

EARNINGS INEQUALITY IN TURKEY: A REGIONAL PERSPECTIVE

TÜRKİYE'DE KAZANÇ EŞİTSİZLİĞİ: BÖLGESEL BİR PERSPEKTİF

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Abstract

This study examines the regional earnings inequality between NUTS-1 regions in Turkey using Theil-T statistics by employing Survey of Income and Living Conditions (SILC) data provided by Turkish Statistical Institute (TURKSTAT). We attempt to investigate the evolution of regional earnings inequality for the years 2006 and 2014 by decomposing the Theil T index in order to distinguish its within and between groups components with the special focus on the several attributive subgroups of labor such as education, economic sector, position in occupation and gender. We interpret the decomposition of Theil-T index with regard to its marginal and gross contributions of these subgroups to total inequality in order to measure their explanatory power of earnings inequality.

Keywords: Regional Inequality, Theil T Index, Earnings Inequality

Jel Classification: C32, D39, D63, J31

Öz

Bu çalışmada, Türkiye İstatistik Kurumu (TÜİK) tarafından sağlanan Gelir ve Yaşam Koşulları Anketi (SILC) verileri kullanılarak Theil-T istatistikleri üzerinden Türkiye'deki NUTS-1 bölgeleri arasındaki bölgesel gelir eşitsizliği incelenmiştir. 2006 ve 2014 yılları için bölge kazanç eşitsizliğinin evrimini Theil T endeksini, içerisindeki ve grup bileşenleri arasında, eğitim, ekonomik sektör, meslekte ve cinsiyette pozisyon gibi çeşitli emeğe dayalı işgücü alt gruplarına özel odaklanarak ayırmak amacıyla, ayırtmaya çalıştık. Theil-T endeksinin bu alt grupların toplam eşitsizliğe olan marjinal ve gayri safi katkıların ayrışmasını kazanç eşitsizliğinin açıklayıcı gücünü ölçmek için yorumluyoruz.

Anahtar Kelimeler: Bölgesel Eşitsizlik, Theil T Endeksi, Kazanç Eşitsizliği

Jel Sınıflaması: C32, D39, D63, J31

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I. Introduction

It is agreed upon that inequality has become a prevalent feature of developing countries and also of various developed industrialized countries as well (see, for example, OECD (2008); Piketty (2014); Atkinson (2008); Stiglitz (2012)). The literature dealing with the resurgence of inequality at the national level or across countries has been expanding while the number of studies examining sub-national or intra-regional variations in the distribution of income is rather limited and scarce. Research at the regional level is crucial in the sense that it raises the issues of inherent spatial heterogeneity in earnings differentials. Moreover, inequality dynamics and its underlying grounds may vary across regions, which in turn require implementing different regional policies for reducing inequality.

The existence of inequality between regions has long been a major issue of the regional development policies in Turkey. Previous studies on the convergence of regions have shown that the inequality is evident between the regions of Turkey (see, for instance, Atalık (1990), Özmucur and Silber (2002), Berber et al. (2000), Gezici and Hewings (2004), Şenesen (2002)). Accordingly, the reducing the regional inequalities has been one of the main aims during the planning period in Turkey (Gezici and Hewings, 2004).

In order to implement effective regional policies, dynamics and determinants of regional inequalities should be addressed accurately. However, exploring macroeconomic indicators such as GDP per capita to investigate the trends in the mean income differentials within regions veils the distributional dimensions of inequality and the factors driving the inequality trends. Hence the use of individual-level survey data helps one to focus on inequality in terms of income distributions *per se* and examine the driving mechanisms of inequality *within* regions as well (Breau, 2015).

This study employs individual level data from the Survey of Income and Living Conditions (SILC) which offers individual and household data for Turkey at the national and regional levels. The amount of income possessed by the households or individuals determines the income disparities in the individual income distributions. Furthermore, it is also possible to categorize the income by occupations, education status, sectors, regions and socio-economic groups (TURKSTAT, 2014a). We attempt to investigate the evolution of regional earnings inequality for the years 2006 and 2014 by employing the decomposition of Theil T index into its between and within components with the special focus on the several attributive subgroups of labor such as education, economic sector, position in occupation and gender.

The rest of the paper is organized as follows. Section 2 briefly overviews the related literature. Section 3 discusses the data utilized and the methodology employed in order to investigate trends in regional earnings inequality in Turkey. In Section 4, we report the results of the analysis. Section 6 summarizes the paper's main findings.

2. Related Literature

The literature on economic inequality is immense, fragmented and complex. Starting from the early studies on inequality, an effort has been paid to establish a conceptual framework to reveal causes of inequality. However, it is now accepted that there is no dominant or a common income distribution theory (Breau, 2015). As Bourne (1993) and Chakravorty (1996) discuss, broadly four sets of mechanisms are discussed in the existing literature that are likely to explain rising inequality recently: changes in (i) local economic conditions and labor market, (ii) the socio-demographic attributes of regions (iii) the spatial attributes of labor markets and (iv) institutional elements which also affect the regional wage distribution (cited in Breau, 2015). Breau (2015, p.59-60) presents a brief and substantial review of the theoretical literature on inequality with regards to this taxonomy. Leaving aside the theoretical discussions on inequality, which is the subject of another line of research, this study will focus on empirical literature with a special emphasis on regional inequality.

