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Development of urban hierarchies at the country and regional levels in Turkey

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Abstract

The purpose of this paper is to illustrate the hierarchical distribution of different city size groups at the country and regional level between 1945 and 2015 in Turkey. During this period, previous studies have illustrated that human mobility played an important role for the physical and socio-economic transformation of cities and regions. At the country level, first, while the growth rate of the number of smaller cities was higher than the others, the growth rate of population was the highest in the large cities. However, later, despite the population increase, the number of small cities was decreased due to transformation of economy from rural to industrial. During the post-modern era, globalization contributed even further the growth of large cities. As a result, hierarchical distribution of different size cities according to regions reveals the wide gap with respect to urbanization between the East and the West of the country. While the metropolitan cities are over urbanized in the urban hierarchy due to globalization, some of the regions in the East do not have large cities due to lack of economic development and higher out-migration rate. Mobility of capital and the people from the East to the West do not allow the full-fledged development of the urban hierarchy in the Black Sea and the East Anatolia Regions. This results in shortage of jobs and thus it becomes a vicious cycle for underdevelopment.

Keywords
Hierarchical urban systems, Regional analysis, Sectoral systems, Turkey, Urbanization.

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1. Introduction

Inter-regional migration and processes of sectoral change affect not only metropolitan areas but also the system of cities as a whole. These changes may be viewed as part of processes that are shaping urban and regional socioeconomic structures spatial evolution. While most research on these issues has focused on specific components of urban and regional change, few studies can be found that consider both the general evolutionary process and its effects on urban system dynamics (Suarez-Villa, 1988). Changes in the comparative advantages of urban and regional location factors, in agglomeration economies, in population, and in sectoral employment are affected by the sectoral structures and their spatial dimensions. In Turkey, long-term changes in the latter were most historically significant in promoting spatial economic and demographic change as, for example, the transformation of the predominantly agricultural economy to industrial, and later, from industrial to post-industrial to some extent. Meanwhile, although economic growth and capital expenditures for development have steadily increased, they have not been uniformly distributed throughout the country, resulting in distinct regional disparities and a socio-economic system with many dualisms in its structure. In general, these changes can be expected to have important implication for the size distribution of cities and the urban hierarchy. The number of cities changed several times since 1940, therefore, population of settlements analyzed by province level to be able to follow development of new cities that were province of another city. In 2012, after the law no 6360, the number of metropolitan cities in Turkey has increased from 16 to 30 and borders of the cities extended over some provinces and rural areas which also changed the hierarchical and sectoral distribution of urban settlements. Although changing policies such as privatization policies, liberalization, etc. effect the sectoral structure of cities and inter-regional migration, the present paper investigates the hierarchical and spatial distribution of different size cities at the country and the regional level through time in Turkey (Figure 1) and does not focus on the explanation of policy effects on urban hierarchies in Turkey. In this sense, it focuses on processes over the possibility of relating urban hierarchical change to other processes of spatial evolution, such as the inter-regional flows, inter-regional inequalities and levels of development, and analysis of spatial and sectoral change.

A review of the literature reveals that there are several studies about the behavior of urban systems at regional, national and international levels, or about how to participate urbanization in order to maximize its advantages and decrease its disadvantages or how economic policies affect the regional social structure and how this structure is changing. Rozman (1978) analyzed the development of urban hierarchical systems from century to century for various countries by using urban pyramids. As he stated, "the varying pyramidal shapes of a graphic representation of the number of central places at each level in the hierarchy convey a general image of the urban network". Dunn (1980) illustrated the development of U.S. urban system in relation to economic development. Storper and Harrison (1991) investigated urban hierarchy with respect to regional development in the 1990s. Coffey and Polese (1984) provide a significant perspective on internally generated evolutionary change and also considered the role of migratory flows in distributing the sources of growth and the relationship between the spatial expansion and supply networks of firms and their location. Current theories of nodal regions and central place hierarchies provide the bases for the recognition of region wide organization of cities into networks, which contributes to the balances distribution of quality of cities. Previously, Rosen and Resnick (1980), Johnson (1980) and Ettlinger (1981) related the city size distribution to levels of economic development and spatial interaction. Hierarchical interaction has also attracted substantial attention from other scholars who have conceptualized and stimulated process models of urban hierarchy growth and change (Allen & Sanglier, 1981; Wil-

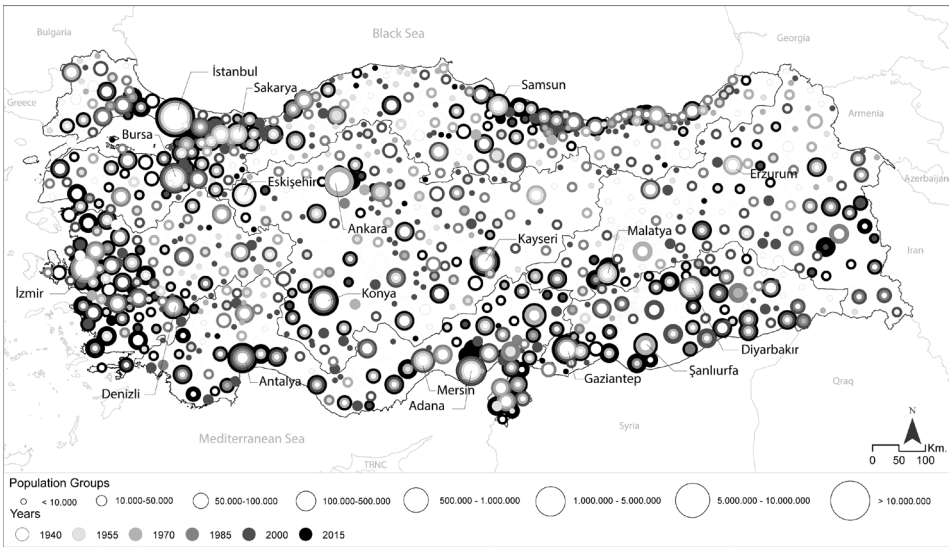

Figure 1. *City size distribution in Turkey from 1940 to 2015.*

son, 1978). Analytic hierarchical city location models and hierarchical plant location models were developed by Dökmeci (Dokmeci, 1975; Dökmeci, 1989a, 1989b)

One of the most significant and visible aspects of metropolitan change is its temporal effect on interurban city size. Most of the literature on urban and regional spatial structure has assumed, that, long term shifts in the urban system are, to a great extent, a product of changes occurring in a nation's largest or primate metropolitan areas (Parr, 1981, 1985). In this respect, shifts in population and the sectoral economies may be closely related to secular patterns of metropolitan change (Suarez-Villa, 1988). To understanding and measurement of these shifts do require a long term evolutionary perspective on the spatial process of hierarchical distribution of cities.

The urbanization process in developing countries is a cumulative result of many basic trends such as rural over population, shortage of jobs, increased mobility, and rise in personal aspirations and expectations. The effect of high migration to large cities may result in agglomeration diseconomies such as congestion, pollution, and crime which is difficult to deal with the capacities of the developing countries (Rogers, 1984). The problem confronting almost every developing country whether this inevitable urbanization process will focus on a few urban poles of primate cities or whether a more articulated and dispersed pattern of urban centers will emerge. In the first case a split into two societies and economies- one urban and modernized, the other traditional society and economy (Brutzkus, 1975). During the last decade, some political parties have especially emphases and benefitted from this duality. As a result of this duality, inequality persists throughout the developing countries. For instance, the quality of life in South American cities is in most ways dramatically inferior to the quality of urban life in North America. As an example, about two-third of the 20 million people living in Mexico City live in substandard housing, without adequate water supply, sewage, garbage disposable, clinics, hospitals, parks, and schools. The Latin America metropolis is characterized by mass poverty and environmental pollution on a scale generally unparalleled in the North. Inequality between the large metropolitan regions, small cities, and rural towns of Latin American nations are gaping. Inequalities within metropolitan areas are no less dramatic (Angotti, 1996).

