8270*	0.0000*
@LEV[@ISPERIOD("1895")]	0.1153*	0.0315	3.6588*	0.0000*
@LEV[@ISPERIOD("1896")]	0.0167	0.0352	0.4749	0.6543
@LEV[@ISPERIOD("1897")]	0.2074*	0.0472	4.3943*	0.0000*
@LEV[@ISPERIOD("1898")]	0.0641*	0.0207	3.0944*	0.0000*
@LEV[@ISPERIOD("1899")]	0.1230*	0.0419	2.9360*	0.0000*
J-Statistic	66.5322			
Prob (J-statistic)	0.5954			
Total Panel Observations	139			
Notes: For 5 percent level of significance, with (*) are indicated the statistically significant estimations				

Table 4: GMM estimation of equation (4) with annual data, including time dummy variables.

growth, or other factors such as the used empirical method, the chosen control variables and other factors [32].

Thomas Malthus, in his study showed a negative relation between the population and economic growth. He explained that "*population has the tendency to grow more rapidly than food supplies*" [33]. Consequently, slow population growth is required in order for the population to remain "at a level consistent with the amount of food available". Along with the Malthusian way of thinking and according to Becker et al., in countries, with mainly agricultural economy, limited human capital and technological means, as is the case of the late 19th-early 20th century Black Sea countries, dense population leads usually to lower per capita incomes and productivity [34]. Productivity may be reduced due to the diminishing returns from the more intensive use of the land and other natural resources.

Bergstrand and Dell find a negative population coefficient in their extended gravity model, by adding the term population of exporting and importing countries, in order for them to examine the relationship between population and trade flows among two countries [35,36]. They observe a reduction in productivity and in the long-run in countries' exports and imports, since population growth has a tendency to decrease per-capita income, making people poorer and reduces the demand for imports. Finally Karimi, who applied the gravity model to a sample of OIC[12] economies in order for him to include in his research different geographical regions and levels of economic development, concludes to a negative relation between population and trade for the exporter and importer countries [37]. He believes that in a country with dense population, people do not indent to export, since they need the products for their own use.

The estimation of per capita GDP's coefficient constitutes the next interesting issue, since the negative sign of it raises queries. According to the important ideas related to urban economics, the per capita GDP constitutes the main wealth characteristic of a country and consequently of its internal development. Countries with greater GDP_{pc} usually show a more intense urbanization process [17]. So, one would expect that this is also valid for the port-cities and especially for their trade activity.

Still, our empirical findings disprove this hypothesis in the specific region and time-period: in almost all different estimations, the coefficient of the per capita GDP has a negative and statistically significant value indicating that an increase in the corresponding country's wealth downgrades the Black Sea city-ports' trade openness and thus urbanization. Our findings though are not unprecedented, since Ades and Glaeser and Moomaw and Shatter indicate in their study that greater urbanization in larger cities "retards growth" [25,38]. Additionally, Elizondo and Krugman [39] explain that an increase in a large city's trade activity affects negatively its importance, while Mills and Hamilton [40] argue that "*As a rule, large countries tend to be less primate than small countries…and high-income countries tend to be less primate than low-income countries". Generally, "Primacy is greater, other things equal, the smaller the economy, the lower GDP per capita, the smaller the share exports in GDP, and the lower the literacy rate*" [25].

Taking into consideration the above mentioned, we could consider two possible explanations of the negative relation between the national per capita GDP and the Black Sea port-cities' primacy and thus urbanization. Firstly, we could think of the specific role and nature of international trade in the epoch studied: trade flows among countries were taking place in specific industries, as the goal was to cover main needs of the population according to the arising regional shortcomings. Today, following the explosive evolution of labor's productivity, countries do not import for covering their internal, basic needs only. In the areas with higher per capita GDP the imports of products may refer to the satisfaction of specialized, diversified desires offering thereby a better way of leaving. Consequently, countries with increased per capita GDP and greater self-sufficiency had less needs for foreign products and thus imports. Moreover, the decrease in the size

[12]The Organisation of Islamic Cooperation (http://www.oicexchanges.org/members/oic-member-state-countries)

of needed imports would probably mean, according to our opinion, a decrease also in the size of the ports' exports, since the Black Sea is partly a "closed loop" trade system:the products leaving from one of its shores end up to the other side as imports.