The literature examining with inequality at the national level or across countries has long been growing. However the number of studies examining sub-national or intra-regional inequality within a country is rather limited and scarce. Research at the regional level is crucial such that it raises the issues of inherent spatial heterogeneity in earnings differentials. Moreover, inequality dynamics and determinants of inequality may vary across regions within a country, which in turn require implementing different regional policies for reducing inequality. Within this scarce literature, earlier studies dealing with regional earnings inequality have made use of macroeconomic variables, for instance GDP per capita, to investigate whether mean income inequalities across regions are decreasing or increasing, which corresponds to famous convergence debate. This line of research does not concentrate on inequality in terms of distribution of income *per se*. However recent research in the area extensively makes use of individual survey data which allows one to capture micro and distributional aspects of inequality at various scales. Former studies focusing on intra-regional inequality mainly analyses U.K. labor market, i.e. Dickey (2001), Monastiriotis (2002), Duranton and Monastiriotis (2002), Dickey (2007) and Taylor (2006). Hauser and Xie (2005) investigates trends in earnings inequality in urban China, Goerlich and Mas (2001) analyze inequality in Spanish provinces and regions, Perugini and Martino (2008) study intra-regional inequality in European regions.

More recent studies, taking advantage of the availability of individual-based extensive micro data sets, also focus on regional variations in earnings determination besides displaying the extent of and trends in regional income disparity. These studies in general investigate the determinants of regional income disparities in an econometric framework employing different techniques. For instance, Breau (2015) employs multi-level models in order to explain differences and variances in the spatial distribution of earnings in Canada, Cristescu (2015) attempts to describe the factors that have an impact on the regional earnings and earnings inequality in Romania within a panel-data framework, Zhou (2014) examines the increasing earnings inequality by employing variance function regressions in order to decompose the

growth in earnings inequality, Pereira and Galego (2015) investigates inequality in Portugal by focusing on wage differentials within regions by using a quantile-based decomposition technique, Santos and Vieira (2015) estimated earnings equation and used Shapley value in its decomposition in order to investigate the main causes of personal income inequality in both rural and urban Brazil.

If we were to shift our focus to inequality in Turkey, income inequality across rural and urban regions, across geographical regions and provinces has been studied in great extent. Elveren and Galbraith (2009, p.12-14) survey the prominent studies in the literature on payment/income inequality in Turkey. A certain part of research on inequality examine β and σ -convergence hypotheses (Altınbaş et al (2002), Erk et al. (2000), Gezici and Hewings (2004), Karaca (2004), Aldan and Gaygısız (2006), Yıldırım et. al. (2009), Öztürk (2012)) by employing aggregated data such as GDP per capita by provinces, provincial GDP and Gross Provincial Product) where the results are ambiguous regarding convergence. Another part of the related literature examines the regional income disparities by employing Theil index and other generalized entropy inequality measures (Gezici and Hewings (2007), Yıldırım and Öcal (2006), Sarı and Güven (2007), Güven (2007)) again by using aggregated data, GDP per capita by provinces. Again empirical evidence regarding inter-regional and intra-regional inequality are rather mixed. And, some of the studies in the literature make use of 1987 and/or 1994 Household Income and Consumption Surveys by employing Gini index and several other inequality measures. Major finding of these studies indicate that the income inequality is considerably higher in urban areas (Gürsel et. al (2000), Silber and Özmucur (2000)).

In addition to these, following studies bring up an industry-wise discussion to the regional inequality research in Turkey. Elveren and Galbraith (2009) analyses the pay differentials in Turkish manufacturing industry from 1980 to 2001 by decomposing the Theil-T index by East-West distinction, geographic region, sub-sector, and province for private and public sectors. Main findings indicate that while pay inequality across regions does not vary for the period in question, it rises by the late 1980s in the private sector between East and West, sub-sectors and provinces. And very recently, Taştan and Akar (2013) investigate the pay inequality in Turkey using the between-group component of the Theil's T statistic by exploring employment and wage data from 1992 to 2010. By examining sectoral sub-groups and regions, they show that, pay differentials among sectors increases at the times of recessions and crisis periods of 1994, 2001 and 2008. Despite the tendency to decline in regional wage inequality starting from the mid-1990s, inequality between East and West does not change.

3. Data and Methodology

In this study we utilize cross sectional micro data called "Income and Living Conditions Survey" (SILC) provided by Turkish Statistical Institute (TURKSTAT) for the years 2006 and 2014. The SILC offers individual and household data for Turkey at the national and regional levels.

The data is provided in 12 regional levels³ (1st level) which are the statistical regions determined by Turkstat based on the NUTS (nomenclature of territorial units for statistics) nomenclature according to the sizes of population by considering economic, social, cultural, geographical and other factors (TURKSTAT, 2018). The individual level data of SILC includes information regarding the household members of age 15 and above, such as education status, employment status, health status, incomes obtained from activities (in the form of wage, salary, per diem and entrepreneurial income) and incomes obtained from out of activities (rental income, property income and transfer incomes)⁴ (TURKSTAT, 2014b). Individuals who currently do not hold an employment status and unpaid family workers are dropped from the sample with the aim of creating a dataset that covers individuals only who actively earn an income in the labor market as regular employee, casual employee, employer, self-employed and employer. Sample size is 10826 and 23399 for 2006 and 2014, respectively.

Annual value of the earnings is calculated as the total of annual net employee income (Salary, wage, per diem incomes), annual net entrepreneur income and social transfers⁵ (including unemployment benefits, old-age benefits and pensions, survivor benefits, sickness benefits, disability pension, ghazi salary, education-related allowances, voluntary retirement premiums and other incomes) (TURKSTAT, 2014c).

