A Research About One City Monopoly Phenomenon in Turkey[1]

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Türkiye'de Monopol Şehir Olgusu Üzerine Bir Araştırma[2]

Abstract

This paper discusses the one-city monopoly phenomenon in Turkey from 2007 to 2018 from inequality. For this purpose, Theil Inequality Index is calculated for the NUTS3 level, and a significant gap between İstanbul and other cities is obtained. Then, club convergence analysis and clustering procedure are applied. According to the finding, the overall country's convergence hypothesis is rejected, and 75 of 81 cities have converged into six clubs. In these heterogeneous convergence clubs, İstanbul has confirmed the one-city monopoly characteristics while diverging from others, both in its great strength and the risks the city confronts.

Keywords : One-City Monopoly Phenomenon, Inequality, Unbalanced Regional Development, Club Convergence Analysis, Theil Index.

JEL Classification Codes : R110, R150, O500.

Öz

Bu çalışmada, Türkiye için monopol şehir olgusu, 2007 ve 2018 dönemi için eşitsizlik perspektifinden analiz edilmiştir. Bu amaçla Theil indeksi 81 il için hesaplanmış ve İstanbul ile diğer şehirler arasında belirgin bir farklılık bulunmuştur. Devamında, kulüp yakınsaması ve kümeleme analizi uygulanmıştır. Elde edilen sonuçlara göre, tam yakınsamayı ifade eden temel hipotez reddedilmiş ve 81 şehrin 75'ini kapsayan 6 yakınsama kulübü elde edilmiştir. İstanbul, heterojen yapıdaki bu yakınsama kulüplerinde yer almamıştır. İstanbul diğer şehirlerden ıraksadığını pozitif anlamda sahip olduğu güçle, negatif anlamda da üstlendiği risklerle göstererek monopol şehir olma özelliğini kanıtlamıştır.

Anahtar Sözcükler : Monopol Şehir Olgusu, Eşitsizlik, Bölgesel Eşitsiz Kalkınma, Kulüp Yakınsama Analizi, Theil İndeksi.

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1. Introduction

Inequality, as a dilemma, is a prior condition of economic development in the short run and a structural problem in the long run for a country. For decades, policymakers have debated the importance of regional inequality in the development process in various forms. Regional inequality decreases from less developed to developed countries. In the early stages of the development process, it is acceptable to expect disparity among regions, cities, and rural and urban areas. Because of the heterogeneity of resource distribution, regional growth is not always balanced during the development process, and as a result, countries are defined by inequality in different aspects. These are primarily economic, social, and geographical. People seek to shift to regions where they can maximize their utility due to various regional inequality situations within countries. This mobility causes agglomeration to some cities, especially in urban areas, creating one of the main problems in countries. Agglomeration in specific cities damages the deployment of resources and economic efficiency. Quintana and Royuela (2014: 1-30) focused on inequality's negative and positive effects. As they stated, high inequality increases socio-political instability and related risks, damages redistribution pressure, decreases the investment capacity because of market imperfections, and affects purchasing power parity. Besides, they emphasized the strong connection between high inequality and high fertility rates.

On the other hand, inequality causes both negative and positive implications in the long run. High inequality creates investment incentives with high aggregate savings or capital for innovative areas. If a country achieves to spread economic development throughout all regions, the government can intervene in agglomerations in earlier periods and increase economic efficiency. Otherwise, inequality starts and continues as a structural problem among cities, mostly in urban or rural towns. Its advantages, such as rapid urbanization, turn into adverse effects in the short run.

Inevitably, city development requires an organized and inclusive perspective for urban and rural areas. Even though urbanization is one of the driving forces for a country's development, rural area development also plays a crucial role in the development process. Therefore, investigation of city-level inequality provides an effective deployment of resources among urban and rural cities and decreases the contribution of inequality from a comprehensive perspective. Chen et al. (2020: 1-12) described integrated development between urban and rural areas as a combined development of new industrialization, urbanization, agricultural and rural modernization. To achieve economic efficiency, these three points should not separate. However, countries generally support big urban cities rather than rural areas to increase their social, economic, and political importance globally and become domestic and international network centres with new integration opportunities. (Wang et al., 2020: 1- 11) Furthermore, countries tend to support urban cities because of the competitive market conditions.

A growing number of urban cities have introduced several urban definitions and classifications. In the literature, urban cities are described as global cities, metropolitan

cities, megacities, and monopoly cities classified according to several functions such as economic performance, urban quality, and population density. Trujillo and Parilla (2016: 1-64) redefined cities according to three main forces: urbanization, global integration, and technological change. These three trends reshape the international economy, and global cities have been classified into seven types. These are Global Giants such as London and New York, Asian Anchors such as Hong Kong and Moscow, Emerging Gateways such as İstanbul and Cape-Town, Factory China such as Shenyang and Suzhou, Knowledge Capitals such as Boston and Stockholm, American Middleweights such as Indianapolis and Kansas City, International Middleweights such as Brussels and Frankfurt.

Zhao et al. (2017: 257-289) defined mega-cities in two terms. The first term is Mega-global cities such as New York and Tokyo, which have significant global effects on the world economy with their financial and business services, technology and innovation capacities, and governance power. The second term is Mega-local cities, mostly in less developed countries such as Asia, Africa and have poor integration with the global economy.

Furthermore, in this study, empirical results showed solid logarithmic relationships between the population of the country and the number of megacities in the country. It is suggested that if the population of a country or territory is around 100 million, the country can potentially have one megacity with an average population of ten million people like Moskva in the Russian Federation. Brazil, China, and the U.S.A. have more than two megacities due to their high population. Mega-global and Mega-local cities diverge due to the external and internal driving forces of economic growth. Although they have a similar population, their effects on the global economy are quite different.

