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RESEARCH PAPER

Inequality of Opportunity in Wage: Estimation for Turkey[1]

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Abstract
This paper aims to examine the effects of the circumstances beyond the control of individuals on wage inequality using the Household Labor Force Survey in the period 2004-2016 in Turkey. The parametric and non-parametric inequality of opportunity estimation methods has been employed for male and female wage/salary earners separately. Parametric estimation results demonstrate that the proportion of inequality of opportunity in total wage inequality increases from 2004 to 2008 and declines afterward. Using the education level of the household head as a sole indicator of circumstances, non-parametric estimation shows that inequality of opportunity increases in the corresponding period. The percentage varies between 18.5%-24.7% and 8.8%-16.7% for females and males, respectively. The education level of the household head and the region are the most significant contributors to the inequality of opportunity in all years.
Keywords: Inequality, Opportunity, Distribution, Turkey, Wage.
JEL Classification: D33, D63, I31, O15.

Introduction

Income inequality is back. After its declining period between the beginning of twenty century and the eighties, it has returned with a vengeance across the globe. This return is probably the result of the globalisation of international trade and financial flows (Basco and Mestieri, 2019).

The top 1% gets massive amounts from global income all around the world (Atkinson and Piketty, 2011). As depicted in Figure 1, the pre-tax global income share of the top 1% was 16.16% in 1980. This share reached 20.44% in 2016. The shares of the bottom 50% are 7.92% and 9.67% in the corresponding years, respectively. In particular, we emphasize the top 1% because there is a significant relationship between the share of this group in total income and the Gini coefficient (Oryoie and Abbasi-Nejad, 2017). According to the Oxfam, the total wealth of 26 billionaires equals the total wealth of poorest 3.8 billion people (Quackenbush, 2019). The worse is that the number of billionaires has doubled since 2008. That means that the financial crisis has benefited someone while it hurts the majority of the world population. This return of income inequality to such an extreme point has caused several social discontents. People have demanded equal income, the prospect of upward mobility and fair taxation in the *Occupy Walt Street Movement* in the United States, in the *15-M Movement* in Spain, and recently, in the *Yellow Vest Protest Movement* in France (Dhananjayan, 2017). At this point, one question which is quite an instigator has emerged: is

1. The abstract of this paper was presented in the International Congress of Management, Economy and Policy held in İstanbul on December 1-2, 2018.
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it possible that someone of those people attends the movements deserved to be left behind? Alternatively, put it differently, should society compensate for all losses of all people?

After the second half of the twenty century, according to a group of economist and political philosopher whose ideas changed the way we think of inequality with their ground-breaking thoughts, not all inequalities are objectionable, so someone might be left behind and society should not compensate for all losses of all individuals (Arneson, 1989; Cohen, 1989; Dworkin, 1981a; 1981b; Nozick, 1974; Rawls, 1958; 1971; Sen, 1980). Even if there are tiny nuances between the views of these scholars, the *currency of equality* is not the outcomes (income, wage, utility, happiness) which utilitarian thinkers claim for years, but the circumstances (for instance, gender, race, and parental education level) which produce those outcomes. Once the circumstances are equalised, individuals are responsible for the effort they exert to achieve the desired outcomes. Inequalities resulted after this process is not objectionable, because individuals start from the same line, and outcome differences reflect their effort they are completely held responsible. Despite the logical soundness and consistency of this theory, researches have been focused on income inequality for years.

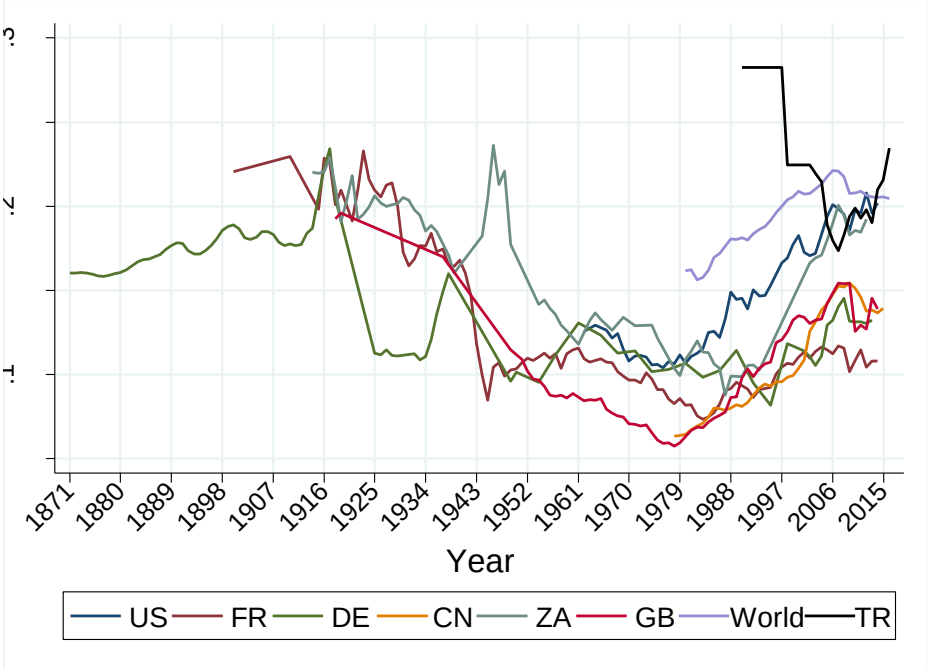

Figure 1. Top 1% Pre-tax National Income Share
Source: World Inequality Database (https://wid.world/).
Note: US (United States), FR (France), DE (Germany), CN (China), ZA (South Africa), GB (Great Britain), TR (Turkey).

The main reason is that measuring inequality of opportunity is not an easy task. Lack of detailed microdata, axiomatic and empirical theoretical basis has made it challenging to measure inequality of opportunity. Fortunately, these difficulties are overcome by collecting data and theoretical developments in the literature (Bossert, 1995; Bossert et al., 1994; Fleurbaey, 1994, 1995; Herrero, 1997; Kranich, 1996; Ok and Kranich, 1998; Roemer, 1998; Van de Gaer, 1993).