We employ the decomposition of Theil T index in order to examine the factors contributing to inequality. This index is sensitive to changes arising at the tails of the income distribution. Theil T index, in fact takes place within generalized entropy (GE) measure that is a member of the family of inequality measures. GE measure is generally formulated by the following:

$$GE(\alpha) = \frac{1}{\alpha(\alpha - 1)} \left[\frac{1}{N} \sum_{i=1}^N \left(\frac{Y_i}{\bar{Y}} \right)^\alpha - 1 \right] \quad (1)$$

In equation (1), \bar{Y} denotes the average income, Y_i denotes the i^{th} individual's income and α is the sensitivity parameter and it stands for the different weights assigned according to distances between incomes at different quintiles of the income distribution. If α parameter takes a more negative (positive) value then it indicates that the GE measure is more sensitive to changes in income at the bottom (top) of the distribution. When α takes the value of 1, GE (1), we obtain the Theil T index and it puts on equal weights across the distribution of income. Then, Theil T index may be characterized as:

$$GE(1) = T = \left(\frac{1}{n} \right) \sum_{i=1}^n \left(\frac{Y_i}{\bar{Y}} \right) \ln \left(\frac{Y_i}{\bar{Y}} \right) \quad (2)$$

3 These 12 regions are denoted in 3 digits and named as Istanbul (TR1), West Marmara (TR2), Aegean (TR3), East Marmara (TR4), West Anatolia (TR5), Mediterranean (TR6), Central Anatolia (TR7), West Black Sea (TR8), East Black Sea (TR9), Northeast Anatolia (TRA), Central east Anatolia (TRB), Southeast Anatolia (TRC) respectively.

4 For a detailed description of the variables included in the dataset please refer to meta data source available at http://www.tuik.gov.tr/MicroVeri/GYKA_2014/english/meta-data/concept/index.html

5 For detailed items in social transfers please refer to meta data available at http://www.tuik.gov.tr/MicroVeri/GYKA_2014/english/meta-data/concept/disposable-income/index.html

where n stands for the population size. Suppose that we divide the population into G groups with n_g observations, equation (2) can be rearticulated as;

$$T = \sum_{g=1}^G \left(\frac{1}{n} \right) \sum_{i=1}^{n_g} \left(\frac{Y_{ig}}{\bar{Y}} \right) \ln \left(\frac{Y_{ig}}{\bar{Y}} \right) \quad (3)$$

i^{th} individual's income in the g_{th} subgroup of the population is represented by Y_{ig} . If β_g and Z_g are defined as $\beta_g = n_g/n$ and $Z_g = \bar{Y}_g/k$, where k and \bar{Y}_g stand for the reference income and average income of the g_{th} subgroup respectively, then T can be written as;

$$T = \left(\frac{1}{k} \right) \sum_{g=1}^G \beta_g Z_g \ln Z_g - \ln k + \left(\frac{1}{k} \right) \sum_{g=1}^G \beta_g Z_g T_g \quad (4)$$

where $k = \sum \beta_g Z_g$ and T_g denotes subgroup g_{th} 's Theil T index. *Between group inequality* is captured by the first two terms of equation (4) while *within group inequality* is captured by the third term. If we define the mean income as the reference income, that requires $Z_g = \alpha_g = \bar{Y}_g/\bar{Y}$, equation (4) can be rewritten as;

$$T = \sum_{g=1}^G \alpha_g \beta_g \ln \alpha_g + \sum_{g=1}^G \alpha_g \beta_g T_g \quad (5)$$

Between group inequality is displayed by the first term in equation (5) and *within group inequality* is shown by the second term. Decomposing the Theil T index into between and within group components with respect to subgroups is called "static decomposition of Theil T index" (Tansever-Sefil, 2017).

The *gross contribution* of a selected variable to inequality is defined as the relative significance of between group component in overall inequality whereas the calculation of *marginal contribution* to inequality relies on the joint distributions of related variables.

If G_j is defined as the gross contribution of variable j to overall earnings inequality, we can define G_{jk} as variable k and j 's joint contribution that shows the inequality between groups K and J regarding these two variables. And if we define M_{kj} as variable k 's marginal contribution, given variable j , we may calculate it by taking the difference between gross contribution of variable j and the joint contributions of k and j :

$$M_{kj} = G_{jk} - G_j \quad (10)$$

If decomposition is executed with n variables, we can compute the marginal contributions from order 1 up to order $n-1$ (Psacharopoulos et al., 1997).

A number of studies that examine the decomposition of Theil-T index with regards to gross contribution and marginal contribution of various groups to overall inequality might be mentioned as Psacharopoulos et al. (1993), Lopez-Acevedo and Salinas (2000) and Neri and Camargo (2002). Their main findings indicate a considerable marginal contribution and gross contribution of educational attributes to inequalities.