Yeung et al. (2020: 31-38) explained the problems of megacities with three indicators. The first problem is the cities' attractiveness to specific industries, such as banking, finance, and manufacturing, which perform nationally and internationally. Secondly, growing cities bring about challenges, and they are striving to achieve a polycentric structure by promoting subcentres. The third indicator pointed out that megacities lack basic urban services such as water supply, fresh air, housing, and other facilities. The researchers used these indicators to stress urban poverty and income gaps in densely populated cities, stirring social tensions with crime and informal economic activities. On the other hand, the study emphasized megacities as globalization pioneers while acknowledging their potential to influence global financial problems in 2008.

Potlogea (2018: 1-30) approached urbanization regarding a city's human capital and skill advantages. The author thought that the unprecedented rates of growth of world urbanization and the performances of some developing countries, such as China, India, Brazil, Indonesia, and Turkey, reduce world income inequality. In addition to this view, even if convergence occurred between countries, economic activity would not be distributed equally across the regions over time and cause spatial disparities. In this step, the strong effect of human capital on urban success is described with the term "skill polarization across space". The theoretical model was developed to define the world economy, and empirical

findings revealed that the skill-intensive cities would rearrange international economic integration.

In developing countries, the term "megacity" is formed by the pros and cons of urbanization. In the short run, due to intense and rapid migration, most resources agglomerate in one city, which has significant effects on the country. These effects could be positive and negative, such as accelerating economic development or increasing regional inequality. This concept is called "one-city monopoly", concentrating resources in one area, mainly in the best-urbanized city. The "one-city monopoly phenomenon" is a significant issue that must be considered during the growth process. Shi et al. (2020: 1-12) summarize the term with three categories. The first category includes industrialized and urbanized countries with approximately 15% and 20% of their population in their leading cities' such as Britain, France, and Australia. The second category country is Japan. Industrialized and urbanized cities have an ageing population; therefore, demand decreases. Also, Tokyo is a metropolis city whose population has grown steadily. The third category involves developing countries where leading cities' portions fluctuate, such as Chile. In this study, Theil Index was used to demonstrate China's monopoly cities and analyse the relationship between the Theil Index, urban competitiveness index, and unbalanced development. They found a strong connection between the one-city monopoly phenomenon and urban competitiveness.

To address the differences among cities and comprehend the regional requirements of world urbanization, it is necessary to understand the process of urbanization and its contribution to inequality. With its multicultural characteristics, Turkey will be an exciting country at this point. Originating from regional unbalanced development and urbanization discussions, this study aims to contribute to Turkey's literature with two different perspectives. The first perspective is about İstanbul, with its characteristics as a "one-city monopoly" and some pros and cons about the city's situation. They are having a city like İstanbul as a chance for Turkey. More importantly, from the standpoint of inequality, hazards, such as a significant earthquake risk, are becoming more apparent. The second perspective is about the unbalanced regional development trends of the remaining 80 cities contributing to inequality. Agglomeration to cities and divergence effects showed how cities differed even within the same region.

This study is structured into five parts. After the introduction, the second part continues with the literature review. Inspiring the efficiencies of regional inequality indexes from the literature, in the third part, the inequality trends among 81 cities of Turkey have been analysed with Theil Index for each city. Then, the Natural Breaks Optimization method has been applied to specify the ranges. We have conducted an empirical analysis using econometric methodology by implementing Philips and Sul's (2007: 1771-1855) method to find the converging inequality clubs for the 2007-2018 period in the fourth part. The "one-city monopoly phenomenon" has been discussed with significant findings in the fifth part regarding the city of İstanbul.

2. Literature Review

In Turkey, regional economic growth policies have been discussed concerning economic and social dimensions. Although Turkey has achieved rapid progress as a developing country, some problems directly damage balanced development, such as unemployment and low productivity. In the past, accelerating urbanization was one of the optimal solutions to overcome these problems and achieve economic growth. According to the Turkish Statistical Institute, the country has witnessed a rapid increase in urbanization for the last thirty years. While 51.3% of the total population lived in rural areas in 1990, this ratio decreased to 12.1% in 2018. The mobility towards urban cities took place from eastern to western regions, especially to İstanbul. İstanbul became a megacity with the highest urban population in the country, where only 1% of its population lived in rural areas in 2019 (TÜİK). The decomposition among areas caused the cities to go in different directions. Additionally, urbanization and inequality increased simultaneously.

Unbalanced regional development and rising inequality are issues all around the world. Each country has its characteristics that cause inequality, Turkey as well. Blanchet et al. (2020: 1-93) investigated inequality using the surveys data, taxes, and national accounts. From 1980 to 2017, inequality in Europe rose slower than in the United States. They discovered the income distribution characteristics of countries behind their calculations. For many years Europe has used a well-designed redistribution model and upheld equality. But U.S.A.'s redistribution model was less successful in controlling equality. Also, Partridge and Rickman (2008: 285-310) indicated that the U.S.A. and inequality increased when the distance grew between rural and metropolitan areas. Conversely, while inequality decreased overall and city levels in China, inequality did not change within the prefecture between 2012 and 2018 (Pan et al., 2020: 1-20). According to OECD (2020: 56), the disparity between urban and rural areas is particularly significant in Croatia, Finland, Hungary, and Luxembourg, where it exceeds almost 17 percentage after 2008.

Studies focused on regional development and unequal resource distribution among Turkey's east and west regions and cities. Gezici and Hewings (2007: 383-403) have classified regional inequalities in Turkey into three categories: geographical, functional, and coastal interior from 1980 to 1997. They used the Theil index to measure inequalities between regions, and the spatial autocorrelation method was used to analyse the relationship between spatial dependence and regional inequalities. Empirical results examined whether rich or developed regions have relatively higher inequalities than poor ones. In Turkey, developed regions are located in the western part of the country, and inequality is observed there. The Marmara region's dominant contributor to total inequality, which includes İstanbul. Filiztekin and Celik's (2010: 116-127) study focused on regional inequalities in Turkey using the Gini coefficient between 1994 and 2003. They stated that inequality should be taken under control in developing countries because it does not have the power to disappear by itself, even in developed countries. Turkey is a developing country with a higher rate of inequality than in OECD and European countries. İstanbul was found to have the highest inequality rate from 1994 to 2003. Even though the other regions, such as the

Black Sea Region, decreased the inequality rates in time, İstanbul remained the highest inequality rates for decades.