Why should we measure and examine inequality of opportunity? First and foremost, equality of opportunity is valuable *per se*. People must not be held accountable for the circumstances which are out of their control. Ignoring the effects of the circumstances is ethically unacceptable. Secondly, outcomes are the products of the circumstances and the effort of individuals. So, if we want to understand outcome inequality, we should understand

the initial conditions that determine related outcome distribution. Thirdly, it is the inequality of opportunity hinders economic growth, not income inequality. Studies show that initial conditions determine the future contribution of individuals to the economy (Atinc et al., 2006; Bourguignon et al., 2007). Finally, attitudes towards income redistribution are affected by people's perception regarding the sources of income inequality. Individuals show tolerance towards inequalities resulted from efforts which individuals are held responsible. However, inequalities produced from exogenous circumstances are evaluated as unacceptable (Alesina and La Ferrara, 2005; Brock, 2018; Fong, 2001).

Developments in the inequality of opportunity measurement and the increasing availability of detailed survey datasets have allowed for flourishing literature on the empirical analysis of inequality of opportunity[1]. Bourguignon et al. (2007) have analysed inequality of opportunity using their counterfactual distribution approach for the Brazilian male wage earners aged 26-60 in 1996. Selecting four circumstances (region of birth, race, parental education level and occupation of the father) and two efforts (education level of individual and labour market status) indicators, the share of inequality of opportunity in the total wage inequality vary between 13%-34% across seven cohorts. Hassine (2012) has estimated the percentage of inequality of opportunity in wage in Egypt for 1988, 1998 and 2006 by gender. Using five circumstances categories (parental education, the occupation of father, region of birth, gender and age) and portioned samples by gender, region and age, she has estimated that inequality of opportunity accounts for 11%-20% of total wage inequality. Brunori et al. (2018) have employed regression trees approach to understand inequality of opportunity in members of the European Union using Statistics on Income and Living Conditions in 2011. They have found that the unweighted averages of inequality of opportunities are .0079 and .0078 for trees and forest, respectively. Ferreira et al. (2011) is, as far as we know, the first and the single study that analysis inequality of opportunity in Turkey. Using household income and wealth which derived from Demography and Health Survey and Household Budget Survey by imputation for 2003, they have estimated inequality of opportunity for the ever-married women aged 30-49. Five circumstances have been used: region of birth, the type of birthplace (urban/rural), parental education, native language, and the number of siblings. According to this study, inequality of opportunity comprises 26% of total inequality in imputed consumption and 31% of overall inequality in the wealth index.

Taking into account the importance of circumstances which are beyond the control of individuals and previous studies, especially on Turkey, this paper aims to uncover the effects of circumstances on wage inequality in Turkey. Like many previous studies, Ferreira et al. (2011) have used a household level variable (imputed consumption and wealth index) and tried to explain its inequality by using individual-level circumstances. Although the households consist of individuals, so household-level outcomes are affected by individual-level variables, we believe that individual-level variables have more explanatory power on the individual-level outcomes. On the other hand, wages and salaries are the sole income source for most of the households. According to the TurkStat (2018), wages and salaries account for 48.9% of total equalised disposable household income in Turkey. This indicates that understanding the factors individuals cannot control behind the wage inequality is vital for to understand the whole income distribution. Therefore, the present paper tries to fill this gap in the literature by answering the following questions: i- how much of the total wage inequality is defined by circumstances? ii- How does the proportion of inequality of opportunity in total wage inequality change by gender across years and regions? Finally, iii- how much do each circumstance contributes to the overall wage inequality? We have employed parametric

1. For comprehensive literature reviews please see Peragine (1999), Pignataro (2012), Ferreira and Peragine (2015), Ramos and de Gaer (2016), and Roemer and Trannoy (2016).

(Ferreira and Gignoux, 2011) and non-parametric (Checchi and Peragine, 2010) estimation methods to find answers to these questions.

The rest of the paper organised as follows; Section2 provides the methodology. Section3 gives information about data and variables. Estimation results are presented in Section4. Section5 provides conclusion.

Methodology

This section firstly provides a general framework for the measurement of inequality of opportunity. Later, the methods we have employed will be presented. For notational consistency, we strictly follow Pignataro (2012). Following the canonical model of Roemer (1998), let there are N individuals in society, $i = 1, 2, ..., N$. The desired outcome that the individual i wants to achieve is represented by y_i. Here, the individual outcome is wage. However, it would be any other outcome such as consumption, household income or happiness. y_i is determined by two factors: a vector of circumstances C beyond the control of individuals (for example, gender, race, parental education) and effort E that individuals are held responsible. C belongs to the finite set $\Omega = \{C_1, ..., C_t, ..., C_T\}$. t is the type which represents the individuals whose circumstances are same, $t = 1, 2, ..., T$. The effort also belongs to a finite set $E \in \Theta$. So, the outcome of individuals is determined by a function $f : \Omega \times \Theta \to \Re_+$ as follows,

$$y = f(C, E) \tag{1}$$

Equality of opportunity can only be achieved when the distribution of outcome is independent of circumstances, i.e. $F(y \mid C) = F(y)$. This condition suggests two additional requirements as follows

$$\frac{\partial f(C, E)}{\partial C} = 0 \tag{2}$$

which implies that there is no direct causal effect from circumstances to outcome, and

$$G(E \mid C) = G(E) \tag{3}$$

which indicates that for the distribution function G, effort should be independent of circumstances.

Generally speaking, inequality of opportunity is calculated in two steps. Firstly, we need to generate a counterfactual distribution that reflects only unfair inequality by removing fair inequality from the actual distribution function. In the second step, inequality of opportunity is measured simply using an appropriate inequality index. The first step of the calculation process should satisfy two principles: compensation and reward principles. Compensation principle requires that inequalities resulted from circumstances should be eliminated and compensated by society. Reward principle supports respecting that inequalities due to efforts. These principles direct the researchers regarding which methodology will be used in the analysis. According to the compensation principles, the investigation can be conducted using the *ex-ante* or *ex-post* view. The *ex-ante* approach support outcome equality for individuals who have different initial conditions. Therefore, there is no room for any concern about effort, because of individuals responsible for their efforts in the same opportunity set. We can say

that there is less inequality of opportunity if inequality between opportunity sets reduces (Brunori et al., 2016).