4. Results

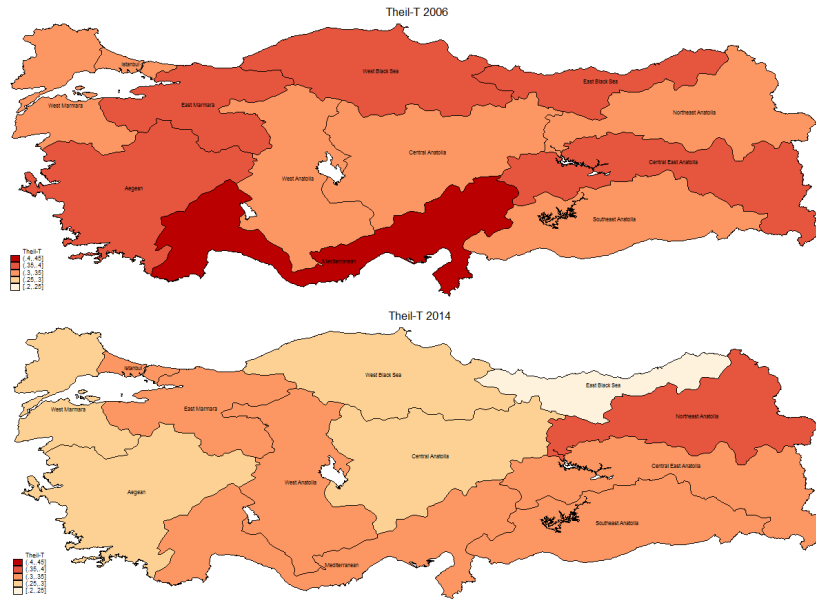
The general results concerning the regional earnings inequality in Turkey with Theil-T index and Gini Index can be seen in Figure 1 and Figure 2 respectively. 1. Earnings inequality is measured at the NUTS1-level for years 2006 and 2014. With the exception of TRA-Northeast Anatolia, both Theil-T and Gini indexes exhibit a decrease at regional levels and at the national level between 2006 and 2014. In 2006, while the most unequal region in terms of earnings distribution is TR6-Mediterranean, the most equal one is TRA-Northeast Anatolia which becomes the most unequal region in 2014. TR9-East Black Sea has the lowest earnings inequality in 2014.

In order to measure the gross and marginal contribution of chosen set of variables to the level of earnings inequality, Theil-T index is decomposed to its between component and within component. Position in occupation, education, economic sector and gender are determined as the main attributes of the economically active labor force that create earnings level gap between NUTS1 regions. Appendix 1 offers the categories of selected variables.

Table 1 and Figure 3 present the gross contributions of chosen variables to the earnings inequality in NUTS1 regions for the year 2006. Position in occupation, education, economic sector and gender together explains more than 37% of total earnings inequality in all regions. Their total contribution to earnings inequality is more than 70% in TRC-Southeast Anatolia and TRA-Northeast Anatolia. While education is the main source of earnings inequality in

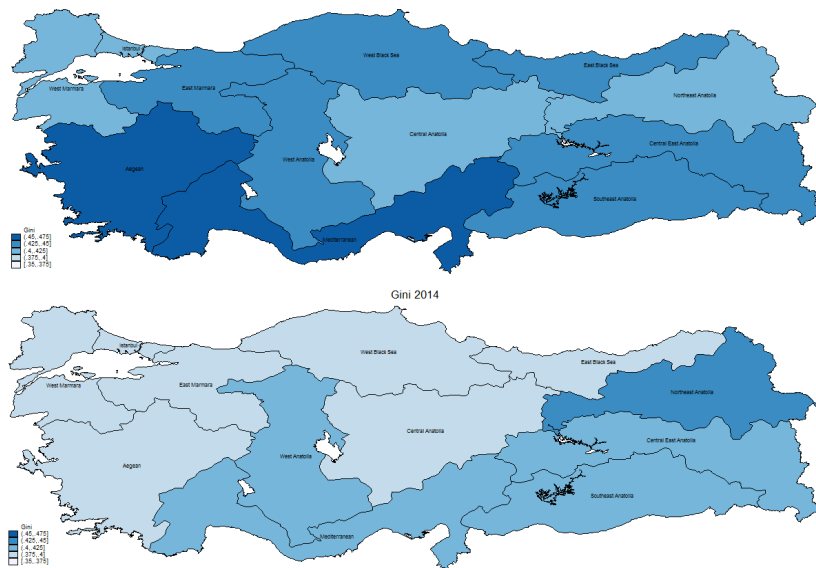
TR8-West Black Sea, position in occupation has the greatest contribution to earnings inequality in all other regions where education is the second greatest source. Economic sector has the third highest contribution to earnings inequality in all regions except TR4-East Marmara where gender is the third biggest source.