This disparity sometimes is further compounded by the depopulation of lagging regions and in-migration into the developed regions, aggregating serious urban problems such as transportation congestion, housing, and high costs of public services. At this junction decentralization policy or a balanced growth concept seems to be a universal answer to the problem. This

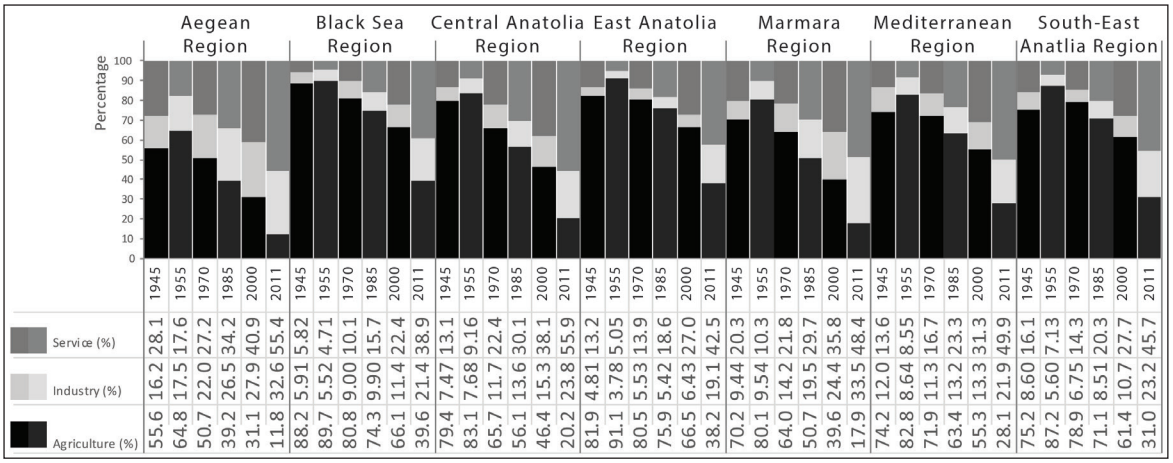

Figure 2. *Changing sectoral distribution of 7 regions in Turkey from 1945 to 2011.*

issue often leads to the policy problem of the spatial reallocation of scarce resources, mainly capital investment, among the regions in a developing country. Today, decentralization of industrial activities is an urgent problem for a great many developing countries in Asia. Spatial distribution of industrial activities is, therefore, an integral part of regional development planning.

More regular distribution of settlements in developed countries than developing countries is observed. For instance, Johnson (1971) illustrated spatial uniformity of a central place distribution in New England, USA, Semple and Golledge (1970) in Canadian prairies and Beckman (1968) in Southern Germany.

Thus, the present paper investigates the development of urban hierarchies in Turkey at the country and regional level. In the second section, regional socio-economic disparities, urbanization levels and the urban hierarchy are described through time. In the third section, regional development of urban hierarchies is explained through time. Final section is devoted to a conclusion and suggestions for further research.

2. Evolution of the hierarchical urban system, socio-economic and sectoral changes

After 1950s, the transformation of the economy from rural to industrial played an important role to increase urbanization and for the development of the urban system and have created a whole new structure of spatial organization and patterns in Turkey (Albaum & Davies, 1973). In 1955,

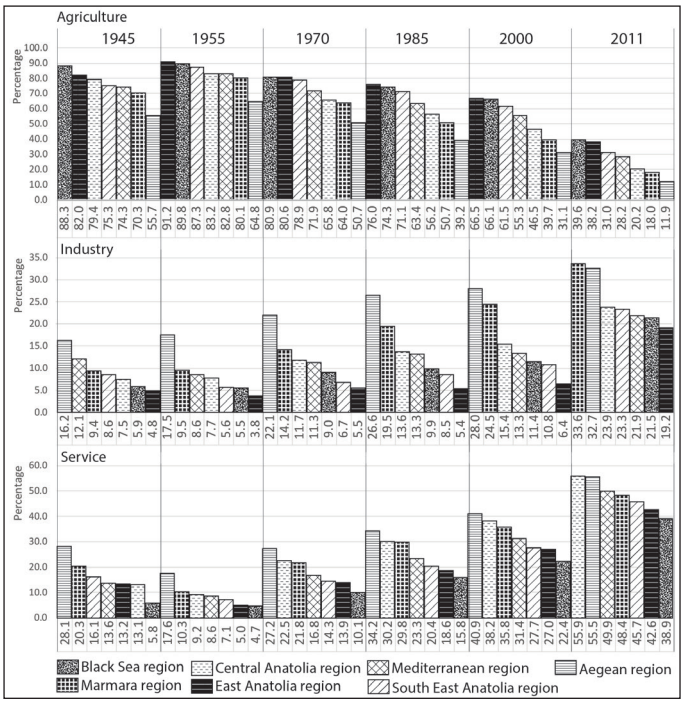

Figure 3. *Changing sectoral distribution from 1945 to 2011.*

while 32.37% of population was urban, in 2000 this ration was increased to 72.07% (Zeyneloğlu, 2008). The most significant change in the broader context is the transition from an industrial to a post- industrial society that was recognized in the fourth quarter of the twentieth century. Much has been written about this transition; generally, it has been characterized by the growth and development of a variety of service sectors in the large cities (Dökmeci & Balta, 1999; Dökmeci & Berköz, 1994). Meanwhile, changes in communication and transportation technology have contributed to the development of the hierarchical settlement system at the regional and country level (Dök-

Table 1. *Ratio of Industrial companies from 1927 to 2001 (Dinler, 1978).*

	1927	1939	1955	1964	1973	1981	1996	2001
Marmara Region	29.6	51.0	47.8	56.1	54.7	57.9	49.7	52.4
Aegean Region	17.9	20.0	19.8	14.0	15.0	14.9	19.9	17.4
Central Anatolia Region	15.8	8.0	10.9	11.6	12.6	11.6	12.6	14.1
Black Sea Region	12.3	6.0	6.8	8.2	7.8	6.8	7.1	6.3
Mediterranean Region	6.6	7.0	7.0	6.4	6.6	5.5	5.7	5.8
South East Anatolia Region	8.2	3.0	3.9	1.7	2.1	2.0	3.6	2.8
East Anatolia Region	9.6	5.0	3.8	1.6	1.2	1.4	1.3	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

meci, 1986).

Sectoral distribution data for cities from 1945 to 2011 (TUIK, 1953, 2013, 2016) is generalized to the geographical regions to represent the change in each region (Figure 2). With respect to the socio-economic characteristics of the regions, the ratio of agricultural employment increased between 1945 and 1955 in all regions but continuously decreased between 1955 and 2011. This decline reached to the dramatic level around 20% between 2000 and 2011. The Aegean Region was most industrialized (17.5%) than the other regions and had highest services (17.6%) in 1955 (Figure 3). Again, the Aegean Region was the most industrialized region (27.9%) and the first with respect to services (40.9%) in 2000, while its urbanization ratio was the fourth (61.4%) in 2000. In 2000, in the Central Anatolia Region, industrial employment was the third largest (15.4%), its service employment (38.2%) and its urbanization ratio (69.2%) was the second largest in 2000. The Mediterranean Region was the fourth highest with respect to industrial employment (13.3%), and service employment ratio (31.3%) and its urbanization ratio was the fifth largest (59.7%) in 2000. This region becomes third in service employment ratio (49.9%) in 2011. A large amount of investment in tourism played an important role for the development of service sector in this region.

The South-East Anatolia Region was the sixth largest with respect to industrial employment (10.8%) and third with respect to urbanization ratio (62%), the fifth largest service employment (27.7%). Industrial employment in the East Anatolia Region (6,4%), the Black Sea Region (11,4%), and South East Anatolia Region (10,8%) are lowest values in Turkey in 2000.