Aksoy et al. (2019: 1-33) claim no overall income convergence in Turkey between 1987-2001 and 2004-2017. They applied Philips and Sul's (2007) club convergence method for both periods. According to obtained convergence clubs, for the period between 2004 and 2017, six convergence clubs were identified in which the first and second clubs included more prosperous cities in western regions. İstanbul and Kocaeli were located in Club 1 as the highest income cities, and Ağrı, Şanlıurfa, and Van were located in Club 6 as the lowest income cities. The results showed a clear division between the East and West regions, and this division requires policymakers to be concerned primarily to eliminate disadvantages. Karahasan (2020: 603-644) has discussed the equity enhancing effect of rapid growth in Turkey by performing the Markov Chain method for 2004-2017. The study investigated spatial variability and focused on the convergence effect on both regional and local levels to detect disparities. Empirical results show that, during this period, overall convergence was not equally distributed between developed and underdeveloped regions. Moreover, in place of convergence, local winner and loser cities have appeared, and convergence patterns were not related to regional proximity of geography.

Hazar et al. (2018: 102-105) stated that despite quite sizable regional inequalities in Turkey, empirical results showed a diminishing tendency between 2004 and 2014. Using subcomponents at regional and provincial levels, this study demonstrated the differentiating effects of migration on income inequalities. The relationship between convergence and migration is related to the level of education. The migration of adults and middle level educated people has a positive effect on the convergence process. Tansever and Kent (2018: 117-136) focused on regional earning inequalities in Turkey, highlighting the determinants of contributors to earnings inequality. To investigate earning inequality trends, the Theil index for NUTS1 level was calculated using individual-level data that formed subgroups of labour like gender, education, occupation, and sector for 2006 and 2014. As a result, they investigated decreasing inequality trends among regions with different subgroups, but the education level of people in İstanbul significantly affects inequality.

3. One-City Monopoly Index

Inequality is often higher in developing countries, with a substantial divide between rural and urban areas, imbalanced regional growth, and unequal resource allocation. One-city monopoly describes agglomeration and polarization in one urban city, and it is an aggravating result of inequality. Polarization in urban areas can provide economic and social advantages and accelerate economic growth in the short run. Still, these advantages can transform into disadvantages in the long run and cause diversity by contributing to inequality. To point out the one-city monopoly phenomenon in Turkey, we calculated the Theil index, a widely used inequality measure, for 81 cities in Turkey throughout 2007 and 2018. With the help of the Theil index, it is possible to explain the contribution of regions or towns to total inequality as a rate. This ranking starts from 0, which means "perfect

equality", and goes to infinity, "inequality". The calculation formula of Theil Index (1) for provinces is used by Shi et al. (2020). The main idea behind this formula is based on replacing the country's population and GDP with the city's population and GDP values. As shown below, A represents GDP, and B represents the population of the relevant city (Shi et al., 2020: 1-12):

$$OMI = ALog\frac{A}{B} + (100 - A)log\frac{100-A}{100-B} \qquad (1)$$

GDP and population data for the NUTS3 level, which consists of 81 cities in Turkey, were collected between 2007 and 2018 from the Turkish Statistical Institute. In the first step, we calculated the Theil index for the NUTS3 level between 2007 and 2018 using the formula above. Ordering the Theil index scores from highest to lowest shows us Turkey's framework of inequality trends. Theil Index starts from 0.0004 for Çanakkale city as the lowest contributor and ends at 1.88 for İstanbul as the highest contributor to inequality.

In the second step, we divided each city's arithmetic mean of Theil index data for the period into four ranges using the Jenks Natural Breaks Optimization method. We also split the Theil index into three or five ranges instead of four, but one city was last in all tests. Each range represents the characteristic monopoly level of cities, and from one to four classes, the one city monopoly effect is becoming more dominant. Table 1 represents classifications, and the fourth class only includes one city, İstanbul, with the highest Theil Index score in this range. From this perspective, İstanbul is a "one-city monopoly" for Turkey. In the third class, six cities (Ankara, Şanlıurfa, Adıyaman, Van, Diyarbakır and Kocaeli) are following İstanbul. But the gap is evident between the third and fourth ranges. The seven cities in the third and fourth classes are the pioneer contributors to overall inequality and illustrate the invisible borders of the country.

As the leading city in this ranking, İstanbul represents the power of economic activity. At the same time, it has the power of disruption on equality with its population and high GDP rates. Kocaeli, a neighbouring city of İstanbul, and Ankara, the country's capital city, are industrialized cities and directly affect economic activity, but not as much as İstanbul. We can say that these three cities have a positive effect on inequality. However, the remaining third-class cities in Turkey's east (Şanlıurfa, Adıyaman, Van and Diyarbakır) have low economic activity power, and GDP Therefore has a negative effect on inequality. The majority of cities in Turkey are in the first and second classes. At that point, if we could exclude İstanbul from this ranking, it would be understandable to explain the inequality in Turkey between the east and west regions according to 3rd class cities. However, this table shows that İstanbul is separated from the east and the cities in the west, even if they are close to İstanbul. As a result, this decomposition confirms İstanbul's one-city monopoly characteristics.