Figure 1: Theil T Index



Source: Authors' own calculations based on SILC Data

Figure 2: Gini Index

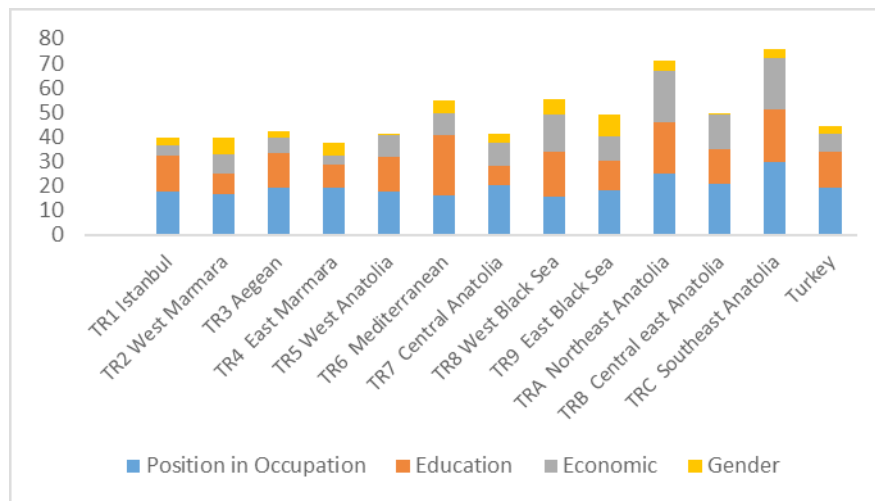


Source: Authors' own calculations based on SILC Data

Table I: Gross Contribution-Year 2006

Regions – NUTS1	Position in Occupation	Education	Economic Sector	Gender	Total
TR1-Istanbul	17.68	14.55	4.5	2.99	39.72
TR2-West Marmara	16.73	8.2	8.12	6.52	39.57
TR3-Aegean	19.23	14.39	6.07	2.51	42.2
TR4-East Marmara	19.32	9.58	3.33	5.62	37.85
TR5-West Anatolia	17.53	14.43	8.7	0.81	41.47
TR6-Mediterranean	24.66	15.91	9.23	5.09	54.89
TR7-Central Anatolia	20.56	7.68	9.19	4.08	41.51
TR8-West Black Sea	15.42	18.27	15.23	6.39	55.31
TR9-East Black Sea	18.29	11.97	9.85	8.78	48.89
TRA-Northeast Anatolia	25.1	20.97	20.63	4.19	70.89
TRB-Central east Anatolia	21.01	14.09	13.75	0.28	49.13
TRC-Southeast Anatolia	29.59	21.63	20.92	3.62	75.76
Turkey	19.43	14.65	7.3	3.1	44.48

Source: Authors' own calculations based on SILC Data

Figure 3: Gross Contribution-Year 2006

Source: Authors' own calculations based on SILC Data

As we can see in Table 2 and Figure 4, in 2014, the total contributions of all chosen variables to earnings inequality decreases in TR6-Mediterranean, TR7-Central Anatolia, TR8-West Black Sea and TRA-Northeast Anatolia, while it increases in all other regions. Position in occupation is not the leading contributor to earnings inequality anymore, but the second greatest after the education in TR1-Istanbul, TR3-Aegean, TR5-West Anatolia, TR7-Central Anatolia, TR9-East Black Sea, TRB-Central east Anatolia, TRC-Southeast Anatolia in 2014. Economic sector is still

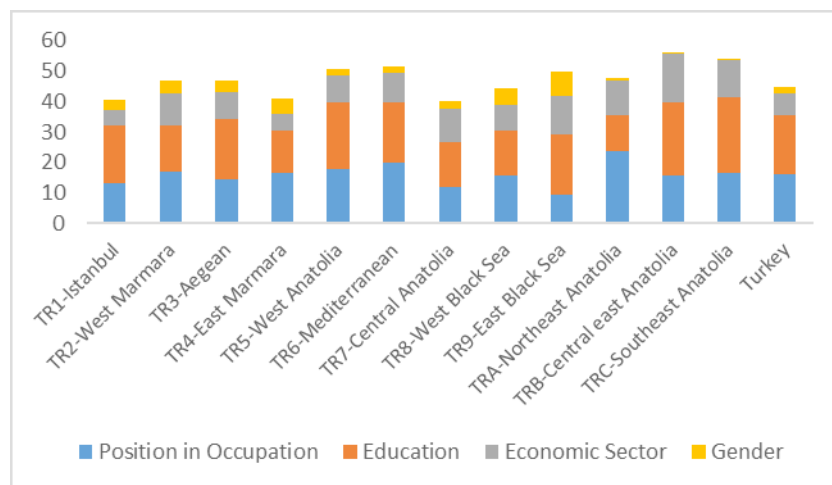
the third greatest contributor to earnings inequality in all regions except TR4-East Marmara where gender is the third biggest source. The marginal contributions of the chosen variables to the earnings inequality in 2006 are presented in Table 3 and Figure 5.

Table 2: Gross Contribution-Year 2014

Regions - NUTS1	Position in Occupation	Education	Economic Sector	Gender	Total
TR1-Istanbul	12.96	18.96	5.43	3.06	40.41
TR2-West Marmara	16.98	15.34	10.34	4.02	46.68
TR3-Aegean	14.24	20.09	8.84	3.54	46.71
TR4-East Marmara	16.45	13.82	5.47	5.05	40.79
TR5-West Anatolia	17.64	21.94	8.8	2.43	50.81
TR6-Mediterranean	19.69	20.23	9.38	2.16	51.46
TR7-Central Anatolia	11.74	14.85	10.9	2.53	40.02
TR8-West Black Sea	15.74	14.67	8.37	5.43	44.21
TR9-East Black Sea	9.31	19.73	12.69	7.97	49.7
TRA-Northeast Anatolia	23.52	12.04	11.3	0.68	47.54
TRB-Central east Anatolia	15.63	24.02	15.9	0.15	55.7
TRC-Southeast Anatolia	16.5	24.7	12.42	0.53	54.15
Turkey	16.17	19.13	7.47	2.21	44.98

Source: Authors' own calculations based on SILC Data

Figure 4: Gross Contribution-Year 2014



Source: Authors' own calculations based on SILC Data

Position in occupation has the greatest contribution to earnings inequality in all regions except TR1-Istanbul and TR8-West Black Sea where education and economic sector are the main sources of inequality and education and position in occupation have the second largest contributions

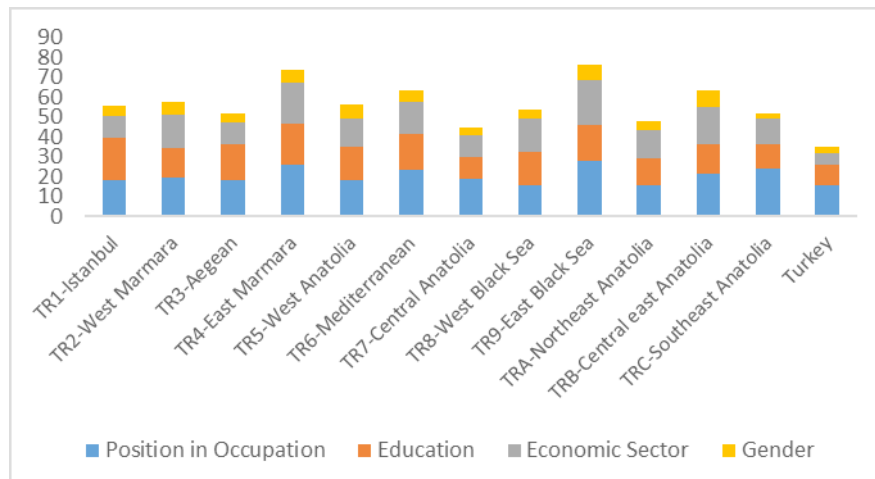
respectively. In all other regions, second largest contribution to earnings inequality derives from the economic sector. The marginal contribution of gender has the smallest magnitude in all regions.

