Ocean and Coastal Management 161 (2018) 57–65

Contents lists available at ScienceDirect

Ocean and Coastal Management

journal homepage: www.elsevier.com/locate/ocecoaman

Coastalization effect and spatial divergence: Segregation of European regions

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ARTICLE INFO

Keywords:
Coastalization
Coastal region
Coastal zone
Inland region
Midland region
Coastal hinterland
Coastal borderland
Geo-economic position

ABSTRACT

Researchers worldwide register continuous socio-spatial polarization connected with the effect of coastalization. It reputedly has the perceptible impact on the increasing regional divergence with the coastal areas exceeding inland territories on a number of socio-economic indicators. A few studies analyze the change in strength of the coastal (marine) influence depending on the distance of the coast, but none focus on the issue of regional segregation to explore the cross-influence of other geospatial particularities. Article presents the results of the statistical analysis of European territories at regional level with regards to the impact of proximity to both the coast and border on regional development. The study refuted a hypothesis on the prevalence of coastal regions in terms of population and GRP. However, our results do confirm the existence of the coastalization effect and its significant impact on the socio-economic development of all types of regions identified, dominated by both coastal and border proximity. A significant impact of the coast over the development of inland regions has predetermined the allocation of a special regional subtype – coastal hinterland, characterized by increased economic efficiency values. The coastal border regional subtype displays a number of distinctive features stemming from a simultaneous impact of coastal and border proximity. Article concludes with policy implications for implementing coastal zone management in coastal border regions.

1. Introduction

Accelerated development of European coastal territories that started in the mid-1800s and lasted up until the 80s of the 20th century saw active population growth and was accompanied by anthropogenic impact on the marine environment (the establishment of irrigation and drainage systems, infrastructural and economic development of the coastal zone). This has attracted attention of the scientific community to the effect of thalasso-attractiveness, or coastalization, i.e. – the attraction of the coast (Antipolis, 2001; Barreto, 2002; Bell et al., 2013; Izci, 2004; Kasanko et al., 2006; Leontidou, 1990; Makhzoumi et al., 2012; Morelli and Salvati, 2010; Salvati, 2014; Salvati and Forino, 2014; Sayas, 2006; Serra et al., 2014; Shi-Qing and Rui, 2012; Sreeja et al., 2016; Suárez Vivero and Rodríguez Mateos, 2005). Such shift towards the sea, or the 'coastal sprawl' (Beach, 2002), became a go-to theme in geoeconomic research, with human geography paying particular attention to the issues of the land-sea and land-ocean contact zone (see, for example, early studies by the Soviet scholars Dergachev, 1980; Lavrov and Salnikov, 1975; Salnikov, 1984; Mikhaylov, 1966; Pokshishevsky, 1979).

Growing importance of coastal territories has led to the so-called 'coastal revolution' in the geographical science: over the last 15–20 years researchers have been increasingly focusing their attention on the impact of the 'coastal factor'[1] on the characteristics and patterns of regional development. Most applied studies of socio-economic development of coastal territories aim to register and substantiate positive population dynamics of this terrestrial surface. Different estimates suggest that coastal area covers up to 20% of the planet's total land surface[2] with the population density twice as much as the global average (Barbier et al., 2008; Burke et al., 2001; Cohen et al., 1997; Creel, 2003; Crossland et al., 2005; Culliton et al., 1990; Emerton, 2006; Pak and Majd, 2011; Reed, 2010; Tobey et al., 2010). Yet, literature review shows a great variation in the percentage of population that is referred to as living in the coastal zone.

As Small and Nicholls (2003) have noted, most scholars postulate that half of the world population reside in the coastal areas (e.g. Creel,

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[1] Coastal geo-economic position that predetermines the socio-economic development trajectory of the region with marine related activities being embedded in the economic structure of the region and outspreading beyond the limits of the coastal zone (see Colgan, 2004; Kildow and McIlgorm, 2010; Morrissey, 2015).