Analyzing change number of industrial companies starting from 1927 to 2001 show that the ratio of three regions were respectively, 9.6, 12.3, and 8.2 in 1927 and 1.2, 6.3, and 2.8 in 2001 (Table 1). The ratio of the number of companies in these regions reduced from 30.1 to 10.3, which is lower than the ratio of the Black Sea Region in 1927, between the years 1927 and 2001 (Dinler, 1978).

The East Anatolia and the Black Sea Regions were much less developed and had lower urbanization ratios (53% and 49%, respectively) than the other regions due to lack of necessary industrial investment and thus the large amount of out-migration from these regions to the more developed ones (Yazgi, Dokmeci, Koramaz, & Kiroglu, 2014). As an example of income gap within the country, the highest income per capita ($6,165) was in Kocaeli, which is near Istanbul, and the lowest ($ 568) was in Ağrı, which is located at the eastern boundary of the country. Since 1960s, various governments have planned to spread equal levels of development throughout the country; however, they have all failed to accomplish this goal (Celebioglu & Dall'erba, 2010; Gezici & Hewings, 2007; Tekeli, 2008).

Although, the changes in sectoral distribution after 2011 did not included in this article, after the law no 6360, in 2012, the number of metropolitan cities in Turkey has increased from 16 to 30 and borders of these cities covered provinces and rural areas. This changeover results in dramatic differences in the population and the ratio of agricultural production in these villages, which also changes the hierarchical and sectoral distribution of urban settlements. Population of cities and

towns were 77.3% and of districts and villages were 22.7%. After the new regulation, population of districts and villages reduced to 8.7% (Kızılaslan, Ünal, & Kızılaslan, 2016).

As Sawers stated, "Dissatisfaction with the regional distribution of population and employment is nearly universal among Third World policy makers. In particular, the overwhelming economic, social, demographic, and political dominance of the largest city –its primacy- is believed to sap the development potential of the entire country as well as present in surmountable problems from excessively rapid growth of the primate city itself. Yet few governments have moved vigorously against urban primacy" (Sawers, 1989).

In order to evaluate the development of hierarchical urban system in Turkey, the cities above 10,000 are taken into consideration as an "urban" settlement, which is defined as a minimum population limit to be an urban settlement in the second national development plan of Turkey. A research on the rank-size distribution of Turkish cities also uses five groups starting form 10.000 population (Dökmeci, 1986). Although another research on spatial urban hierarchy of Turkey defines seven levels total, it includes settlements with population lower than 10.000, but five hierarchical levels defined over 10.000 population limit (Mutlu, 1988). Population of cities have great range starting from 1940 to 2015. For example, İstanbul has 793.949 population in 1940, which is the highest in that year. The population of Istanbul increases to more than 14.000.000 in 2015. Therefore, in this research seven groups are defined to analyze the changing hierarchical structure of the geographical regions of Turkey.

The high amount of migration among the regions increased urbanization and the distribution of city size groups at the country level. For instance, in 1940, there were 2 cities between 100,000 and 500,000, 6 cities between 50,000 and 100,000 and 87 cities between 10,000 and 50,000 together with Istanbul at the top with 793,949 people (See, Figure 4).

In 1955, there were 5 cities between 100,000 and 500,000, 11 cities between 50,000 and 100,000, and 104 cities between 10,000 and 50,000. Meanwhile, Istanbul with 1,268,771 people, reached to a much higher level than expected by separating itself from the rest of the urban hierarchy due to high amount of rural to urban migration (Figure 4).

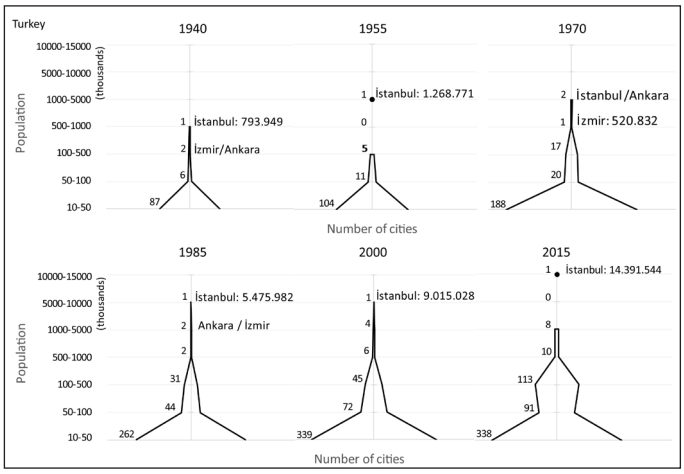

Figure 4. *The Hierarchy of City Groups from 1940 to 2015.*

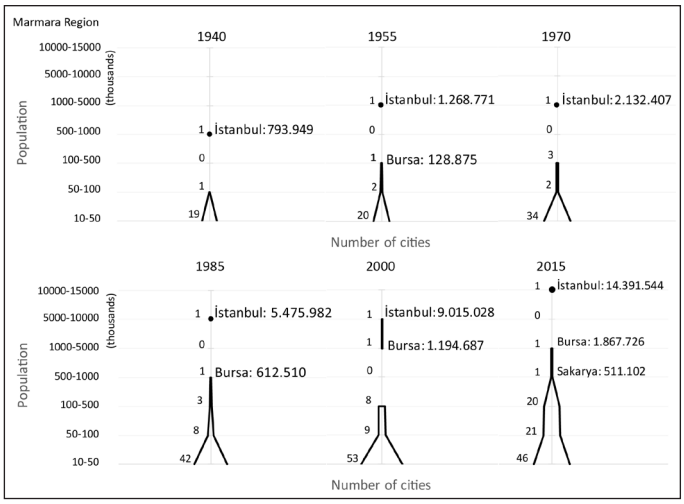

Figure 5. *Urban Hierarchy in the Marmara Region from 1940 to 2015.*

In 1970, the number of cities between 100,000 and 500,000 increased to 17, the number of cities between 50,000 and 100,000 to 20 and the number of cities between 10,000 and 50,000 to 188 and the population of Ankara and Istanbul were between 1,000,000 and 5,000,000 and Izmir 520,832 (See, Figure 4). During this period, increase in the urbanization ratio was almost equal to the increase in the urbanization ratio in the US in 100 years, and in 50 years in England, in the 19th century (Weber, 1898).

In 1985, it is observed relatively a regular pattern distribution of cities in the urban hierarchy. Istanbul was at

the top of the hierarchy with 5,475,982 people. There were 2 cities between 1,000,000-5,000,000, 2 cities between 500,000-1,000,000, and 31 cities between 100,000-500,000, 44 cities between 50,000-100,000 and 262 cities between 10,000-50,000.

In 2000, rapid urbanization of large cities had continued and there were 4 cities between 1,000,000-5,000,000, 6 cities between 500,000 and 1,000,000, 45 cities between 100,000 and 500,000, 72 cities between 50,000 and 100,000 and 339 cities between 10,000 and 50,000. Meanwhile, the population of Istanbul reached to 9,015,028. So, the hierarchy of cities had expended vertically and horizontally (Figure 4). Application of this approach confirms that the occupational structure has an evident relationship with settlement size. As we move up the urban hierarchy, the percentage of the population in various nonagricultural occupations rises accordingly.

In 2015, there were 8 cities between 1,000,000-5,000,000, 10 cities between 500,000 and 1,000,000, 113 cities between 100,000 and 500,000, 91 cities between 50,000 and 100,000, and 338 cities between 10,000 and 50,000 together with Istanbul at the top of the hierarchy with 14,391,544 people with world city characteristics (Robinson, 2005) (Figure 4). Because of decrease of agricultural subsidies, and free trade policy to import agricultural products and closing down factories in the cities at the lower levels of the urban hierarchy, while the number of cities were increased at the top three levels of the urban hierarchy, they decreased at the smallest city group due to decrease of the agricultural sector. The dependency of small city populations on the agricultural population was already illustrated by the previous studies (Mutlu, 1988).