Table 3: Marginal Contribution-Year 2006

Regions - NUTS1	Position in Occupation	Education	Economic Sector	Gender	Total
TR1-Istanbul	18.32	20.95	11.07	5.05	55.39
TR2-West Marmara	19.47	14.80	17.15	6.35	57.76
TR3-Aegean	18.32	17.72	11.49	4.44	51.96
TR4-East Marmara	26.14	20.49	20.58	6.52	73.74
TR5-West Anatolia	18.23	16.39	14.68	6.86	56.17
TR6-Mediterranean	23.55	17.98	16.17	5.77	63.47
TR7-Central Anatolia	18.95	10.81	11.24	3.75	44.75
TR8-West Black Sea	15.36	16.74	17.20	4.45	53.76
TR9-East Black Sea	28.03	17.71	22.88	7.73	76.35
TRA-Northeast Anatolia	15.81	13.48	13.81	4.71	47.81
TRB-Central east Anatolia	21.16	14.89	18.76	8.36	63.16
TRC-Southeast Anatolia	24.07	12.15	13.03	2.55	51.81
Turkey	15.65	9.98	5.77	3.85	35.25

Source: Authors' own calculations based on SILC Data

Figure 5: Marginal Contribution-Year 2006



Source: Authors' own calculations based on SILC Data

Table 4 and Figure 6 show the marginal contributions of the chosen variables to the earnings inequality in 2014. In TR1-Istanbul, TR3-Aegean, TR7-Central Anatolia, TR9-East Black Sea,

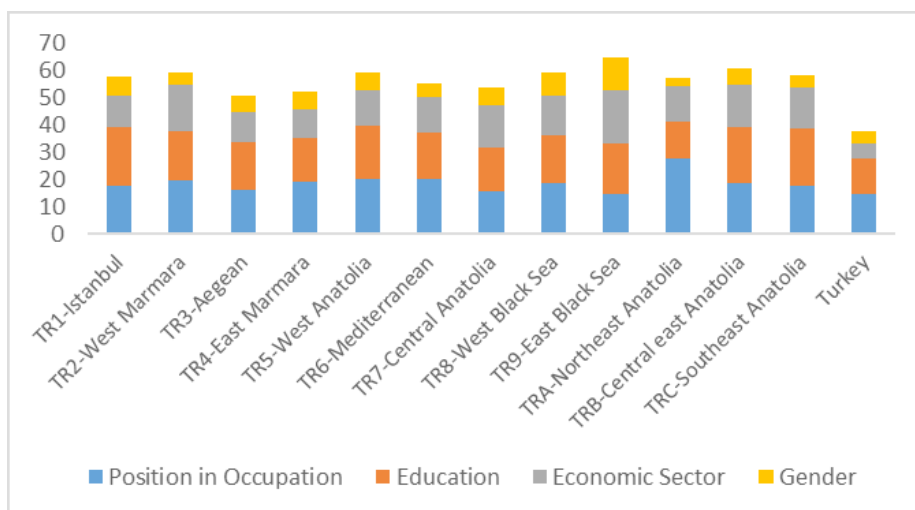
TRB-Central east Anatolia and TRC-Southeast Anatolia, the role position in occupation as the main earnings inequality source is replaced by education in 2014. Economic sector has third greatest contribution to earnings inequality in all regions except TR9-East Black Sea where economic sector is the leading contributor. On the other hand, gender is still relatively less important as a source of inequality than the other variables as it is in 2006.

Table 4: Marginal Contribution-Year 2014

Regions – NUTS1	Position in Occupation	Education	Economic Sector	Gender	Total
TR1-Istanbul	17.75	21.39	11.72	6.97	57.83
TR2-West Marmara	19.64	18.23	17.17	4.50	59.54
TR3-Aegean	16.17	17.42	11.14	5.88	50.62
TR4-East Marmara	19.36	15.85	10.78	6.34	52.33
TR5-West Anatolia	20.24	19.73	12.97	6.49	59.42
TR6-Mediterranean	20.10	17.17	12.92	5.41	55.61
TR7-Central Anatolia	15.41	16.37	15.35	6.84	53.97
TR8-West Black Sea	18.59	17.59	14.83	8.52	59.53
TR9-East Black Sea	14.49	18.50	19.68	12.27	64.94
TRA-Northeast Anatolia	27.91	13.59	12.96	2.93	57.39
TRB-Central east Anatolia	18.79	20.61	15.34	6.40	61.14
TRC-Southeast Anatolia	17.43	21.53	15.07	4.26	58.30
Turkey	14.81	13.02	5.59	4.47	37.89

Source: Authors' own calculations based on SILC Data

Figure 6: Marginal Contribution-Year 2014



Source: Authors' own calculations based on SILC Data

5. Conclusion

In this study, we aim to investigate the earnings inequality in NUTS1 regions by employing decomposition of Theil-T index for the years 2006 and 2014. The between components of Theil-T index is interpreted with regards to gross and marginal contribution of chosen labor sector related variables namely education, economic sector, position in occupation and gender to earnings inequality.