On the contrary, the *ex-post* view concerns about outcome differences between individuals who exert the same effort level but have different circumstances. So, this view seeks to inequalities between individuals who are within the same effort set and ignores effort level inequalities. These views are equivalent to each other when effort and circumstances are distributed independently (Ramos and Van de Gaer, 2016). We follow the *ex-ante* approach because *ex-post* approach requires calculating effort level; however, the effort is an unobservable variable. To this end, we have employed the nonparametric approach of Checchi and Peragine (2010) and a parametric approach of Ferreira and Gignoux (2011). Following sub-sections will provide detailed information about these approaches. The parametric method has been run using the `iop` command written by Juarez and Soloaga (2014) in Stata.

Nonparametric Method

The nonparametric approach has several advantages, including functional flexibility and calculation simplicity. These advantages come with a cost: this approach demands enormous dataset. For a given dataset, increasing circumstances mean that the number of observations per cell decreases. This damages the accuracy of the analysis because the variance gets bigger within the cells. Nevertheless, we will present the results from the nonparametric approach for comparison purpose with a parametric one.

Let there are K types and N individuals, $i \in \{1,2,...,N\}$ and $t \in \{1,2,...,K\}$. The population of interest is partitioned into subgroups, each of which is homogeneous regarding circumstances. Let $\Pi = \{t_1, t_2, ..., t_K\}$ be the set of types. The type-specific mean outcome (hereafter, wage w) is $\mu_t(w)$. If the mean wage is the same across types, there is equality of opportunity, $\mu_k(w) = \mu_l(w), \forall k,l \mid t_k, t_l \in \Pi$. Thus, measuring inequality of opportunity is to calculate the extent of $\mu_k(w) \neq \mu_l(w), k \neq l$. Replacing the individuals' wage by group-specific mean wage where individuals belong, we get the hypothetical smoothed distribution $\bar{\mu}_{k,i}(w)$, where there is no within-group inequality. After this replacement, measuring wage inequality gives only the between-group (circumstances vectors) inequality, because there is no within-group inequality anymore. Let I be any scalar inequality index. So, absolute and relative inequality of opportunity can be written, respectively, as follows,

$$\theta_a = I\left(\left\{\bar{\mu}_{k,i}(w)\right\}\right) \tag{4}$$

and

$$\theta_r = \frac{I\left(\left\{\bar{\mu}_{k,i}(w)\right\}\right)}{I(w)} \tag{5}$$

Mean logarithmic deviation (MLD) is selected for the inequality index because it satisfies all necessary axioms for inequality decomposition by population subgroups (Foster and Shneyerov, 2000).

Parametric Method

The parametric specification permits modelling so many circumstances even third number of size is small. Also, this approach makes it possible to estimate the contribution of each circumstance to total inequality. This feature of this method is invaluable because knowing the impact of each circumstance on wage inequality enhances the policy-making process. The parametric approach starts the traditional log-linear wage equation,

$$\ln w_i = \alpha_0 + \alpha_1 C_i + \alpha_2 E_i + u_i \tag{6}$$

Equation (6) says that individual outcome is determined by circumstances, exerted effort by individual and other factors (for instance, luck, exogenous shocks, effects of genes) captured by u. Although the Equation (3) requires the orthogonal relationship between circumstances and effort, in practice, the effort individuals exert depends on the circumstances. Therefore, we need the second regression,

$$E_i = \beta_0 + \beta_1 C_i + v_i \tag{7}$$

By inserting Equation (7) in the Equation (6), we yield,

$$\ln w_i = \underbrace{(\alpha_0 + \alpha_2 \beta_1)}_{\delta_0} + \underbrace{(\alpha_1 + \alpha_2 \beta_1)}_{\delta_1} C_i + \underbrace{(\alpha_0 v_i + u_i)}_{\varepsilon_i} \tag{8}$$

Equation (8) is the reduced form, and it can be estimated by OLS. The coefficient of circumstances δ_1 captures the effects of circumstances on wage directly and indirectly via efforts. Now, we can construct the parametric smoothed distribution as follows,

$$\hat{w} = \exp\left[\hat{\delta}_0 + \hat{\delta}_1 C_i + \sigma^2/2\right] \tag{9}$$

Similar to the nonparametric method, we can use smoothed distribution to calculate relative and absolute inequality of opportunity as is done in the nonparametric method using MLD. Whichever estimation methods are used, we should keep in mind that all estimation results are lower-bound estimates (Balcazar, 2015). That is to say, if we could observe all circumstances, we would have a higher inequality of opportunity. So, all findings should be evaluated as an *approximation*. Finally, we did not take into account the selection process, because we must use some circumstances such as the number of children, marital status, or the wage of the spouse (e.g. assortative mating) which are not beyond the control of individuals in the selection equation. However, we only want to estimate the effects of circumstances out the control of individuals.

Data

The analysis is based on the Household Labor Force Survey (HLFS) which carried out by Turkish Statistical Institute (TurkStat). In 2000, the survey was started sharing with the public in microdata format. Since some essential variables (for instance, wage, region, and age in numerical format) are not available for the years 2000-2003, the analysis covers the period 2004-2016. HLFS has detailed socioeconomic information about individuals, including age, sex, marital status, region, labour market condition, occupation, working history, etc. We also benefited from the second data source. To generate one of the circumstances, we have used Major Episodes of Political Violence time series data of Integrated Network for Societal Conflict Research (INSCR, 2018).

Our outcome variable is the hourly wage. Some restrictions have been applied to the data. After some exclusion, our sample consists of employees who work full time in the private sector, earn at least minimum wage, and live with her parent(s). Following previous studies, we have used seven circumstances: gender, age, region, parental (household head) education, birth order, mandatory education reform, and political violence. General information about circumstances is given in Table 1. Detailed information and discussion about circumstances may be found following lines.