Thus, the number of cities and their sizes were increased in parallel to the population growth and economic development as already claimed by the previous researchers that the population growth and growth of the size of cities, as an indicator of relative importance and development process (Chase-Dunn & Manning, 2002). The rank of the three largest cities mostly stayed constant during the study period as already illustrated by the previous studies (Polèse & Denis-Jacob, 2010). Continuous rural to urban migration and the growth of large cities creates duality in the society which is a general characteristic in developing countries (Sawers, 1989). Especially, this phenomenon was observed during the last decade in Turkey with especial emphasis of politicians and used for their benefits as in some other developing countries

3. Evolution of hierarchical urban system at the regional level through time in Turkey

In general, a well- developed urban system is taken as a prerequisite for the balanced economic development. According to previous researchers, within this system, movements and flows occur hierarchically (from the largest centers to the next larger) and with some distance decay effect. But much more important are the lateral interconnections between large regional centers (Pred, 1975). Within this context, to evaluate the interdependency for economic development strongly suggests the need to examine the structural evolution of the urban system at the regional level through time.

In the 1940s, like most developing countries, Turkey did not have a much-proliferated urbanized structure. Economic development and especially industrialization, however, has led to further urbanization of the economy. Investigation of the regional urban system through time reveals that balanced development of the urban system started primarily in the West because of migration from the East to the West and then spread toward the Central Anatolia Region. There was one city between 50,000-100,000, and 19 cities between 10,000 and 50,000. Istanbul with a population of 793,949 was far above the urban system in the Marmara Region since it was the largest city of the country.

3.1. Marmara Region

In 1940 and 1955, the Marmara Region was the most urbanized area in the country. Istanbul was at the top of the urban hierarch with a popula-

tion of 793.949 in 1940 (Figure 5) and 1.268.771 people in 1955.

While there were no cities between 500.000-1.000.000, there were only one city between 100.000-500.000 and two cities between 50.000 and 100.000. Meanwhile, there were 20 cities at the lower level of the hierarchy between 10.000 and 50.000 (Figure 5).

In 1970, industrial and population growth of Istanbul spread to its periphery and the number of large cities between 100,000-500.000 increased to 3 (Figure 5). These cities enjoyed the advantages of agglomeration without the disadvantages of size. The pattern then would be one of megalopolitan development, which as an adaptation to over-increasing populations, to urbanization in the form of a constellation of metropolitan areas. This development is observable in most developed countries (Alonso & Medrich, 1978). While there were 2 cities between 50.000 and 100.000, there were 39 cities between 10.000-50.000, which represent the increasing number small towns depending on agricultural production stimulated by the growth of population and industrialization of this region (Albaum & Davies, 1973).

In 1985, Istanbul was at the top of the urban hierarchy with a population of 5,475,982 people. Increasing global interactions (Jacobs, Ducruet, & De Langen, 2010) it was the 24th among the world cities with respect to location of headquarters and first class subsidiaries of the world's 100 largest corporations (Godfrey & Zhou, 1999). As a result of continuous rural migration due to its jobs and education opportunities, its growth was already above the capacity of the country and there was a break in the urban hierarchy (Figure 5). The urban pattern then illustrated the adaptation of its over-increasing population to transformation of its urban structure from the mono-nucleated large city of the mid-twentieth century to the poly-nucleated metropolis of the last quarter of the twentieth century (Dökmeci & Berköz, 1994). Istanbul was the capital of thee empires and its historical center don't allow the construction of high rise buildings which were only permitted in the periphery of the city. While there was no city

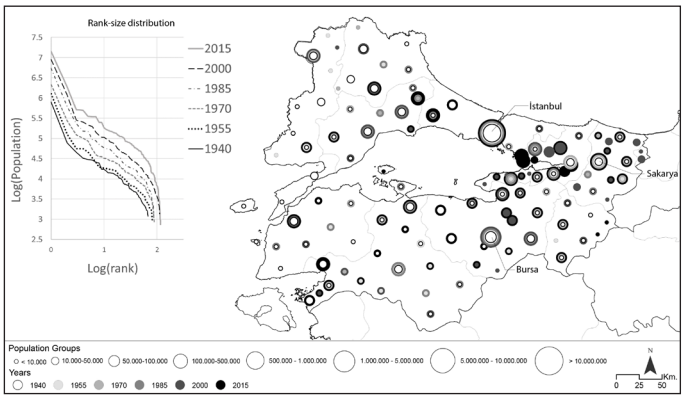

Figure 6. *City size distribution in the Marmara Region from 1940 to 2015.*

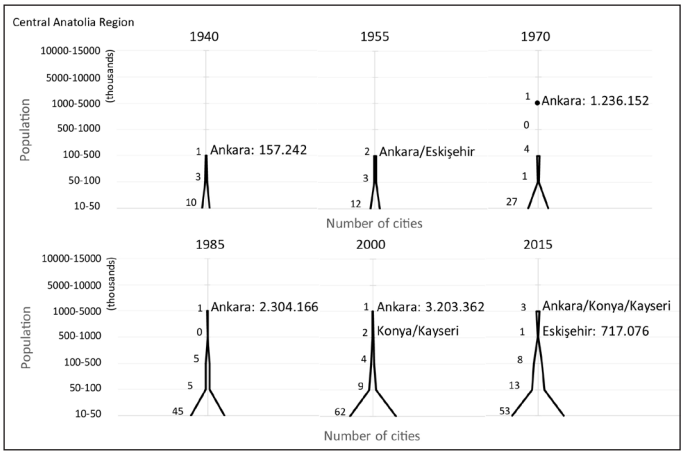

Figure 7. *Urban Hierarchy of Central Anatolia from 1940 to 2015.*

between 1.000.000-5.000.000, there was only one city between 500.000-1.000.000. Meanwhile, the number of cities between 100.000 and 500.000 was stayed constant at 3 and the number of cities between 50.000-100.000 was increased to 8. The highest growth in the number of cities was observed between 10.000 and 50.000 as 42 (Figure 5). While the regional pattern of the urban hierarchy displayed a regular pattern except the lacking level between Istanbul and the rest the urban hierarchy due to extreme growth of Istanbul as a result of national and global interactions.

In 2000, the population of Istanbul was almost doubled with 9,015,028 people. Bursa was the second largest city with 1,194.687 people due to heavy industrialization and increasing national and global interactions (Figure 5). Both of them were separated from the rest of the urban hierarchy since there were no cities between 500,000 and 1,000,000. There were 8 cities between 100,000-500,000, 9 cities be-

tween 50,000 and 100,000, and 53 cities between 10,000 and 50,000.

In 2015, the population of Istanbul was 14,391,544. As a result of increasing global interactions with respect to trade and tourism, the location of Istanbul raised to 15th within the world city ranking system (United Nations, 2014). The lack of layers of cities between 5,000,000-10,000,000 interrupted the top level from the rest of the urban hierarchy (Figure 5). While the number of cities between 1,000,000 and 5,000,000, and between 500,000 and 1,000,000 was one, between 100,000 and 500,000 increased to 20, between 50,000 and 100,000 to 21, the number of small cities between 10,000 and 50,000 were reduces to 46 in this period. This can be explained by the high amount of migration from this level to the higher levels of the hierarchy or loosing population due to locational disadvantages (Kundak & Dökmeci, 2015; Zeyneloğlu, 2008).

Thus, during this period, although the growth of Istanbul and Bursa above the capacity of the region due to globalization and high in-migration created an interruption within the continuity of regional urban hierarchy, the rest of the regional system was developed into a more integrated pattern (Figure 6) with the diffusion of industry within the existing settlement system and the development of the transportation network in the metropolis hinterland.

3.2. Central Anatolia Region

In 1940, there was a small urban hierarchy in the Central Anatolia. While Ankara was at the top of the hierarchy with a population of 157,242, there were 3 cities between 50,000 and 100,000, and 10 cities between 10,000 and 50,000 (Figure 7).

In 1955, the Central Anatolia was the second most urbanized region in the country. The urban hierarchy had only 3 levels. There were two cities between 100,000 and 500,000. One of them was Ankara, which was growing very rapidly due to provision of large amount service jobs being the capital of the country and attracting large amount rural migrants. The second one was Eskişehir due being an industrial center. There were 3 cities between 50,000 and 100,000 and 12 cities between 10,000 and 50,000 (Figure 7).