[2] e.g. Gallup et al. (1999) stand for 3%, 4% – Barbier et al. (2008), 8% – Costanza et al. (1997) and Turner et al. (1996), 10% – Thia-Eng (1993) and Shi et al. (2001), 12% – Crossland and Baird (2005), 15% – Burbridge (2004), 18% – Amos et al. (2013) and Smith (2005); 20% – Martinez et al. (2007).

https://doi.org/10.1016/j.ocecoaman.2018.04.024
Received 16 June 2017; Received in revised form 24 April 2018; Accepted 25 April 2018

2003; Hinrichsen, 1996; Kurt, 2016; Rakodi and Treloar, 1997; Shi et al., 2001; Thia-Eng, 1993; Turner et al., 1996). Another popular estimation is 60% or more, reaching two-thirds of the world's people (e.g. Cetin et al., 2008; Cracknell, 1999; El-Sabh et al., 1998; Hinrichsen, 1990, 1996; Vallega, 1998; Vitousek et al., 1997). However, there are numerous research results that do not confirm this mainstream viewpoint. For instance, Gallup et al. (1999) estimate that 13% of the world's population live in the coastal areas, Burbridge (2004) – 37%, Culliton et al. (1990), Emerton (2006), Martinez et al. (2007), Reed (2010), and Tobey et al. (2010) – 40–45%, *et cetera*. As Cohen and Small show in their earlier (Cohen et al., 1997) and later research (Small and Cohen, 2004), these results are highly dependent on the distance from a coastline selected as benchmark measurement – 37–38% of world's people reside within 100 km of the coastline, 44%–150 km, 49–50% – within 200 km, and 66–67% – within 400 km from the coast. Bijlsma et al. (1995) and Bowen et al. (2006) further indicate great variations on the percentage of coastal occupancy among countries. An interstate comparative study conducted by Grenon and Batisse in 1988, revealed significant differences between countries in the share of the population living in the coastal area – from 10% in France, to 100% in Albania, Israel, Lebanon, and Malta. Comparable results were obtained nearly thirty years later by Baztan et al. (2015) whose findings were in the range of 5% in Romania and 9% in Germany, reaching 100% in Cyprus, Denmark, and Malta. Similar divergence is also found on a national, i.e. – intrastate level, as shown by Fedorov et al. (2017) for the Baltic Sea region.

According to various estimates (Kurt, 2016; Makhnovsky, 2014; Valev, 2009), Europe's coastal regions represent no less than 12% of its municipalities and over a third of its total population. Among the 27 countries of the European Union (EU-27, before the accession of Croatia on July 1, 2013), up to 40% of the territory can be attributed to the coastal type (over 33% of all municipalities – the territorial units for statistics of the third level – the NUTS 3 regions). 502 million people, or 40.8% of the population,[3] resided there in 2011 (Collet and Engelbert, 2013; Eurostat regional yearbook 2012: Focus on coastal regions), and almost 40% GDP was generated (Salvador et al., 2015). However, the coastal input differs from country to country. The combined area of coastal regions of Finland, France, Greece, Italy, Spain, and Sweden represent two-thirds of the EU-22 Member States coastal area (European Communities, 2009). A study conducted for the European part of Russia has shown that in some regions the coastal zone accounts for over half of all employment, enterprises, investments and industrial output (Druzhinin, 2017).