Table 1. Circumstances Used in the Analysis

Circumstances	Variable Type	Description
Gender	Dummy	-
Age	Continues	-
Region	Dummy	Where households interviewed.
Parental education	Dummy	The highest level of education completed.
Birth order	Ordinal	Birth order of individuals.
Mandatory education	Dummy	Indicates individuals who are exposed to 8 years of mandatory education reform in 1998. Individuals who are born in 1986 and after that date are subjected to this reform. This variable may be seen as a treatment in a natural experiment.
Political violence	Continuous	Indicates political violence individuals experience aged between 18 and 25.

Source: Research finding.

Our first circumstance is gender. People are, especially females, are discriminated in the labour market because of their gender. Women generally are offered lower wages than men. There are many explanations for this phenomenon (Blau and Kahn, 2016). Whatever the explanations might be, this is unfair because the gender is not selected by individuals. Therefore, no one can be held responsible for his or her gender. Age is our second circumstance. This is an indispensable variable in the wage regressions. Findings show that there is an inverted-U relationship between age and wage. Getting older reduces the productivity of individuals after some point. The third circumstance is the region where individuals live. Regions in the countries generally develop unevenly. This leads to remarkable wage differences between regions. The region may not be seen as a circumstance since people might migrate between regions. Even if individuals would migrate and change the circumstance, we believe that it is not as easy as it appears. Cultural habits, family ties and skills needed to migrate to region pays are higher hold individuals where they are.

The next and probably the most significant circumstance is parental education. The literature demonstrates that even the studies have focused on different transmission mechanism, the children of educated parents also are educated (Juarez, 2015). This vicious circle reproduces inequality again and again. To not exclude female-headed household, we will use the education level of the household's head. This variable is categorised as follows: uneducated (illiterate or literate but not have any diploma), low (primary or secondary), middle (high-school), and high (university). To see how much the education of household's head affect the wage of children, at least descriptively, we provide cumulative distribution functions of wages for male and female, respectively, by the education level of household head in Figure 2. It is seen that children of educated parents earn more than others regardless of gender.

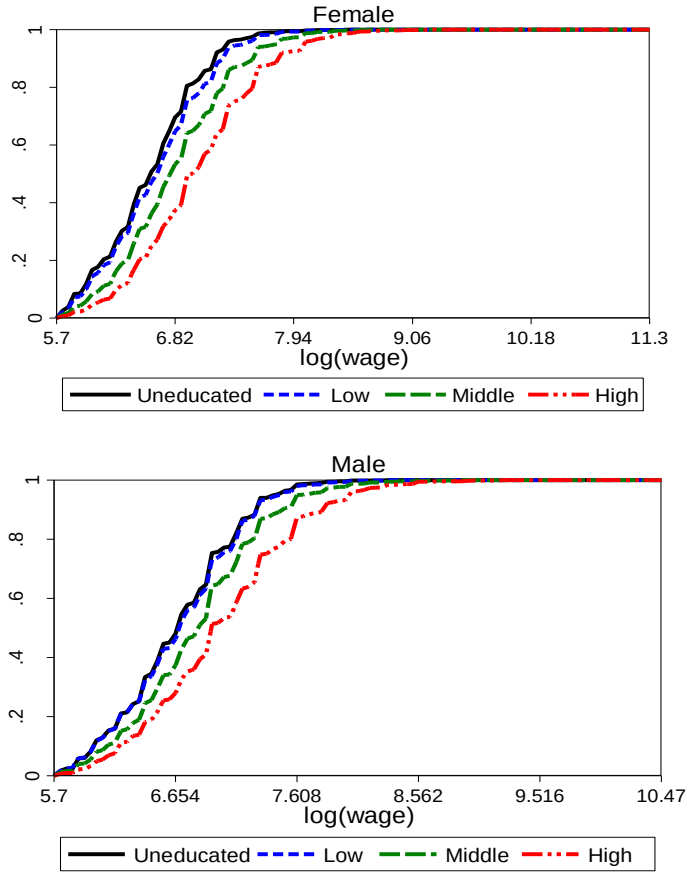

Figure 2. Cumulative Distribution Functions by Gender and the Education Level of the Household Head
Source: Research finding.

Birth order is another circumstance variable we mainly discuss. The birth order variable is an ordered variable showing the order of the individual among the children in the household. The variable starts with 1 and increases by age. How does our birth order determine our future outcome? If so, which direction? Low-income families generally spend their sources abundantly for their first and second children. This decision has not to be made intentionally because low-income families tend to have more children than higher-income families. Parents will be older, so their income also will decrease. Consequently, there will be fewer resources per child for late comings. Birth order can also be assessed from a gender perspective. Jayachandran and Kuziemko (2011) shows that families in India breastfeed girls less than boys if the first child is a girl. These families want to have a boy so that mothers will prepare themselves for the next birth. Less breastfed babies will be less healthy not only physically but also mentally. Therefore, girls will fall behind the boys in the labour market. In this context, it may be a disadvantage to be one of the first born children.

The fourth variable is a dummy variable that indicates mandatory education reform put into action in 1998 in Turkey. Until this reform, mandatory education is five years in Turkey. This reform has made it eight years. Individuals who born in and after 1986 are affected by this reform. These individuals will be more educated whether they want to be or not. Hence, the probability of being employed in a higher-paying job for these individuals is higher than others who were born before 1986.

The last circumstance used in the analysis is political violence variable, and it needs special attention. Turkey has witnessed dark years, especially between 1970s-1990s. Exposed

to political violence and social discontent, especially in early adulthood, might have severe impacts on the individuals' future outcomes. INSCR (2018) provides Major Episodes of Political Violence (MEPV) time series for Turkey from 1946 to 2017 (see Figure 3). This variable is a Likert-type scale ranging from zero to ten. Zero means there is no political violence, and ten means there is extreme political violence. Following Tien and Adoho (2018), and references therein, we focus on early adulthood defined age between 18-25. The simple arithmetic mean of the MEPV values in the corresponding years experienced by an individual is coded as the political violence value for that individual.