Table: 1
Natural Break Optimization Classification

class	lower	upper	count
1	0.000143	0.029981	56
2	0.033762	0.09764	18
3	0.15084	0.271602	6
4	1.899165	1.899165	1

From a broader perspective, we would like to illustrate inequality trends between regions and cities in Turkey. We used the NUTS1 classification, consisting of 12 regions: West Marmara, Aegean, Central Anatolia, East Black Sea, West Black Sea, East Marmara, Mediterranean, Northeast Anatolia, Central East Anatolia, West Anatolia, Southeast Anatolia, and İstanbul. Except for İstanbul, the remaining regions consist of different cities according to neighbourhood relations. With GDP and capacity, İstanbul is a NUTS1 level region and a NUTS3 level city.

Table 2 shows the descriptive statistics of NUTS1. From 2007 to 2018, İstanbul's Theil index took values of approximately a minimum of 1.74 and a maximum of 2.011 with a mean of 1.8992 and a standard deviation of 0.1003. From İstanbul to West Marmara, the contribution to inequality decreases. According to Theil index results, compared to other cities, İstanbul is a prominent region and city. The big gap among regions is noticeable, and there is a more than tenfold difference between İstanbul as the significant contributor to inequality and West Marmara as the minor contributor.
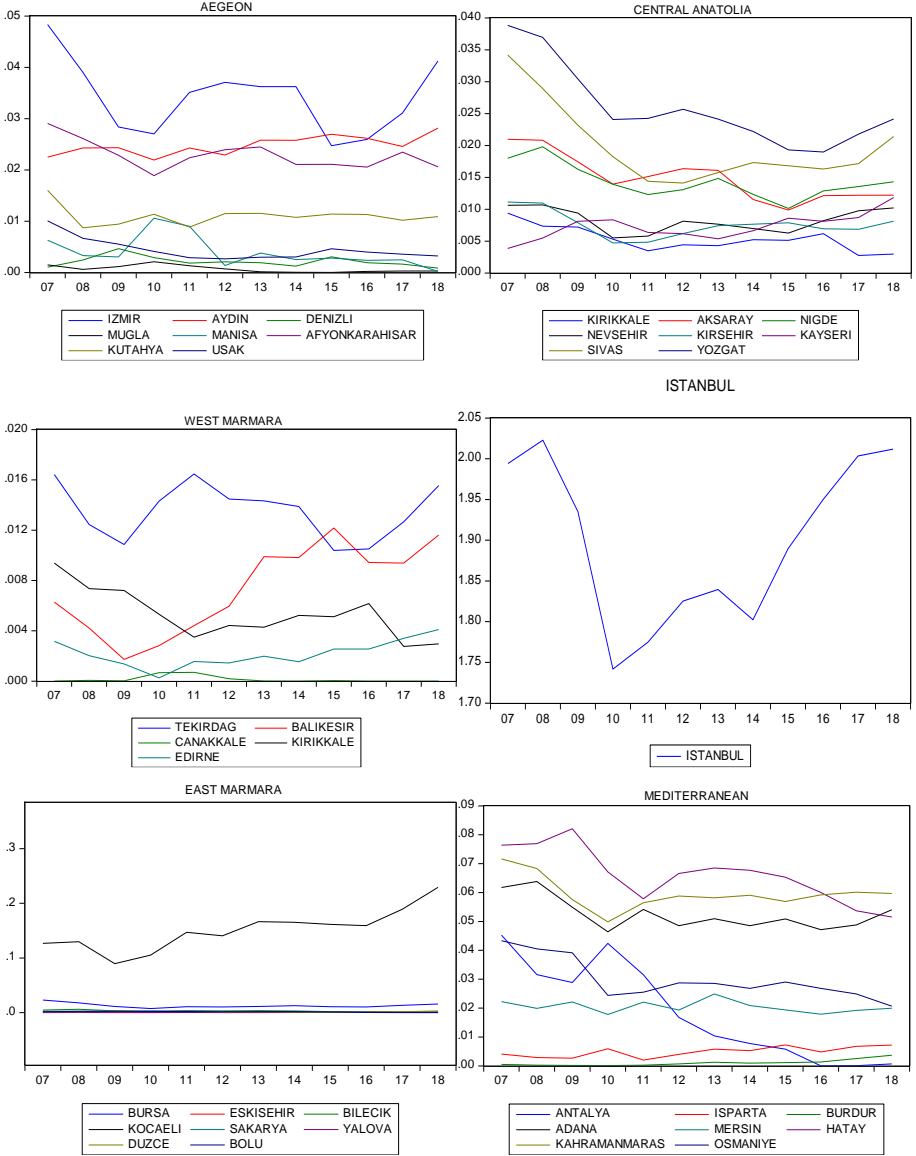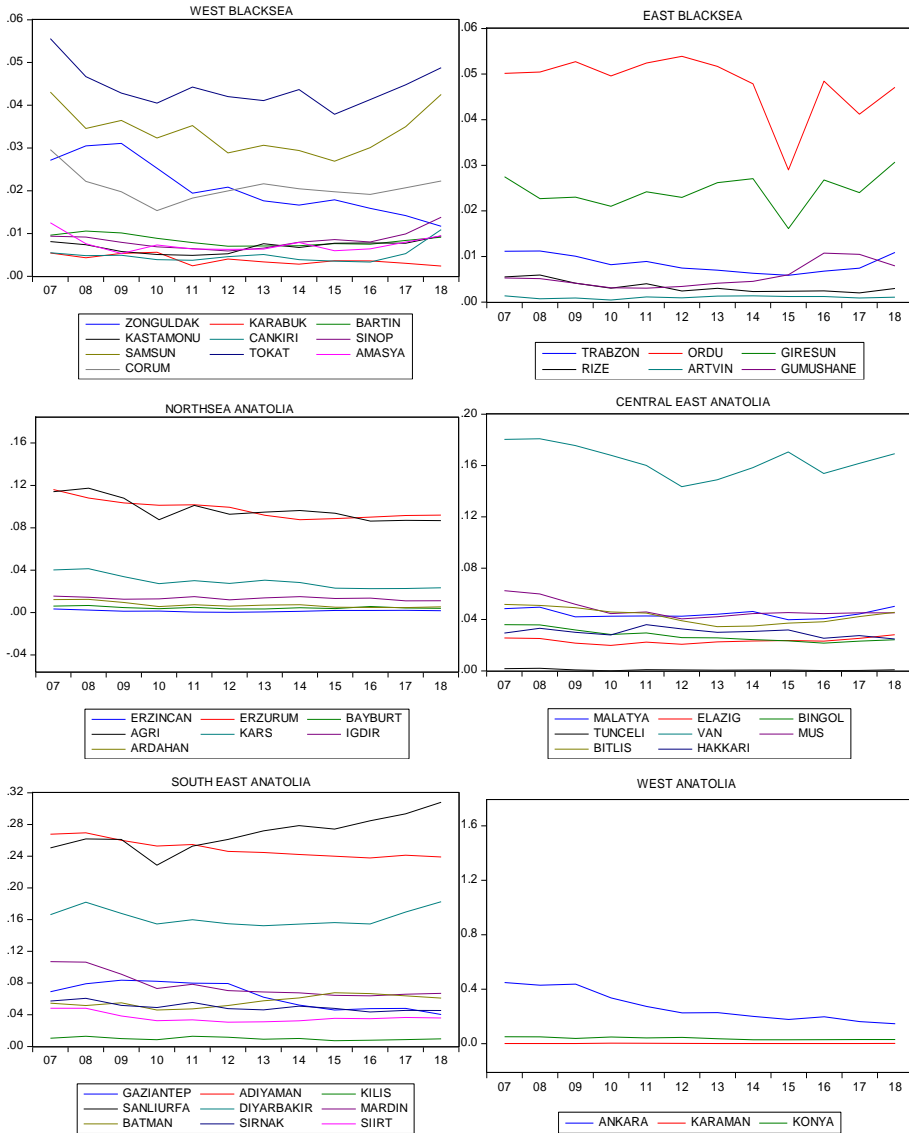
Table: 2
Descriptive Statistics of NUTS1