Further development of the coastalization trend is ambiguous and represents an important scientific problem. Some researchers forecast a steady or even exponential increase in the concentration of socio-economic activity in coastal areas with the population figures reaching up to 75% of the world's total within the next 10–15 years (Adger et al., 2005; Amos et al., 2013; Arakelov, 2011; Barbier et al., 2008; Bulleri and Chapman, 2010; Cetin et al., 2008; Creel, 2003; El-Sabh et al., 1998; Hinrichsen, 1996; McGranahan et al., 2007; Pak and Majd, 2011; Pernetta and Elder, 1992; Rakodi and Treloar, 1997). Salvati (2014) further specifies that most prominently the coastal sprawl will be evident in coastal cities. According to Cori (1999), a significant increase in the coastal population will be observed in some regions belonging to the south-east coast of the Mediterranean Sea, with simultaneous strengthening of the inland (i.e. mainland, continental) urbanization in France, Italy and Greece. A number of other studies support this viewpoint; scholars hypothesize the transition from coastalization to continentalization, accompanied by a shift of economic activity towards inland regions (e.g. Bezrukov, 2008; Famoso, 1995; Makhnovsky, 2014). A recent study on coastal regions has recorded a declining population in the coastal regions of Greece – by 1.4%, Bulgaria and Estonia – by 1.7%, Germany – 2%, Romania – 7.8%, Latvia – 8% and Lithuania – 11.7% in 2005–2014 (Maritime economy statistics …, 2015). Yet it would be premature to assert on the formation of a global or pan-European trend. Such a reduction often, reflects the nationwide trend, rather than coastal particularity, especially in the Baltic States.

As shown in the literature review, region's geo-location has a significant impact on the vector of its development and is determined by the cross-influence of a range of natural, geopolitical, socio-cultural, economic, institutional and other factors and conditions. The coastal location in particular is suggested to be one of the drivers of regional socio-economic development and prosperity. Researchers agree that the strength of coastalization effect differs with remoteness from marine coasts (incl. Latitude), and their key message remains unchanged – a significant part of land, defined as coastal, for a long time shows accelerated growth rates, and this trend is projected to strengthen. However, considering coastalization effect without taking into account other spatial factors equalizes all coastal regions (as well as all inland regions) and prevents from the identification of their development features and particularities.

In this paper, we critically examine the canonical statement on the superiority of coastal regions, in particular, over the concentration of population and economic activity figures. For the first time, the article uses a broad interpretation in determining the regions of Europe, including not only the EU member states, but also the regions of the Balkan peninsula countries, the European part of Russia and others.

A distinctive feature of the study is in its focus area, falling beyond the broad category of a 'coastal region' by segregating the regions, including those, generally united into the category of 'other' – inland, internal, midland, continental, closed, etc. This approach enables to verify whether the coastal regions do have the superiority they have been acknowledged for, especially when contrasted to both the aggregate territory of the inland type, and the other categories of regions – adjacent territories, borderland, etc. The borderland regions are particularly interesting, since this geo-economic position is often described in terms of disadvantages inherent to peripheral outlaying frontiers. The dualistic 'contact-barrier' function (Kolosov et al., 2016) of a border suggests that borderlands are highly vulnerable to the established geopolitics, which may have both positive and negative consequences. Leveraging cross-border cooperation and self-sufficiency defines the development trajectory of a particular borderland, the results of which can be broadly described using the four scenarios outlined by Martinez (1994): alienation, co-existence, interdependence, or integration.

Apart from 'soft' institutional borders of the states, the coastal border regions are characterized by the presence of a coastline – a 'hard' physical border. This natural barrier cannot be eliminated or blurred by liberalization of the barrier function, yet it can be transformed into a strategic resource enabling global cooperation of the region via the development of maritime transport, infrastructure and accessibility. Thus, finding a balance between the contact and the barrier function in a coastal border region is not only a matter of geopolitics and socio-economic strategy, but also an important environmental issue of land-sea relationship.

Our study tests three hypotheses, put forward in response to previous studies on the subject: 1) coastal regions excel inland regions by the average annual population and the aggregate volume of gross regional product; 2) an independent subtype of 'coastal border' regions can be identified due to strong impact of the state border imposed on the coastal regions; 3) inland regions located next to coastal regions are characterized by higher labor productivity compared to other inland regions due to residual influence of coastalization effects.

1.1. Research methodology

The study area covers the regions of 48 European countries. These

[3] Population of European coastal regions: 2007 data for EU-22 – 43% (Collet, 2010; Meiner, 2013), 2013 data for EU-26 – 41.7% (Baztan et al., 2015).