In 1970, the population of Ankara grew more than 3 times and reached to 1,236,152. There were no cities between 500,000 and 1,000,000, which breaks the continuous distribution of cities within the levels of the urban hierarchy and emphasizes the role of Ankara above the region at the country level. There were 4 cities between 100,000 and 500,000 and one city between 50,000 and 100,000 which illustrated the rapid growth of cities in lower level and their movement to the higher level. During this period, the number of cities between 10,000 and 50,000 was increased to 27 due to increasing demand for agricultural production and trade as a result of population growth (Albaum & Davies, 1973) (Figure 7).

In 1985, under the dominance of Ankara, urban growth was observed in each level of the urban hierarchy. The distribution of cities according to the different layers of the urban hierarchy was illustrated in a more regular pattern. There was one city between 1,000,000 and 5,000,000 and 0 city between 500,000 and 1,000,000, 5 cities between 100,000 and 500,000, 5 cities between 50,000 and 100,000 and 46 cities between 10,000 and 50,000 (Figure 7).

In 2000, the population of Ankara reached to 3,203,362. There were 2 cities between 500,000 and 1,000,000, 4 cities between 100,000 and 500,000, 9 cities between 50,000 and 100,000, and 62 cities between 10,000 and 50,000 (Figure 7).

In 2015, during this period, although the general pattern of the hierarchical urban system mostly was preserved, the number of large and middle size cities was increased and the number of small cities was decreased. There were 3 cities between 1,000,000 and 5,000,000. There was one city between 500,000, and 1,000,000, the number of cities between 100,000 and 500,000 was 8, the number of cities between 50,000 and 100,000 was 13 and the number of small cities was 53. While the globalization effected the growth of the number of the large and middle size cities, free trade policy to import agricultural products and reduction in agricultural

subsidies caused the decline of small cities, which were mostly depending on agricultural production and industry (Figure 7).

In this region, during the last decade, in all the provinces, out-migration exceeds in-migration except Ankara and Eskisehir (Koramaz & Dokmeci, 2016). It is necessary to increase new investments in order to prevent economic decline and population loss in the provinces such as Çankırı, Yozgat, and Kırşehir as a substitute for the loss of agricultural industry (Figure 8).

Development of these provinces is important not only for themselves but also to provide economic development corridors between the development clusters (Özdemir & Dökmeci, 2015).

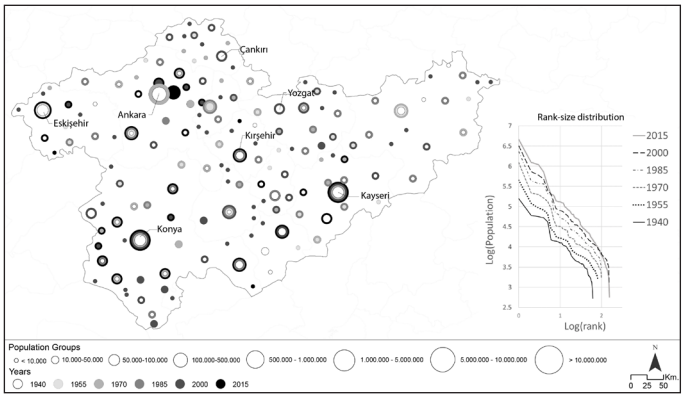

Figure 8. *City size distribution in the Central Anatolia Region from 1940 to 2015.*

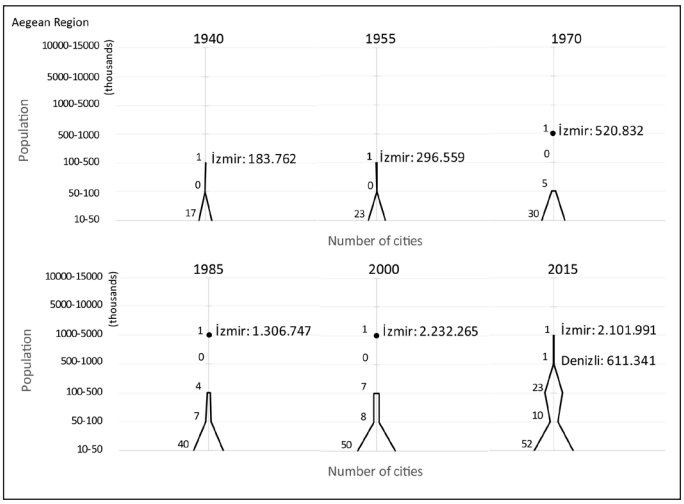

Figure 9. *Urban Hierarchy of the Aegean Region from 1940 to 2015.*

3.3. Aegean Region

In 1940, in the Aegean Region, there was a small urban hierarchy. Izmir was at the top of the urban hierarchy with a population of 183,762 people. While there were no cities between 50,000 and 100,000, there were 17 cities between 10,000- 50,000 (Figure 9).

In 1955, in the Aegean Region, while the general pattern of urban hierarchy was preserved, the population of Izmir was reached to 296,559 and the number of cities between 10,000 and 50,000 became 23 (Figure 9). There were no cities between 50,000 and 100,000 since Izmir was the major attraction center in the region due to having a port, industrial and service jobs and infrastructure. The small cities were mainly based on agricultural production and trade as already illustrated by Zeyneloğlu (2008).

In 1970, despite the increasing number of cities because of economic development, the general pattern of urban hierarchy stayed the same. The population of Izmir was almost doubled and reached to 520,832. There were 5 cities between 50,000 and 100,000. The number of small cities between 10,000 and 50,000 was increased to 30 due to growing demand for agricultural production as a result of increasing population and urbanization in the region (Figure 9).

In 1985, while the population of Izmir was tripled and increased to 1,306,747, the number of cities between 100,000 and 500,000 was 4, between 50,000 and 100,000 was 7, and between 10,000 and 50,000 was 40, the continuity of the urban hierarchy was interrupted by the lack of the layer of cities between 500,000 and 1,000,000 which means the growth of Izmir beyond the capacity of the region due to its growing global and national trade relationships (Önder, Deliktaş, & Karadağ, 2010) (Figure 9) and thus increasing in-migration.

In 2000, while the urban hierarchy preserved its general pattern, the population of Izmir reached to 2,232,265, the number of cities between 100,000 and 500,000 increased to 7, cities between 50,000 and 100,000 to 8 and cities between 10,000 and 50,000 to 50 (Figure 9).

In 2015, it is observed a well develop urban hierarchy (Figure 10) due to increasing integration of the development cluster in the region as already illustrated by Eraydin and Armat-