NUTS1	Theil Index-Mean	Std. Dev.	GDP-Mean	Population-Mean
İstanbul	1.8992	0.1003	578.4769	13.9180
Southeast Anatolia	0.1085	0.0008	10.4061	0.8898
West Anatolia	0.1036	0.0009	73.17204	2.4389
Central East Anatolia	0.0476	0.0045	5.6093	0.4681
Northeast Anatolia	0.0358	0.0401	3.6252	0.3152
Mediterranean	0.0316	0.0045	23.9419	1.2125
East Marmara	0.0217	0.0026	18.1531	0.7359
West Black Sea	0.0159	0.0021	7.6878	0.5072
East Black Sea	0.0151	0.0019	7.3435	0.4276
Central Anatolia	0.0129	0.0042	8.7529	0.48532
Aegean	0.0100	0.0039	29.8527	1.2125
West Marmara	0.0047	0.0049	18.1531	0.7359

The following twelve figures combine the NUTS1 level and NUTS3 level Theil index over 2007 and 2018. The values for İstanbul decreased during the global financial crisis between 2008 and 2010, but they increased. In 2018 İstanbul has reached the highest level of contribution to inequality. Inequality tendencies were observed in the third class of cities decomposed from others within the same region, such as Kocaeli in East Marmara and Van in Central Anatolia.

Figures: 1 to 12
NUTS1 and NUTS3 Level Theil Index Trends

WEST BLACKSEA

ZONGULDAK — KARABUK — BARTIN
KASTAMONU — CANKIRI — SINOP
SAMSUN — TOKAT — AMASYA
CORUM

EAST BLACKSEA

TRABZON — ORDU — GIRESUN
RIZE — ARTVIN — GUMUSHANE

NORTHSEA ANATOLIA

ERZINCAN — ERZURUM — BAYBURT
AGRI — KARS — IGDIR
ARDAHAN

CENTRAL EAST ANATOLIA

MALATYA — ELAZIG — BINGOL
TUNCELI — VAN — MUS
BITLIS — HAKKARI

SOUTH EAST ANATOLIA

GAZIANTEP — ADIYAMAN — KILIS
SANLIURFA — DIYARBAKIR — MARDIN
BATMAN — SIRNAK — SIIRT

WEST ANATOLIA

ANKARA — KARAMAN — KONYA

4. Club Convergence Analysis

City-based Theil Index shows, most of the cities in the same regions have their unique paths, and neighbourliness among cities cannot help us while explaining the inequality structure of the NUTS1 level. Although the inequality problem between Turkey's east and west regions has been discussed for many years, we observed that inequality occurred

between İstanbul and other areas no matter where the cities are located. İstanbul is dominant as it has the characteristic of a one-city monopoly. Difference inequality trends of cities within the same NUTS1 regions have led us to employ convergence analysis to understand whether there is an overall convergence in the country and which cities converge to İstanbul.

The third step of the empirical part continues with club convergence analysis, developed by Philips and Sul (2007: 1771-1855). This method, termed the 'log t' regression test, is based on a data-driven algorithm and takes us to our goal. Philips and Sul (2007) suggest that, even if overall convergence is rejected, that does not mean rejection of subgroup convergence. The full panel can be separated from the convergence clubs and divergent members. Obtaining convergence clubs using this algorithm provides a chance to explore relations and characteristics of data during the period. We aimed to find out which inequality club İstanbul is in and which cities have converged to İstanbul and each other between 2007 and 2018.