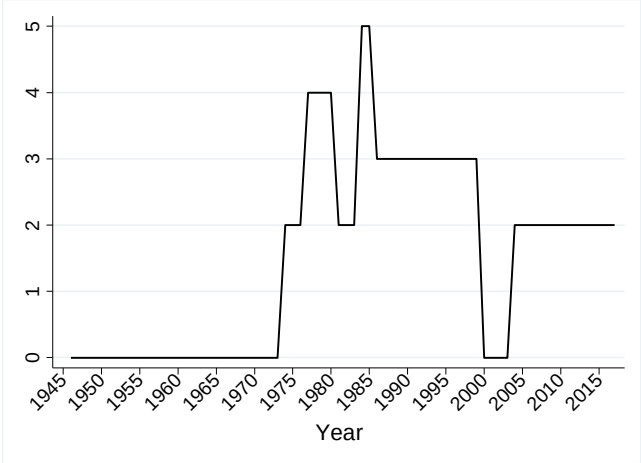

Figure 3. Major Episodes of Political Violence in Turkey, 1946-2017
Source*:* INSCR (2018).

Empirical Findings

This section presents the results we have found in the empirical analysis. We present firstly general wage inequality trend with time series graph. After that, findings on the inequality of opportunity are given. Figure 4 shows how wage inequality changes in the period of 2004-2016 by gender. Good news is that wage inequality has been decreasing for both male and female workers. Downwardness is especially remarkable after 2013. The bad news is that wage inequality among female workers is considerably higher than inequality among men. This difference probably is the result of the unequal schooling rates. In the past, families preferred to send their boys to school rather than girls. That discrimination has not only caused wage differential between genders. It also has caused wage differentials among females.

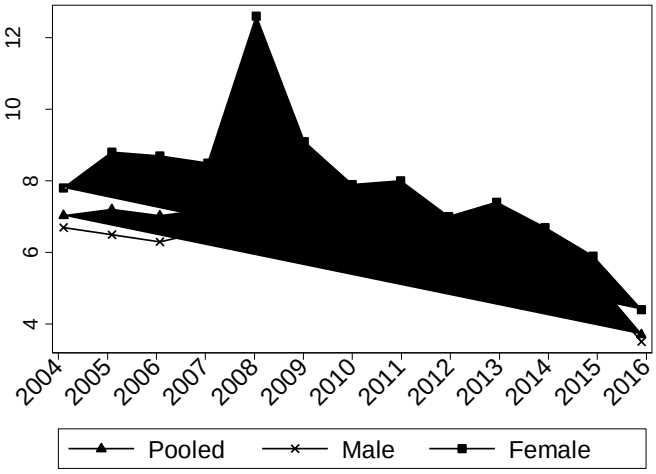

Figure 4. Wage inequality in Turkey, 2004-2016
Source: Research finding.

Figure 4 also indicates that the global financial crisis hit the female worker more badly than male workers. Female wage inequality rose suddenly in 2008, while male wage inequality is decreasing. We can also assess wage inequality from a different point of view. As we have stated in the data section, the education of the household head is a vital circumstance affects the future outcome of individuals. Hence, Lorenz curves which depict distributional inequality by the education level of household head are provided by gender in Figure 5. This figure shows the different side of wage inequality in Turkey. It is seen that wage inequality increases as the education level of household head increases. This fact is valid for both male and female workers. However, there is almost the same inequality level for males whose household head is uneducated or low-educated. It is the evidence of that education of household head can only explain inequality between individuals. Inequalities within individuals are waited to be explained. Now, we turn to present empirical findings for inequality of opportunity in the following lines.

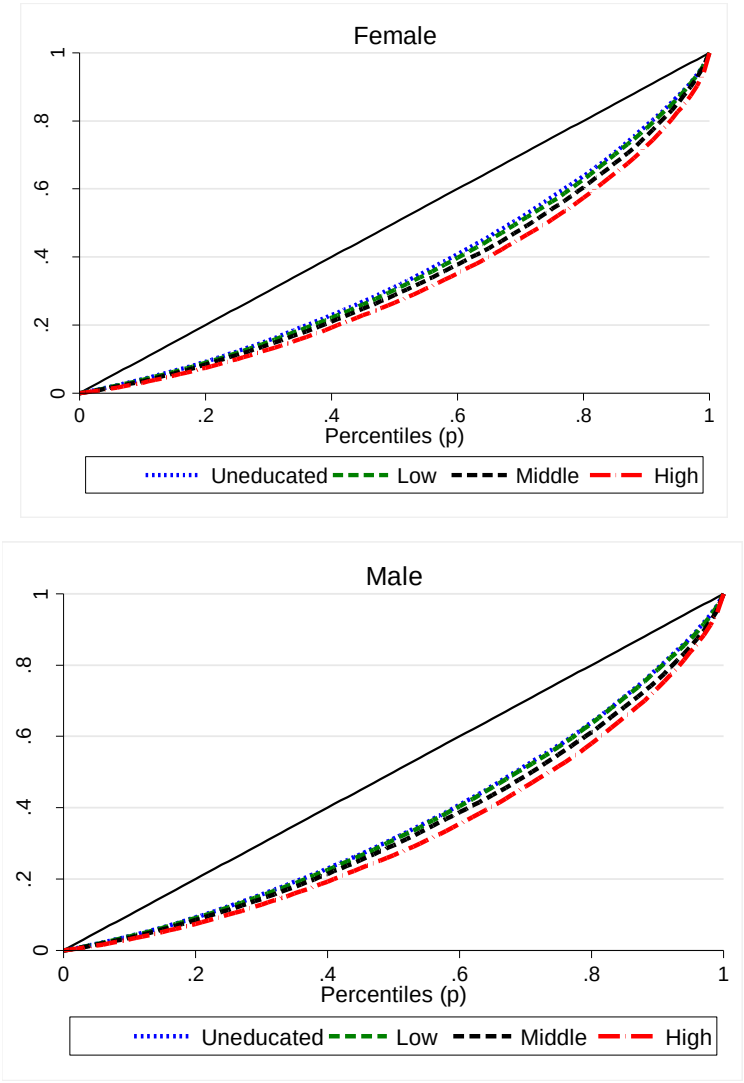

Figure 5. Lorenz Curves by the Education Level of the Household Head
Note: Diagonal solid line indicates perfect equality. So, the Lorenz curve nearer solid diagonal line represents less inequality.
Source: Research finding.