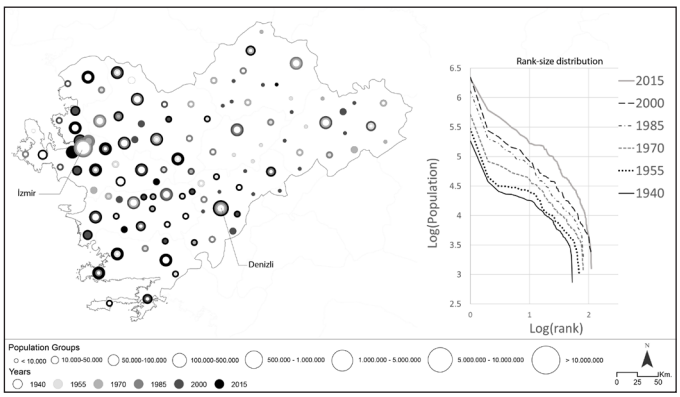

Figure 10. *City size distribution in the Aegean Region from 1940 to 2015.*

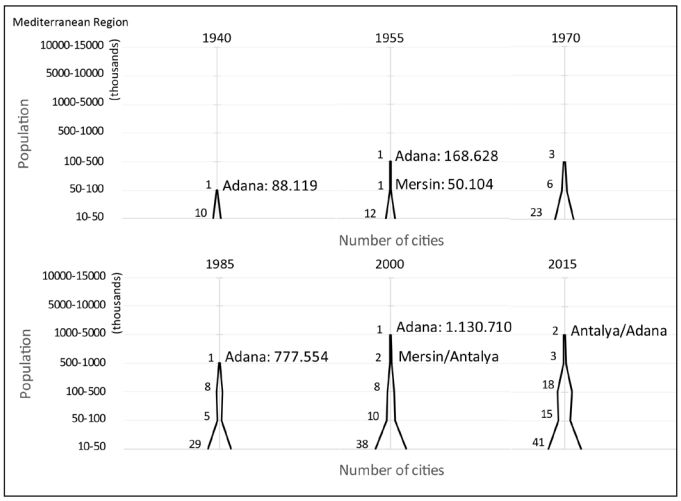

Figure 11. *Urban Hierarchy from 1940 to 2015.*

li-Koroglu (2005). The number of cities between 1,000,000-5,000,000 and between 500,000 and 1,000,000 was one. The number of cities between 100,000 and 500,000 increased to 23, cities between 50,000 and 100,000 increased to 10, and cities between 10,000 and 50,000 was increased to 52 (Figure 9).

3.4. Mediterranean Region

In 1940, in the Mediterranean Region, there was a simple urban hierarchy consisted of two levels. Adana was at the top of the hierarchy with a population of 88,119 and there were10 cities between 10,000 and 50,000 (Figure 11).

In 1955, there was a three level urban hierarchy. The population of Adana was doubled with 168,628 people. There was one city between 50,000 and 100,000, and there were 12 cities between 10,000 and 50,000. There were no large cities, and thus, capital and people who are more qualified to work at the top level of urban hierarchy, were migrating to large cities in other regions (Figure 11).

In 1970, it was observed the growth of cities in each level of the urban hierarchy as a result of industrial, and tourism development due to mild climate and amenities along the Mediterranean coast, and agricultural development at the lower level of the hierarchy due increasing demand for agricultural products. There were 3 cities between 100,000 and 500,000, 6 cities between 50,000 and 100,000, and 23 cities between 10,000 and 50,000 (Figure 11).

In 1985, the urban hierarchy increased to 4 levels. Adana was at the top of the hierarchy with a population of 777,554 people. There were 8 cities between 100,000 and 500,000, 5 cities between 50,000 and 100,000, and 29 cities between 10,000 and 50,000 (Figure 11). The impact of industrial, tourism and agricultural development had continued on urbanization in this period, also.

In 2000, there was a 5 level urban hierarchy. Adana was at the top of the urban hierarchy with 1,130,710 people. There were 2 cities between 500,000 and 1,000,000, 8 cities between 100,000 and 500,000, 10 cities between 50,000mand 100,000 and 38 cities between 10,000 and 50,000 (Figure 11).

In 2015, the number of cities on each level of urban hierarchy was increased, due to economic development and urbanization (Figure 12). There were 2 cities between 1,000,000-5,000,000 (Adana with industrial establishments and Antalya with tourism investments were the hub of migration (Koramaz & Dokmeci, 2016), three cities between 500,000 and 1,000,000, 18 cities between 100,000 and 500,000, 15 cities between 50,000 and 100,000, and 41 cities between 10,000 and 50,000 (Figure 11).

3.5. South-East Anatolia Region

In 1940, the South-East Anatolia Region was highly agricultural and had a two-level urban hierarchy. Gaziantep was at the top of the hierarchy with a population 57,132. There were 8 cities between 10,000 and 50,000 (Figure 13).

In 1955, the South-East Anatolia had continued to have the similar urban hierarchy. There were two cities

between 50,000 and 100,000, and 9 cities between 10,000 and 50,000 (Figure 13).

In 1970, the rapid urbanization in the region resulted in the horizontal growth of the medium size cities. There were 3 cities between 100,000 and 500,000, and 18 cities between 10,000 and 50,000. Thus, capital and better qualified people to work at the top of the urban hierarchy were moving to the larger cities in the other regions due to lack of large cities in this region (Figure 13).

In 1985, although the levels of urban hierarchy stayed constant, the urban system expended horizontally due to large construction of dams, industrial and agricultural development which increased urbanization. The number of cities between 100,000 and 500,000 was increased to 4, between 50,000 and 100,000 to 4 and between 10,000 and 50,000 to 24. Thus, during this period also, capital and qualified professionals had continued to migrate to large cities in the other regions due to lack of jobs appropriate for them in this region (Figure 13).

In 2000, the levels of urban hierarchy were increased to 4. The number of cities was increased in each level except the lowest level which stayed constant. There were 2 cities between 500,000 and 1,000,000, 6 cities between 100,000 and 500,000, 12 cities between 50,000 and 100,000, and 24 cities between 10,000 and 50,000 (Figure 13).

In 2015, during this period, this region had the third highest urban ratio in the country and the urban hierarchy took a regular pattern as a result of large infra-structure investments, increasing international trade and economic development. While the levels of the urban hierarchy and the number of large and middle size cities were increased, the number of small cities was stayed constant as a result of free trade policy to import agricultural products, reduction of agricultural subsidies and thus the higher amount of out-migration (Yazgi et al., 2014). Gaziantep took place at the top of the urban hierarchy with a population of 1,597,324, there were 2 cities between 500,000 and 1,000,000, 16 cities between 100,000 and 500,000, 12 cities between 50,000 and 100,000, and 24 cities between 10,000 and 50,000 (Figure 13,Figure 14).

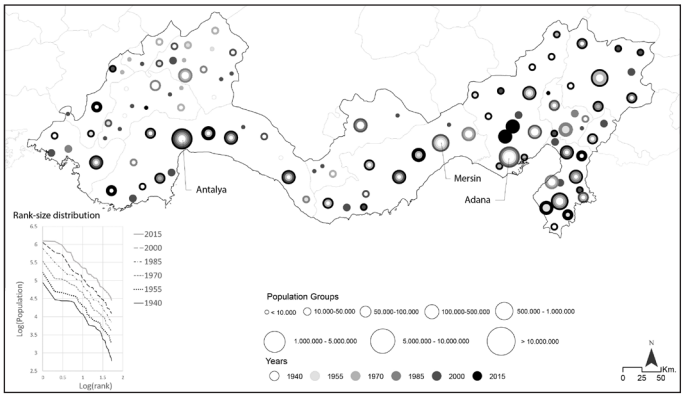

Figure 12. *City size distribution in the Mediterranean Region from 1940 to 2015.*

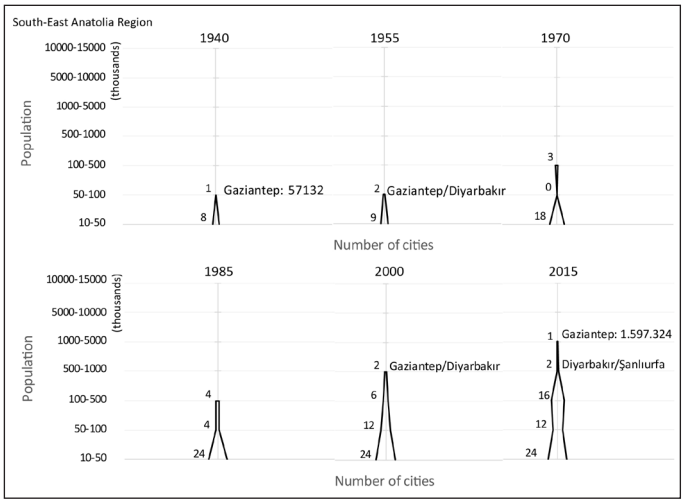

Figure 13. *Urban Hierarchy from 1940 to 2015.*

3.6. Black Sea Region

In 1940, in the Black Sea Region, there was a single level urban hierarchy consisted of 15 cities between 10,000 and 50,000 (Figure 15).