Club convergence algorithm depends on panel data X_{it}, which points out the Theil index in this study, with time (t=2007,…,2018) and city (i=1,…,81). X_{it} can be explained with permanent components, g_{it}, and transitory components, α_{it}.

$$X_{it} = g_{it} + \alpha_{it} \tag{1}$$

The algorithm assumes these components (g_{it} and α_{it}) may contain μ_t, as common idiosyncratic components. The notation is specified to show time-varying idiosyncratic element δ_{it} and single common component, μ_t.

$$X_{it} = \left(\frac{g_{it}+\alpha_{it}}{\mu_t}\right)\mu_t = \delta_{it}\mu_t \quad \text{for all i and t.} \tag{2}$$

Then, h_{it} is defined as transition coefficient to estimate δ_{it} while eliminating μ_t.

$$h_{it} = \frac{X_{it}}{\frac{1}{N}\sum_{i=1}^{N} X_{it}} = \frac{\delta_{it}\mu_t}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}\mu_t} = \frac{\delta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}} \tag{3}$$

The following equation explains the semi-parametric form of δ_{it} which provides an algorithm for to test club convergence; $\delta_{it} = \delta_i + \sigma_{it}\xi_{it}$ and $\sigma_{it} = \frac{\sigma_i}{L(t)t^\alpha}, t \geq 1, \sigma_i > 0$ for all i, where ξ_{it} is iid(0,1) in across i but weakly dependent over t. In this function, L(t) is equal to log(t), varying slowly, increasing, and divergent infinity. The size of α is determined to be a convergence of X_{it} toward δ_i. Philips and Sul imply the null hypothesis of convergence and alternative divergence hypothesis below.

$H_0: \delta_i = \delta \text{ and } \alpha \geq 0$

$H_1: \delta_i \neq \delta \text{ or } \alpha < 0$

To test log(t) regression, the following equation can be used:

$$\log\left(\frac{H_1}{H_t}\right) - 2\log(\log(t)) = \alpha + b\log(t) + u_t \quad \text{for} \quad t = [rT], [rT] + 1, \dots, T \text{ with}$$

$r > 0$ (r=0.3 is recommended) where, H_1/H_t is cross-sectional variance ratio, $H_t = \frac{1}{N}\sum_{i=1}^{N}(h_{it} - 1)^2$, h_{it} described as Eq(3) and $b = 2\alpha$. The null hypothesis is stated as a one-sided test for $b \geq 0$, which against $b < 0$ and the null hypothesis is rejected when $t_b < -1.65$ at the 5% level of significance.

In a nutshell, Philips and Sul's (2007) clustering algorithm can be explained step by step for our study as follows: (i) Starting to sort the data which is Theil index for 81 cities over the period 2008 and 2018 based on the last observation. (ii) Selecting the first k highest cities in the panel to form the subgroup G_k for $2 \leq k \leq N$ and run the log-t regression to compute the convergence test statistics $t_k = t(G_k)$ for this subgroup. Core group size k* should be chosen according to the criteria: $k^* = \arg max_k\{t_k\} subject to min\{t_k\} > -1.65$. If calculated test statistics are lower than -1.65, there are no convergence clubs. (iii) The procedure continues with sieving individuals for club membership. After identifying the core group G_k, G_k^c is added as the complementary set where c is critical value and $t > c$. In our study, a city was added and performed the log-*t* regression each time. The procedure is required to be repeated until making sure $t_b > -1.65$. (iv) Finally, the procedure should be stopped after repeating the (ii) and (iii) steps until clubs are no longer formed. Additionally, the log-t test is performed for all pairs of the subsequent initial clubs to merge them, fulfilling the convergence hypothesis jointly (Philips & Sul, 2007: 1771-1855; Ganioglu & Seven, 2019: 1-14).

The empirical results of the log(t) test are presented in Table 3. These results suggest that we reject the null hypothesis (t-stat = -76.82 < -1.65), which denotes full panel convergence of Turkey over the period 2007 and 2018.

Table: 3
Log (t) Test Results

Variable	Coefficient	Standard Error	t-stats
Theil Index	-1.2185	0.0159	-76.8217
The number of individuals is 81. The number of periods is 12. The first four periods are discarded before regression.			

Hence the overall club convergence hypothesis was rejected. We implemented a clustering algorithm to create potential convergence clubs among 81 cities. As the results showed in Table 4, we obtained six convergence clubs which include 75 cities from different NUTS3 level. Also, six cities are not included in any convergence clubs, diverging from others. In this method, contribution to inequality decreases from Club 1 to Club 6.

Obtained clubs indicated the heterogeneous structure of Turkey's convergence trends. As expected, cities with a high-rate Theil index, especially the first seven cities in the ranking (İstanbul, Ankara, Kocaeli, Adıyaman, Şanlıurfa, Van and Diyarbakır), fall into Club 1 and in "not converge" group. On the other hand, 52 cities from 11 NUTS regions are concentrated in Club 2, and 17 of them in this club are "metropolis cities". So, in Turkey,

not only do metropolis cities contribute to inequality, but small cities have a significant effect over the period. Club 3, Club 4, and Club 5 are also heterogeneous, and Çanakkale, which is mentioned as the lowest contributor to inequality, falls into Club 6.

Furthermore, cities in the same NUTS region fall into different convergence clubs. For example, West Anatolia's part consists of 3 cities, Ankara is in Club 1, Konya is in Club 2, and Karaman is in Club 5. Therefore, divergence among cities occurred within the same NUTS regions. The distribution of cities towards high inequality and the density from Club 6 to Club 1 may predict further increasing inequality in the future. Rising inequality indicates degradation in resource distribution and causes several problems.