Compared to males, inequality of opportunity in wage is higher for females regardless of estimation method almost in all years. However, parametric and non-parametric estimation methods give contradictory findings of the changes in inequality of opportunity through time. The parametric approach reveals that the proportion of inequality of opportunity in total wage inequality for female workers changes between 22-19.3%. Except for jumps due to the effects of the financial crisis in 2008 and 2009, this means that the effects of circumstances play a permanent role in the life of women. For males, the proportion of changes between 13.5-9.7%, and it declines since 2008. According to the non-parametric approach, relative inequality of opportunity increases for both male and female workers. The increment is much steeper for females. Recall that we have used the education level of the household head as a single circumstance in non-parametric estimation. The contradiction between findings demonstrates that, as we have stated previously, despite the importance of parental education, the other circumstances also play essential roles in the wage distribution process.

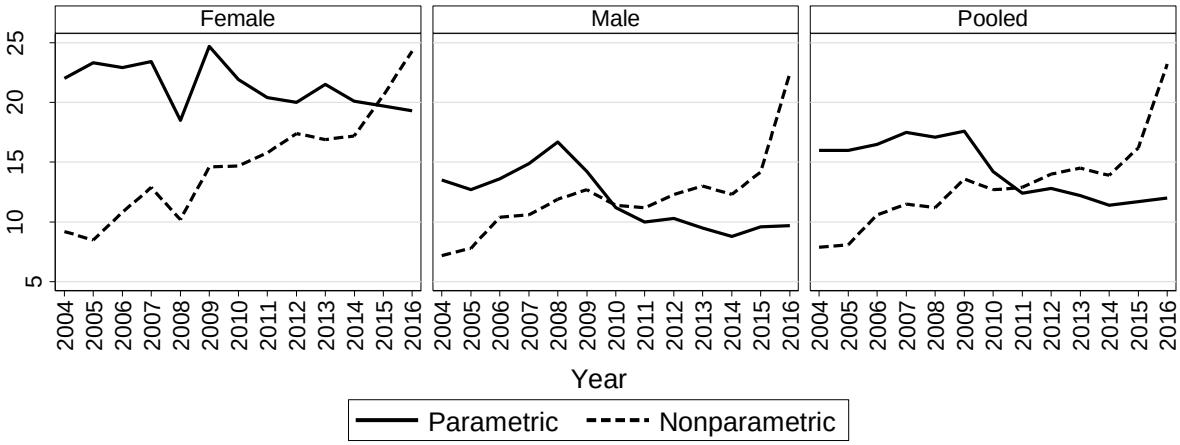

Figure 6. Relative (%) Inequality of Opportunity in Turkey, 2004-2016
Source: Research finding.

To see the explanatory power of each circumstance on the relative inequality of opportunity, the contributions of circumstances are given in Figure 7. In terms of contribution to inequality of opportunity, the good news is that gender is the least contributor to inequality. Its maximum values are 1% and 1.8% in 2015 and 2016, respectively. At first sight, gender is expected to be a significant contributor; fortunately, it is not valid, at least for Turkey. This finding might be a sign for that gender-based wage gap might also be a lower bound estimate for Turkey. Figure 7 demonstrates that education of the household head, region, and age are the first three contributors. Except for age, education of the household head and region has more explanatory power among male workers. The contribution of the mandatory education reform increases slightly and decreases after 2010. As we have argued in the data section, the births order matters much more for female workers. The effect of political violence steadily decreases for both genders. However, its contribution is remarkably high in the first years. We believe that if we had microdata for earlier years, i.e. 1980-2000, the contribution of this variable would reach, and maybe exceed, the current most contributor variables.

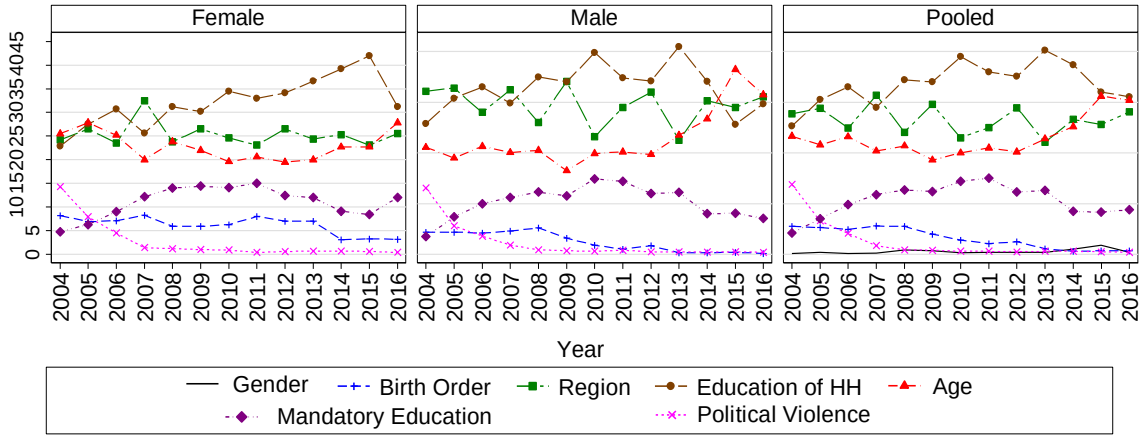

Figure 7. The Contributions (%) of Circumstances to Relative Inequality of Opportunity
Note: Contributions are calculated using Shapley approach.
Source: Research finding.