The regional earnings inequality in Turkey decreases in all regions from 2006 to 2014 except TR6-Mediterranean, which becomes relatively more unequal in terms of labor earnings in 2014. On the other hand, TRA-Northeast Anatolia which is the less unequal region in 2006, becomes the most unequal region in 2014. TR9-East Black Sea has the lowest earnings inequality in 2014.

The results regarding the gross contribution analysis indicate that, while the contribution of position in occupation to the earnings inequality is the relatively most important in almost all regions in 2006, education is the leading contributory factor to earnings inequality in 2014. In general, economic sector and gender are the third and fourth most significant contributory variables respectively. In 2006, the marginal contribution of the position of occupation is also relatively most significant one in all regions except TR1-Istanbul and TR8-West Black Sea where education is the main source of inequality. But, the role position in occupation as the main earnings inequality source is replaced by education in 2014.

The increasing importance of the education with regards to its gross and marginal contribution at the regional level indicates that, earnings differentials deriving from the educational human capital in labor market becomes more significant at regional level in Turkey. Hereby, this structural change in the sources of the earnings inequality requires a detailed examination for revealing the underlying mechanism behind the increasing importance of the educational human capital.

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Appendix: Descriptive Statistics**Mean Earnings by Region (TL)**

Regions-NUTS1	2006	2014
TR1	11630	23473
TR2	8748	20220
TR3	9809	19903
TR4	10799	20246
TR5	11249	24829
TR6	8126	19254
TR7	9200	20055
TR8	7519	19743
TR9	8913	18178
TRA	7202	18635
TRB	7841	17038
TRC	5737	16056
Turkey	9101	20041

Gender by Region

Years	2006			2014		
	male	female	Total	male	female	Total
TR1	76.36	23.64	100	70.37	29.63	100
TR2	77.43	22.57	100	76.94	23.06	100
TR3	78.2	21.8	100	72.79	27.21	100
TR4	77.41	22.59	100	72.88	27.12	100
TR5	81.26	18.74	100	76.55	23.45	100
TR6	81.06	18.94	100	74.96	25.04	100
TR7	86.49	13.51	100	81.58	18.42	100
TR8	77.65	22.35	100	77.96	22.04	100
TR9	70.77	29.23	100	70.01	29.99	100
TRA	86.24	13.76	100	87.04	12.96	100
TRB	89	11	100	87.15	12.85	100
TRC	86.05	13.95	100	84.79	15.21	100
Turkey	80.05	19.95	100	77.1	22.9	100

Education by Region

Regions- NUTS1	Illiterate	Literate but not a graduate	Primary school	Secondary, vocational secondary or primary education school	High school	Vocational or technical high school	Faculty/ university college or higher education level	TOTAL
2006								
TR1	0.88	4.23	40.81	13.82	14.46	9.11	16.69	100
TR2	3.27	3.84	50.23	12.3	7.56	13.43	9.37	100
TR3	2.44	3.48	49.44	12.67	7.45	9.96	14.55	100
TR4	1.75	2.74	43.97	14.58	8.88	13.49	14.58	100
TR5	1.72	1.95	39.89	12.87	12.87	10.23	20.46	100
TR6	5.99	5.22	46.47	12.46	10.92	8.89	10.05	100
TR7	5.46	3.88	43.97	13.51	13.07	7.18	12.93	100
TR8	6.68	4.49	47.93	14.52	5.99	11.18	9.22	100
TR9	9.31	6.29	42.07	12.98	9.31	7.73	12.32	100
TRA	13.22	11.58	37.06	12.53	10.76	7.77	7.08	100
TRB	13.83	8.5	36	14.5	10.83	6	10.33	100
TRC	14.34	13.44	43.28	11.76	8.66	2.84	5.68	100
Total	5.78	5.42	44	13	10	9	12	100
2014								
TR1	1.32	3.74	29.02	19.07	12.78	9.74	24.33	100
TR2	1.11	2.08	39.38	14.79	10	12.92	19.72	100
TR3	1.49	2.51	40.11	14.55	7.89	11.58	21.88	100
TR4	1.82	1.99	36.16	16.83	8.74	15.14	19.33	100
TR5	0.97	1.24	27.08	17.55	8.8	12.39	31.97	100
TR6	3.1	4.8	34.86	15.75	11.78	9.25	20.47	100
TR7	1.77	1.7	35.49	19.58	10.94	10.13	20.39	100
TR8	2.75	2.65	40.35	15.77	8.04	12.4	18.05	100
TR9	5.77	4.02	35.13	15.18	9.16	11.17	19.57	100
TRA	6.6	12.59	32.07	14.86	12.05	5.69	16.15	100
TRB	7.08	10.56	25.62	17.71	13.96	6.81	18.26	100
TRC	7.47	10.14	31.55	19.74	11	4.75	15.35	100
Total	3.08	4.5	34.13	16.81	10.29	10.33	20.88	100