Table: 4
Final Convergence Clubs

Club	Cities					t-stats	Coefficients
Club 1	Kocaeli	Ankara	Adıyaman	Diyarbakır		1.655	0.649
Club 2	Bitlis	Hakkari	Aydın	Isparta	Kahramanmaraş	-0.787	-0.066
	Elazığ	Tekirdağ	Afyonkarahisar	Burdur	Osmaniye		
	Bingöl	Edirne	Kütahya	Adana	Gaziantep		
	Muş	Balıkesir	Bursa	Mersin	Kilis		
	Malatya	İzmir	Yalova	Hatay	Mardin		
	Kayseri	Çankırı	Konya	Ağrı	Batman		
	Sivas	Sinop	Ordu	Kars	Zonguldak		
	Yozgat	Samsun	Giresun	Iğdır	Bartın		
	Erzurum	Gümüşhane	Kastamonu	Amasya	Çorum		
	Şırnak	Aksaray	Nevşehir	Tokat	Kırşehir		
	Siirt	Niğde					
Club 3	Kırıkkale	Artvin	Erzincan	Bayburt	Ardahan	-0.058	-0.006
Club 4	Denizli	Düzce	Rize			0.162	-0.019
Club 5	Tunceli	Manisa	Eskişehir	Bilecik	Sakarya Karaman	3.485	0.728
Club 6	Kırklareli	Çanakkale	Muğla	Bolu	Antalya	1.979	0.078
Not Converge	Van	İstanbul	Uşak	Şanlıurfa	Karabük Trabzon	-46.45	-1.049

Figure: 13
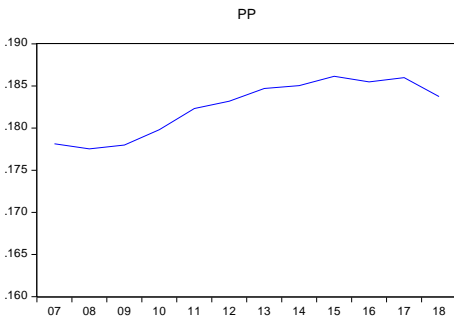**Arithmetic Means of Theil Index for Each Convergence Club**
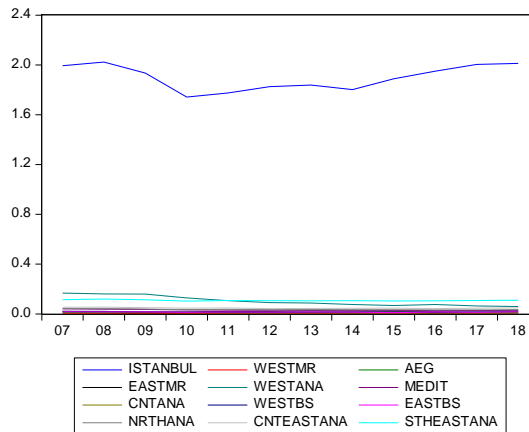
The figure above shows the arithmetic means of each convergence club and İstanbul as well. From Club 1 to 6, convergence clubs are shown, Club 7 shows do not converge group. We separated İstanbul from the "not converge" group cities to show its divergence pattern.

5. One City Monopoly: İstanbul

İstanbul always plays a pivotal role in Turkey's primary economic transformation and has positive and negative effects on inequality as one city monopoly. The city is one of the most popular megacities in the world. It has strong connections to the world economy, a magnificent cultural heritage, and a strategic transcontinental location. İstanbul is the prominent driving force of Turkey in a variety of ways. According to the Turkish Statistical Institute, the city's population is over 15 million, nearly 18% of the total population in Turkey (Figure 14) (TÜİK). It is expected that a country with a population of an average of 100 million should have one megacity with a population average of 10 million, with a 0.10 ratio. (Zhao et al., 2017: 257-289). However, İstanbul's average ratio was 0.19 in 2018.

Furthermore, the city has produced approximately one-third of the total GDP for many years. As shown in Figure 15, since 2010, trends of the share of GDP have continued to increase with minor fluctuations. The services sector is the highest contribution to the city's economic growth, and it is more than one-third of total services. Undoubtedly, finance is the most significant player in this sector. In Figure 16, when we compare the services and industry sectors, it is apparent that the industry's share has fallen with time, while agriculture's contribution is minuscule. The city's density causes dispersion among other cities and disrupts effective resource distribution to a great extent. Figure 17 shows the per capita Turkish Lira GDP of Turkey and İstanbul. Although Turkey's per capita GDP has increased over time, it is clear that İstanbul's per capita GDP has remained stable and higher than its average ratio.
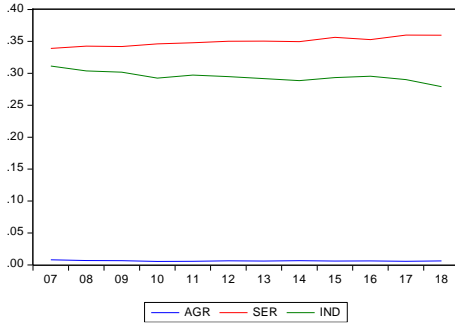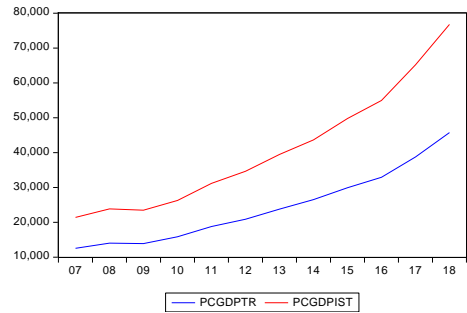
Figure: 14 **Share of Population**	**Figure: 15** **Share of GDP**
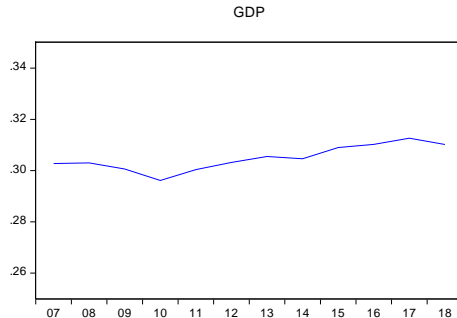
Figure: 16
Sectoral View of Agriculture,
Services, and Industry

Figure: 17
Per Capita GDP of Turkey and
İstanbul (TL)