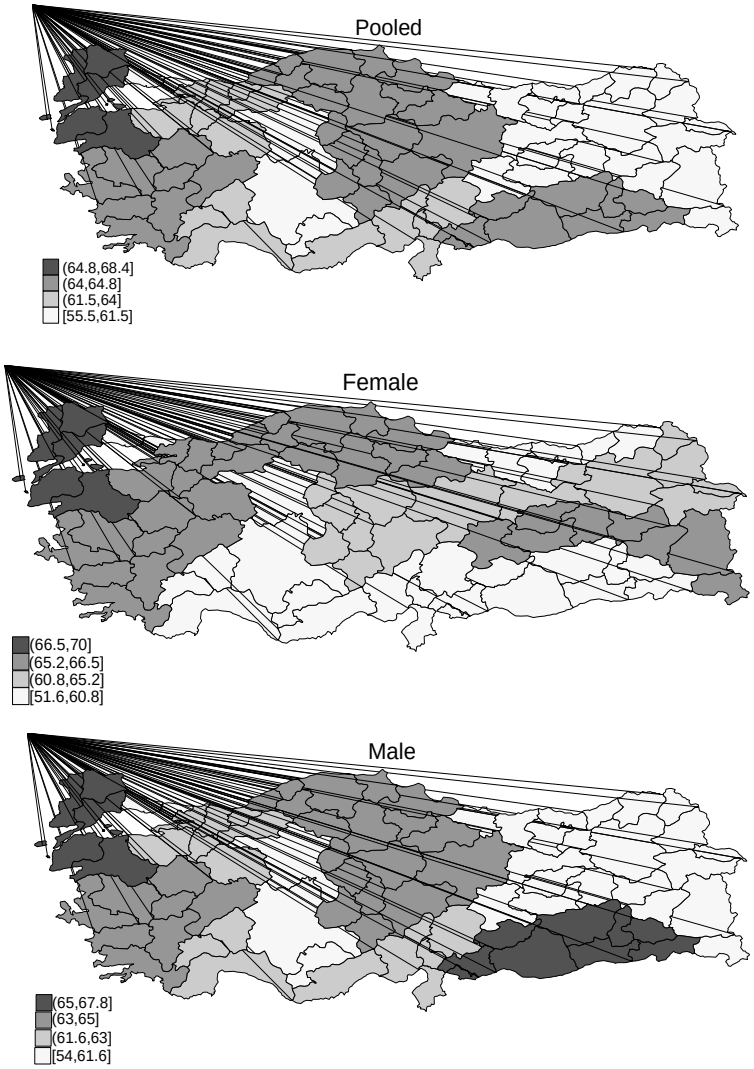

Figure 8. Regional Relative (%) Inequality of Opportunity, 2004-2016
Source: Research finding.

To uncover more detail, we have analysed inequality of opportunity by region. As we have seen in the previous lines, the region is the second significant contributor. Therefore, the regional analysis is expected to suggest more information about the inequality of opportunity in Turkey. Firstly, we focus on the inequality of opportunity within genders. Figure 8 presents regional relative inequality of opportunity within genders by map graphs. At first sight, we can easily see that Turkey has significant developmental differences in terms of inequality of opportunity between regions and inequality of opportunity is higher among females in most of the regions. Inequality of opportunity reaches its smallest values in the West Anatolia (51.6%) and the North East Anatolia (54%) among female and male workers, respectively. Its highest values are seen in the West Marmara with 70% and 67.8% among female and male workers, respectively.

These figures demonstrate that inequality of opportunity is notably high when the region is excluded from the analysis. This means that the region is considerably correlated with other circumstances, and this leads to unbiased estimated coefficients in the regression analysis. Besides, very high within region inequalities imply that the contribution of circumstances we have presented in Figure 7 also will change considerably. Probably, the most exciting finding we have obtained from the regional analysis is the levels of inequality of opportunity within genders in the West Marmara and within female workers in the South East Anatolia. We have expected that there should be higher inequality of opportunity among females than males in

South East Anatolia. We also have presumed that inequality of opportunity might be smaller in the west part of the country. So, why do we face such a finding? To reveal the answer, we have plotted mean gross domestic product (GDP, 2009 is the base year) per capita against inequality of opportunity within genders.

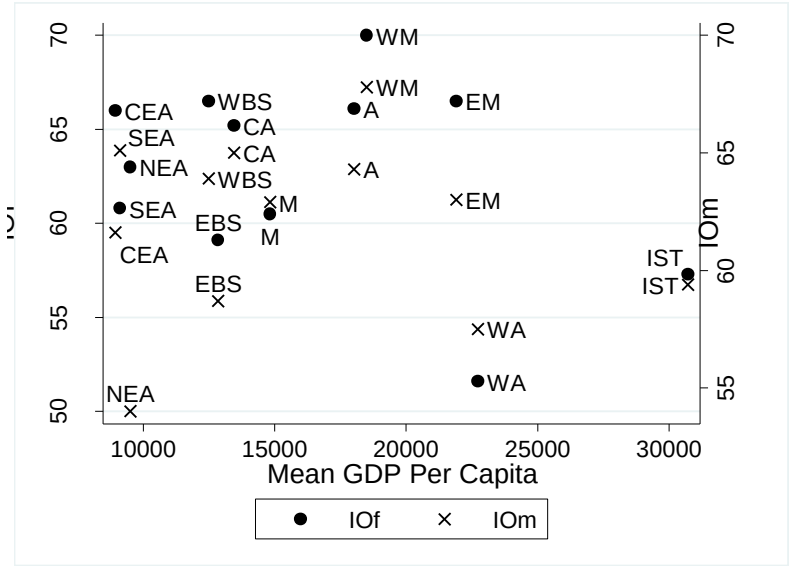

Figure 9. Inverted-U Relationship between Regional Mean GDP per capita and Inequality of Opportunity within Genders, 2004-2016.
Source: Research finding.
Note: We calculated the simple mean of the GDP per capita for the period of 2004-2016. 2009 is the base year, and GDP is measured with the national currency. GDP series are obtained from the Turkish Statistical Institute. IOf: inequality of opportunity among females; IOm: inequality of opportunity among males; NEA: North East Turkey; CEA: Central East Anatolia; EBS: East Black Sea; SEA: South Black Sea; M: Mediterranean; WBS: West Black Sea; CA: Central Anatolia; A: Aegean; WM: West Marmara; EM: East Marmara; WA: West Anatolia; IST: Istanbul.

Figure 9 shows a possible relationship between relevant variables. We can easily see that there is an inverted-U relationship between mean GDP per capita and inequality of opportunity in Turkey. Inequality of opportunity increases for both genders until some point and starts decreases after that point. This phenomenon is known as the Kuznets curve after Simon Kuznets' seminal contribution to the growth-income inequality nexus (Kuznets, 1955). Consequently, the reason we have found unexpected findings is the income differences between regions.