Position in Occupation by Region

Regions-NUTS1	Regular employee	Casual employee	Employer	Self-employed	Total
2006					
TR1	76.36	6.15	9.42	8.07	100
TR2	49.89	14.56	4.51	31.04	100
TR3	52.99	9.47	7.17	30.36	100
TR4	63.93	8.44	6.03	21.6	100
TR5	60.57	10.23	7.13	22.07	100
TR6	46.09	17	6.38	30.53	100
TR7	46.12	16.67	4.74	32.47	100
TR8	47.58	10.83	6.45	35.14	100
TR9	38.14	6.95	9.17	45.74	100
TRA	36.38	9.54	4.77	49.32	100
TRB	41.5	13.17	6.67	38.67	100
TRC	44.7	26.1	3.62	25.58	100
Total	52.03	11.99	6.52	29.46	100
2014					
TR1	79.65	4.97	5.84	9.54	100
TR2	61.67	7.92	4.86	25.56	100
TR3	64.28	9.38	4.67	21.67	100
TR4	71.32	6.79	4.37	17.52	100
TR5	72.82	6.59	5.67	14.92	100
TR6	61.25	13.18	6.31	19.26	100
TR7	65.26	8.84	3.67	22.23	100
TR8	62.34	7	3.79	26.87	100
TR9	49.44	7.03	3.76	39.77	100
TRA	47.23	12.89	1.59	38.29	100
TRB	59.51	15.76	2.99	21.74	100
TRC	60.25	17.11	2.44	20.19	100
Total	64.63	9.76	4.4	21.22	100

Economic Sector by Years

FI140	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC	Total
2006													

Agriculture, forestry, hunting and fishing	0.7	26.0	23.2	16.1	16.6	26.2	27.9	27.8	44.2	45.4	29.5	24.8	24.1
Mining and quarrying	0.2	0.5	0.6	0.8	0.2	0.3	0.1	1.3	0.7	0.4	0.8	0.1	0.5
Manufacturing	36.3	23.5	21.3	35.5	16.9	14.9	15.1	17.2	8.8	4.9	8.0	16.8	19.7
Electricity, gas, steam, water supply	0.6	0.2	0.6	0.9	0.5	1.1	0.9	0.5	0.1	1.0	0.2	0.5	0.6
Construction	5.1	6.7	5.3	4.6	7.6	7.5	10.8	8.4	4.9	6.0	9.2	12.1	7.1
Wholesale and retail trade, repair *	20.8	14.9	16.2	11.8	15.8	15.9	15.5	15.1	11.3	12.5	15.8	16.0	15.4
Hotels and restaurants	4.5	5.6	5.9	4.7	2.6	3.9	2.6	5.2	4.2	3.0	4.0	3.4	4.3
Transport, storage and communications	7.4	3.7	4.7	5.2	5.5	6.3	4.6	4.2	4.6	6.5	6.7	6.9	5.5
Financial intermediation	2.8	0.1	1.2	1.1	2.4	0.6	0.6	0.8	0.7	0.3	0.8	0.0	1.0
Real estate, renting and business activities	6.3	2.4	4.5	3.6	5.4	3.5	2.7	3.0	2.9	1.9	2.5	2.3	3.6
Public administration and defense; compulsory social security	2.2	6.6	4.7	4.4	11.0	5.6	5.8	5.9	6.3	8.7	8.8	6.2	6.0
Education	2.8	2.6	3.6	3.5	4.9	5.0	6.2	5.0	6.6	3.7	5.2	3.5	4.2
Health and social work	2.2	2.0	2.9	2.1	3.6	2.4	3.9	2.7	3.2	2.2	3.8	2.1	2.7
Other community, social services activities	8.2	5.3	5.5	5.7	7.0	7.0	3.5	3.2	1.8	3.5	4.7	5.3	5.3
2014													
Agriculture, forestry, hunting and fishing	0.7	17.9	16.6	10.7	6.8	14.7	14.8	18.9	33.4	32.2	15.8	14.5	14.6
Mining and quarrying	0.2	0.8	1.8	0.3	0.3	0.3	0.5	1.6	0.6	0.5	0.4	1.3	0.8
Manufacturing	27.6	23.1	20.8	32.1	17.5	13.4	16.4	15.6	7.2	3.8	9.1	13.0	18.0
Electricity, gas, steam, water supply	0.9	1.2	1.2	1.1	0.9	1.1	1.6	0.5	0.5	0.8	0.5	1.2	1.0
Construction	6.6	5.8	6.5	7.4	6.9	9.1	10.2	9.6	9.7	13.0	17.6	12.1	9.1

Wholesale and retail trade, repair *	16.8	12.4	12.1	12.4	15.0	16.1	13.7	11.4	9.7	10.1	10.6	14.1	13.3
Hotels and restaurants	7.0	5.6	5.8	5.0	4.7	8.4	3.7	4.5	5.3	4.3	4.7	4.8	5.5
Transport, storage and communications	8.3	4.7	4.8	6.6	5.8	6.1	4.8	4.4	5.4	4.5	4.6	7.1	5.7
Financial intermediation	2.9	1.0	0.8	1.0	1.1	1.1	1.2	0.7	1.0	1.1	0.5	0.3	1.1
Real estate, renting and business activities	10.9	7.2	8.0	6.9	10.5	7.2	6.7	5.6	5.7	5.1	5.6	5.7	7.4
Public administration and defense; compulsory social security	3.7	7.9	6.1	4.5	12.9	5.8	7.5	7.9	5.3	8.4	11.9	7.9	7.3
Education	5.2	5.6	6.6	5.7	6.7	8.1	8.4	8.5	7.2	8.4	10.2	8.1	7.2
Health and social work	4.2	3.2	4.4	3.1	5.6	4.8	6.6	5.7	4.4	4.4	5.4	5.8	4.8
Other community, social services activities	5.1	3.5	4.4	3.4	5.3	4.0	4.0	5.1	4.9	3.3	3.3	4.3	4.3
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: *of motor vehicles, motorcycles and personal and housing goods