For many years, İstanbul has been included in several city rankings for its competitiveness, quality of life, happiness, and other factors. These indices highlight the city's worth and reveal obvious facts regarding İstanbul's urban life. In 2018, İstanbul was placed 47th in the Quality-of-Life Index, 92nd in the Health Care Index, 50th in the Safety Index, 49th in the Cost-of-Living Index, 125th in the Pollution Index, and 157th in the Climate Index, out of 184 cities. Furthermore, in 2019, compared to prior years, the pollution index and climate index worsened, while İstanbul's density was measured at 2.892,34 per person/km^2 (Numbeo & Endeksa). In addition, according to the traffic commute time index, İstanbul residents spent at least 45 minutes commuting, which is longer than Europe's 25 minutes and OECD countries' less than 30 minutes (Statista). According to Subjective Well-Being Rankings in 2020, İstanbul was placed 115th out of 186 cities as an expected result (World Happiness Report, 2020: 47-67). Overall, even if this numerical knowledge is vital, it is insufficient to comprehend İstanbul's urbanization. Cities' uncontrolled growth, particularly in İstanbul, has resulted in regional development disparities and polarization. The consumption-oriented urban structure has had a negative impact on İstanbul's socioeconomic balance. Unfortunately, urban poverty and deprivation are now unavoidable realities (Başarmak & Öktem, 2020: 284-300).

6. Conclusion

This paper aimed to examine the one-city monopoly phenomenon in Turkey. Turkey has achieved considerable growth rates and has overcome many problems as a developing country. However, some structural problems persist. This study approached the city-based inequality and focused on the one-city monopoly phenomenon to better understand unbalanced regional development. Rising inequality within a country brings higher economic and social risks, and Turkey is facing these risks, such as regional disparities in the urbanization process. In the literature, the disparities mainly have been demonstrated between Turkey's east and west regions. But urban agglomeration trends indicate that

focusing inequality only between the eastern and western parts of Turkey is insufficient to understand the structures.

To point out the current situation of Turkey, we analysed inequality among cities in 3 steps, which enabled us to look from a broader perspective at the regional and city-level for the period 2007 and 2018. First, we calculated the Theil inequality index for all cities to find the highest and lowest contributors to inequality. According to the results, İstanbul has the highest score (1.88) and is the main contributor to inequality, while Çanakkale has the lowest (0.00014). The ordering Theil Index, from highest to lowest, also shows the counter inequality borders of Turkey. Defining inequality is quite difficult because it has more meaning than a ratio. In our study, the concept of inequality also represents the economic power of cities. In the second step of the empirical part, we continued with the Natural Break Optimization method to specify the Theil Index ranges among 81 cities and classified them into four to find monopoly cities. The fourth class only includes İstanbul (1.899), and the third class includes six cities: Ankara (0.27), Şanlıurfa (0.26), Adıyaman (0.24), Van (0.16), Diyarbakır (0.16), and Kocaeli (0.15). We are considering the gap between the third, and the fourth classes confirmed that İstanbul is the one city monopoly. After obtaining one city monopoly, İstanbul, as the third step, the club convergence method was adopted to Theil index to find which convergence club İstanbul is in. The results did not indicate overall convergence for the country, and the full panel was separated into six convergence clubs, including 75 out of 81 cities. Six cities out of 81 diverged from others.

Finding convergence clubs provides more comprehensive results about rising inequality trends among cities in Turkey. From Club 1 to Club 6, inequality decreases, and many cities fall within Club 1 and Club 2. In Club 1, cities represent the two edges of inequality's negative and positive effects. Club 2 includes 52 cities, where 35 of them are small. That shows increasing inequality in Turkey with both metropolises and small cities.

Furthermore, according to empirical results, İstanbul diverged from other cities as expected and confirmed that inequality occurred among İstanbul and other cities, even among İstanbul and İstanbul's border cities. That's why describing inequality trends between western and eastern regions would be neither clear nor conclusive. More specifically, the highest and lowest contributor cities to overall inequality occur in the east sides of the country and the same geographical region.

Being one city monopoly results in increasing İstanbul's responsibilities and risks day by day. Growing urbanization without capacity brings urban-specific problems to the city, such as urban poverty, land scarcity, housing, and some quality-based difficulties. Besides, exceeding capacity for a long year decreased the efficiency and productivity of İstanbul, and the socioeconomic structure has been damaged. The importance of government policies toward İstanbul has increased because of this predicament. The density of İstanbul is both the cause and result of uncontrolled rapid urbanization. İstanbul diverges from other cities in terms of both economic and social conditions. More importantly, prominent risks in İstanbul, such as an expectation of a great earthquake underlined for many years, increase

the country's economic vulnerability. While İstanbul is a one-city monopoly, the risks also threaten the country.

In the future, cities are expected to transform and grow more rapidly than today. Local cities will be strongly connected to global networks. New challenges will require more attention to resource distribution and urbanization expertise. Also, urbanization should not damage the harmony of cities, and it might be conclusive. But in Turkey, we experienced some adverse effects. As a result, the cities have diverged: İstanbul and others. İstanbul offers numerous advantages that will aid Turkey's future development, such as labour quality, research, development investments, technological adaptation level, worldwide prominence, etc. However, as the city grows, the gap between İstanbul and other cities will widen. Under these conditions, it will be unsustainable, potentially damaging harmony.

This picture shows, to cease rising inequality in Turkey depends on closing the gap between İstanbul and other cities. In Turkey, urbanization should be balanced and contribute more to economic growth than inequality. Providing a sustainable urbanization process, policymakers should make decisions to decrease risks. Cities require institutional reorganization to provide a sustainable urbanization process that grasps the development dynamics of cities and reveals their potential. On the other hand, İstanbul requires well-designed urban city planning to meet the challenges and distribute the city's resources equally while eliminating the difficulties and considering the city's capacity. In the future, rather than new investments, degrowth strategies may boost the city's benefits and quality while lowering the costs.

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