In 1955, there was a simple two level urban hierarchy. Samsun was at the top of the hierarchy with a population of 62,629 and there were 20 cities between 10,000 and 50,000. Lower rate of urbanization was the result of the higher ratio of agricultural sector and mountainous pattern of the region which do not allow the development of larger urban centers (Figure 15).

In 1970, the levels of the urban hierarchy and the number of cities were increased due to economic development, population growth and rapid urbanization during this period. There was one city between 100,000 and 500,000, 4

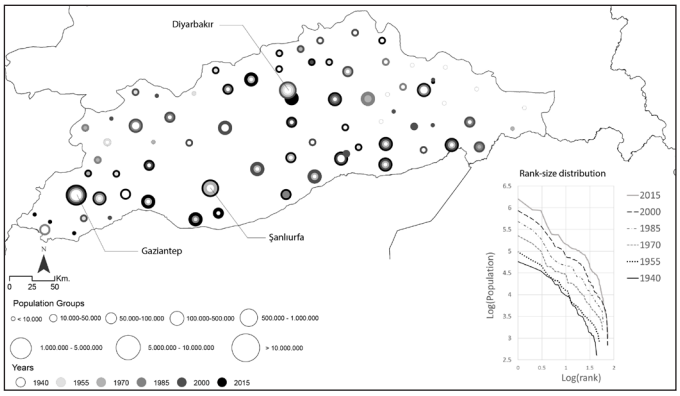

Figure 14. *City size distribution in the South-East Anatolia Region from 1940 to 2015.*

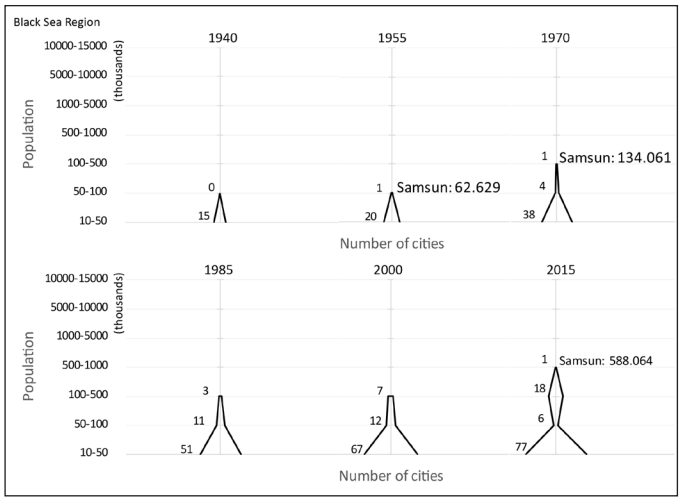

Figure 15. *Urban Hierarchy of the Black Sea Region from 1940 to 2015.*

cities between 50,000 and 100,000, and 38 cities between 10,000 and 50,000 as a result of increasing demand for agricultural products due to population and urbanization growth (Figure 15).

In 1985, while the levels of the urban hierarchy stayed stagnant due to topographic constraints which limit the size of the hinterlands necessary for larger cities, the number of cities on each level of the hierarchy was increased. Thus, urban hierarchy was horizontally developed rather than vertically. There were 3 cities between 100,000 and 500,000, 11 cities between 50,000 and 100,000 and 51 cities between 10,000 and 50,000 (Figure 15) due to increasing demand for agricultural products as a result of population and urbanization growth.

In 2000, the urban hierarchy had continued to grow at the horizontal way due to high amount of out-migration of capital and qualified people who need to work at the higher levels of the urban hierarchy otherwise (Yazgi et al., 2014). There were 7 cities between 100,000 and 500,000, 12 cities between 50,000-100.000 and 62 cities between 10,000 and 50,000. Thus, the number of cities was increased on each level of the hierarchy (Figure 15).

In 2015, both the levels of the urban hierarchy and the number of cities were increased except the middle size cities (Figure 15), due to economic development despite the closing down or privatization of factories (Turk & Dokmeci, 2001). Samsun was at the top of the urban hierarchy with a population 566,064 people. There were 18 cities between 100,000 and 500,000, 6 cities between 50,000 and 100,000, and 77 cities between 10,000 and 50,000 (Figure 16).

3.7. East Anatolia Region

In 1940, the East Anatolia Region had a single level urban hierarchy similar to the Black Sea Region, consisted of 8 cities between 10,000-50,000 (Figure 17).

In 1955, the urban hierarchy had two levels. There were 2 cities between 50,000 and 100,000 and 8 cities between 10,000 and 50,000 (Figure 17). Lower level urbanization and lack of large cities was due to lower level economic development and topographic constraints which limit inter-regional interactions was already observed by the previous studies (Dökmeci, 1986).

In 1970, the levels of the urban hierarchy and the number of cities were increased as a result of industrial investments, economic development and higher urbanization ratio. There were 3 cities between 100,000 and 500,000, 2 cities between 50,000 and 100,000 and 18 cities between 10,000 and 50,000 (Figure 17). Thus, the development of the urban hierarchy was vertical as well as horizontal due to topographic barriers on the hinterlands of the cities.

In 1985, although the number of cities was increased on each level of the hierarchy, the levels of the urban hierarchy stayed stagnant during this period. The number of cities between 100,000 and 500,000, and between 50,000 and 100,000 was 4 and between 10,000 and 50,000 was 31 (Figure 17)

due to increasing demand for agricultural products as a result of population and urbanization growth. Meanwhile, qualified professionals who could not find appropriate jobs due to lack of large firms which require large cities and capital have continued to migrate to the large cities in the West.

In 2000, the horizontal development of urban hierarchy had been continued. There were 5 cities between 100,000 and 500,000, 12 cities between 50,000 and 100,000, and 45 cities between 10,000 and 50,000 (Figure 17). The top level of the urban hierarchy could not have developed due to high amount of migration of capital and qualified persons to large cities in other parts of the country.

In 2015, the urban hierarchy had 4 levels. Malatya was at the top with a population of 595,935 people. While the number of upper level cities was increased, lower level cities were stayed stagnant due to high amount of out-migration rate (Figure 17).

The number of cities between 100,000 and 500,000 was 10, between 50,000 and 100,000 was 14 and between 10,000 and 50,000 was 45 (Figure 17). Lack of investment, closing down or privatization of factories, and reduction of agricultural subsidies, and thus higher rate of out-migration played an important role for the stagnation of the number of small cities.

Thus, the results of the study reveal that while the urban hierarchies of the regions in the West grew more than the capacity of their regions due to their economic development, globalization and receiving high amount of migration from the less developed regions in the East Anatolia and the Black Sea Regions, the latter ones could not have developed their urban hierarchies for the reverse reasons. The lack of development of urban hierarchy plays an important role as the cause of out-migration and thus became a vicious cycle for the less development of these regions. Thus, it is necessary large amount of investments in these regions in order to provide balanced development of the urban hierarchies.

According to Berry (1961) the kind of discontinuity in the urban system is expected to have unfavorable implications for economic and social development. The functions of cities of the second and third rank as regional centers are presumably not being adequately carried out; urbanization taking place largely through migration concentrated upon the largest cities implies a maximum break in cultural and occupational continuity for the migrant, with a likelihood of multiple maladjustments, various kinds of evidence other than demographic support such conclusions.