The second explanation of the negative relation among the per capita GDP and the trade activity refers to the specific initial characteristics of the Black Sea port-cities. As a city grows, in the frame of its urbanization process it may experience modification of its character converting into a different kind of urban centre [41]. Let us use an example from the history and today's reality of the Greek city of Thessaloniki. A part of the historical centre of the city "Ladadika", constituted one of the oldest trade areas of Thessaloniki hosting mainly wholesale stores-selling olive oil, cereals and spices- and trade warehouses. Many of the Jews of Thessaloniki were living in that area, forming the old Jewish neighbourhood, while in the Upper "Ladadika" was living mainly French and Italian merchants. Just before the outbreak of the First World War, brothels and taverns started appearing, while the years after the great Fire of 1917, which destroyed a great part of Thessaloniki's historical centre, the area lost its dynamic [42]. During the last decade, "Ladadika was spontaneously transformed into a cluster of cultural and leisure activities", where can be found "popular leisure enterprises" such as cafes, bars, restaurants and dance halls [43]. Therefore, although its wealth is increasing, the area loses its trade character.

Another interesting finding of our study is the negative and statistically significant estimation for the DV_L of our equation. The DV_L examines the importance of a port-city's geographical position for its trade openness and thus urbanization and takes the value one for the North-East Black Sea ports and that of null for the West Black Sea ports. Its negative coefficient indicates a more dynamic development of the port-cities on the Western shore, other things equal. The countries of Bulgaria and Romania have a total GDP smaller than that of Russia, meaning that their rate X_c+M_c/GDP_L is relatively bigger, leading us to conclude that smaller economies pull ahead [44]. In fact Western Black Sea ports show a greater trade activity, not because of a big domestic economy, but because of their dynamic hinterland. They serve the dynamic markets of West Europe, which develop a significant trade activity both for imports as well as exports. West and North-East Black Sea port-cities may have the same absolute size of trade flows, given the "closed loop" trade system of the sea, however, the size of the trade flows transported through the West Black Sea ports is relatively bigger, since those ports operate not only as ports of their countries, but also as ports of a wider region (hereto of the West Europe). After all, a port's trade openness and thus urbanization is not affected only by the size of the domestic market but also and mainly by the size of the wider region served by the port [45].

To that point, it is also worth mentioning the positive and statistically significant relationship between the Black Sea ports' trade activity and the railway network extent of the respective country. A city's primacy seems to be greatly affected by transport infrastructure (both waterways and roads), since it facilitates access to the hinterland and opens new markets [38]. Furthermore, Nicolae et al. in their study for the Black Sea port's performance find that the quality of a port's transport connections with the hinterland is crucial for the relationship between the exporter and the "consignee" and thus for the port's trade activity [8]. An adequate and well maintained transportation network makes the goods' movement from and to the port, to and from the hinterland easier diminishing delays and higher costs [46].

Moving now to the estimations derived by the GMM method, especially with respect to the time DV_Ls, the coefficients are positive and statistically significant for the most of the years, possibly referring to a series of structural changes that took place in the end of the nineteenth till the beginning of the twentieth century. The construction of the Dnepr dam, the Volga-Danube canal, the coastal roads and railway networks that linked the ports with the inland completed the alteration of the Black Sea region and gave a boost in the development of its port-cities.

Conclusions

The above empirical conclusions and the discussed theoretical implications, besides enlightening the processes in the specific historical period, they also give rise to analogue questions, meaning the factors that affect the development of the contemporary Black Sea port-cities. During the last decades, Black Sea countries are "affected by a number of economic integration and transition forces shaping at the same time the economic landscape in Europe", while "their identity is dominated by their geographical location" [13]. The changes that took place in the Black Sea region and the emergence of new countries, after the dissolution of the former Union of Soviet Socialist Republics (USSR), led to the restate of the Black Sea countries' frontiers. The port-cities of the coasts could not remain unaffected by the geopolitical and economic transition happening. Some of them were developed, others declined, while others retained their role as significant trade centres.

Taking into consideration the historical developments, it would be interesting for us to examine the socio-political and economic situation of the port-cities studied above during the recent years, let's say the time period from late twentieth century to early twenty first century. In that way we would be given the opportunity to cover some weaknesses of our current study. Since our future study would be referred to the port-cities' development during the recent decades, we believe that the number of the data available would be greater. If this is the case, our sample would be more sufficient and for an extended time period, a weakness of our current study. We also anticipate adding Istanbul to our future research, since the lack of adequate data did not allow us to include its port-city in our current study, another weakness that could be highlighted

How have the Black Sea port-cities and their trade activity been affected by the fall of the Berlin Wall or the dissolution of the Soviet Union some years later? Which are the factors influencing their development? Are they the same with the ones described in the pages of the current article? These are some of the questions that could concern our further research.

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