Although most of the results of the study is within the concept of the general central places theory, the ratio of the number of cities between the levels of hierarchy does not follow the rules of the central places theory. This finding is parallel with another research on the urban hierarchy in Turkey: "The system is a mixed hierarchy. It does not conform to any of the pure theoretical K networks advanced by Lösch and Christaller…"(Mutlu, 1988)

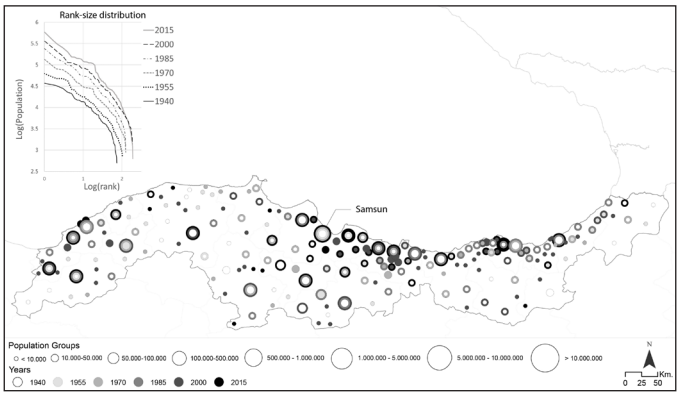

Figure 16. *City size distribution in the Black Sea Region from 1940 to 2015.*

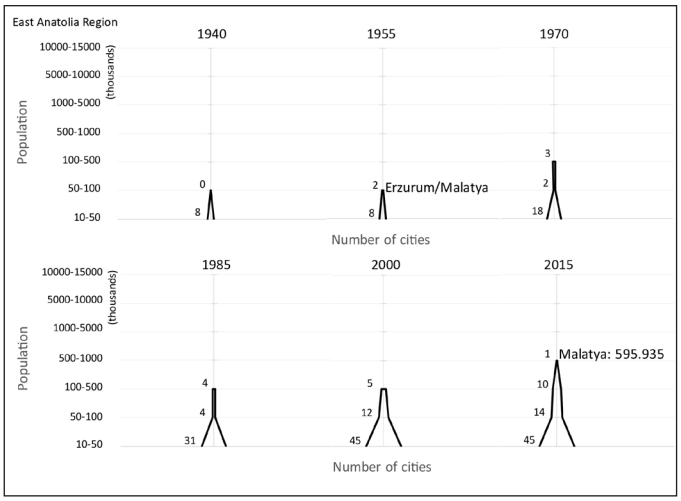

Figure 17. *Urban Hierarchy of the East Anatolia Region from 1940 to 2015.*

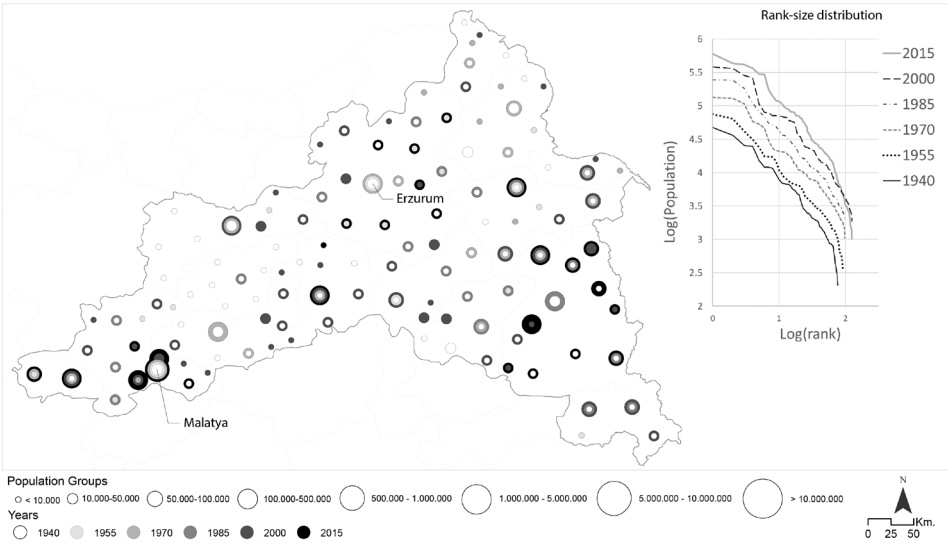

***Figure 18**. City size distribution in the East Anatolia Region from 1940 to 2015.*

Moreover, despite the rapid urbanization at the country level, it is observed that large cities are not equally distributed among the regions. Not only mal distribution of income but also lack of large cities encourages migration from the East to the West due to insufficient job opportunities (Akın & Dökmeci, 2015; Yazgi et al., 2014) as in the other countries (Alexander, 1978; Fan, 2005; Greenwood, Mueser, Plane, & Schlottmann, 1991; J. H. Johnson & Salt, 1990). The detection of spatial clusters of high and low per capita GDP throughout the country is an indication of the persistence of spatial disparities among the regions which is the main cause of mobility from the East to the West of the country. Thus, investments in these regions are crucial not only for themselves but also to increase the economic interaction among the development clusters to multiply their economic mutual impacts. The role of the new regional investments by providing a dynamic economic force in a region for urban development is already illustrated by the previous studies (Schachter, Kraus, & Kim, 1978).

4. Conclusion

This article has presented an approach to investigate the historical dynamic of hierarchical urban systems at the regional and country level in Turkey that is greatly influenced by changes in the sectoral economy of cities and inter-regional migration. Regional disparities and variations in the spatial structure of socio-economic attributes in Turkey are clearly portrayed in the resultant regional urban system.

In this study, first, regional socio-economic characteristics and urbanization levels are described and socio-economic discrepancy, which is the major source of from the East to the West migration, is illustrated. Then, historical dynamics of urban hierarchies was described between the 1940 and 2015 for Turkey. While, at the beginning of the period, the urban hierarchy was consisted of 4 levels, it increased to 5 levels in 1970, to 7 levels in the year 2015 in parallel to the population increase, technological and industrial development, globalization and economic development.

Later, urban hierarchies were described for each region for the years 1940, 1955, 1970, 2000 and 2015 by taking into consideration the number of cities for each level of the urban hierarchies. In 1940, there were 4 levels for the Marmara Region, 3 levels for the Central Anatolia and Aegean Regions, 2 levels for the Mediterranean and South-East Anatolia Regions and a single level for the Black Sea and the East-Anatolia Regions. In 2015, the levels of urban hierarchy were increased to 7 in the Marmara region, to 5 in the Central Anatolia, Aegean, Mediterranean, South East Anatolia Regions, and to 4 in the Black Sea and East Anatolia regions. So, according to the results, while the regional urban hierarchies were developed mostly hori-

zontally in the regions in the East as a result of lower economic development and high migration rate to the west of the country, the regional urban hierarchies were developed vertically in the West above the capacities of their regions due to globalization and population over growth.

Although urbanization in the developed countries is characterized by stronger tendencies toward the dispersion of population, in Turkey, the privatization of government factories at the country level and relaxing of agricultural products imports, the existence of agglomeration economies in large cities and their advantages for investors stimulated migration to large cities which caused pollution increase and traffic congestion. On the other hand, this trend aggravated the already existing discrepancy in economic structure and standard of living. Therefore, the decentralization policy of industry and population during the republican era was reversed by increasing the concentration in the large cities.

Conceptually, the attempt has been made to link the processes of metropolitan and spatial economic change with one of the best-known and most intriguing aspects of spatial structure, the number and size distribution of cities according to the different levels of the urban hierarchy. This has allowed the possibility of visualizing the interurban population and sectoral distributions as dynamic phenomena and as inseparable components of broader processes of socio-economic development.

The economic efficiency of the urban system is critical to the efficient use of national resources. Thus, the investments for economic development should be made for the balanced development of the urban hierarchies. Distribution of manufacturing among different city sizes can be both a product of development of urban system, and a determinant of subsequent changes in the population distribution among the level of urban hierarchy. On the other hand, under the effects of neo liberal policies and globalization, location of the industry and its distribution among different city sizes become more difficult in the highly competitive global market.

Moreover, world-class metropolises in advanced and developing nations are shaping both the major channels of global interaction and the national spatial structures over which they exert considerable influence. The relationship between urban system change and the interurban distribution of population and economic activities in a national space-economy can therefore be considered within the global metropolitan hierarchy as a future study.

The results of the study can be used as the basis to produce theoretical generalizations about the interaction between the urbanization and economic growth. The link between the interurban population and sectoral distribution as dynamic phenomena has seldom been intensively explored in the spatial literature, and remains a promising area for future research. To investigate the role of the lacking levels for the economic development of the regions is a provoking and challenging work and suggested for future research.

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