In the previous paragraph, we have stated that the contributions of circumstances within regions are expected to be higher than we have found if the region is included as a circumstance in the analysis. To check whether this expectation is right, we have also analysed the contributions of each circumstance to total inequality of opportunity within regions. Figure 10 presents the contributions of each circumstance in general and within genders by region. In all estimation groups, the most significant contributor is mandatory education reform. This reform mainly has caused essential changes in the inequality of opportunity in the east part of the country by providing education to the children. Inevitably, more educated individuals will earn more; therefore, someone will fall behind others in the labour market in terms of wages and salaries. Once again, pooled estimation shows that gender has little impact on the inequality of opportunity. It mainly has higher values in the eastern regions. As the aggregate analysis given in Figure 7 demonstrates, political violence seems as if it has almost the same contribution to the inequality for both genders.

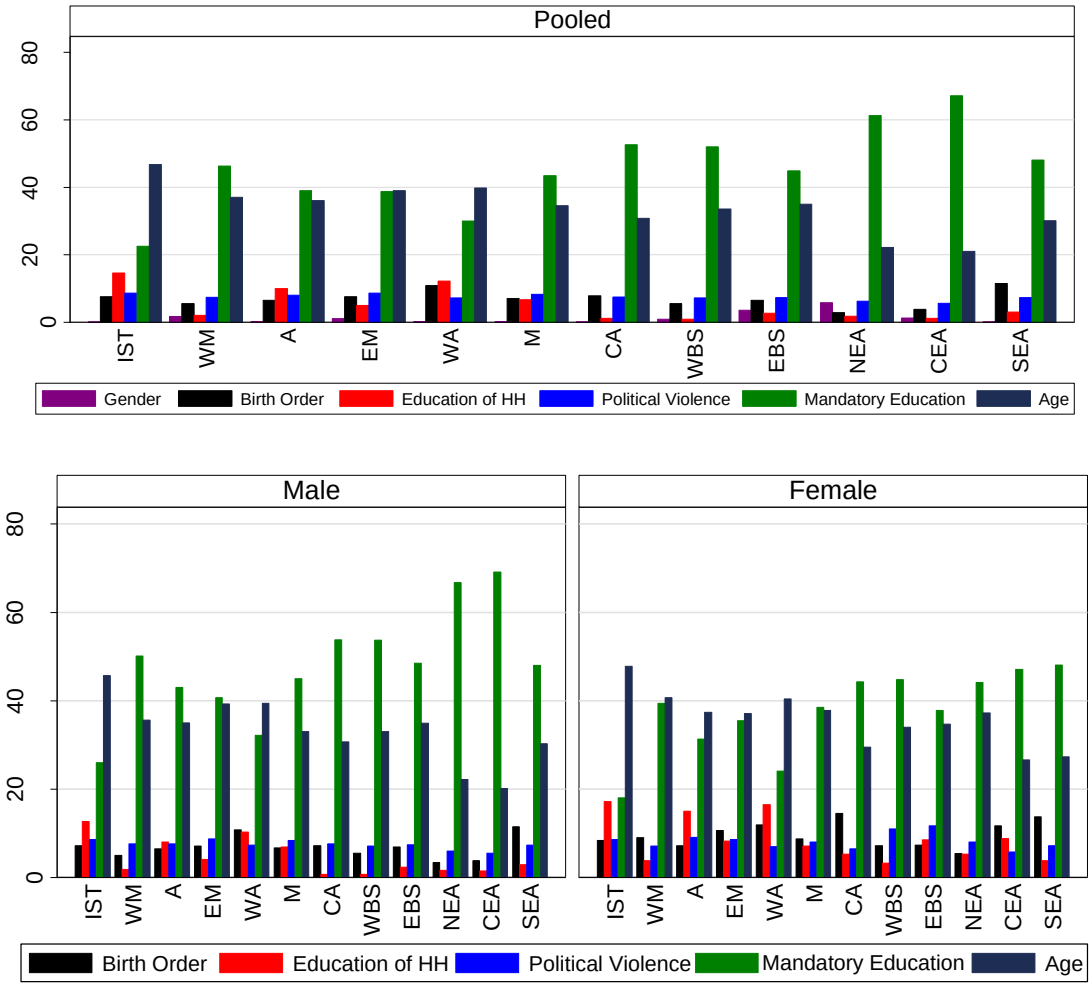

Figure 10. The Contributions (%) of Circumstances to Relative Inequality of Opportunity by Region
Note: Contributions are calculated using Shapley approach. IST: İstanbul; WM: West Marmara; A: Aegean; EM: East Marmara; WA: West Anatolia; M: Mediterranean; CA: Central Anatolia; WBS: West Black Sea; EBS: East Black Sea; NEA: North East Anatolia; CEA: Central East Anatolia; SEA: South East Anatolia.
Source: Research finding.

However, the regional analysis suggests that political violence is particularly meaningful among females. This is not surprising. Families might be tending to choose not sending their girls to the university in chaotic times. Why girls, but not boys? There may be two reasons for this choice. One may be the physical power of boys. The second reason, and most likely to us, men are seen sole bread-winner in the patriarchal societies. Therefore, if someone should stay home, this should be girls because boys have to find a job and maintain a family, but girls do not have to.

Conclusion

The present paper has examined the inequality of opportunity in wage appears to be one of the leading causes of income inequality in the context of Turkey. As the paper propounds, the circumstances shape wage inequality seriously in Turkey. On average, nearly 14% of the total wage inequality comes from inequality of opportunity. The level of education of the household leader, the region, and age are the first three variables that make the highest

contribution to the inequality of opportunity in wage in all years. The analysis carried out on the basis of gender and region shows that the variables that make the highest contribution to inequality of opportunity are compulsory education policy and the age of the individual. Regional analysis by gender demonstrates that the situation is much worse. The inequality of opportunity accounts for 50-70% of total wage inequality. At first glance, an interesting finding has been obtained: the western and eastern regions of the country have similar index values. When the regional GDP values are taken into consideration, it is seen that this is consistent with the growth-inequality nexus of Kuznets. Age and exposure to compulsory education policy are the two most contributing circumstances to inequality of opportunity in all regions.

Since the measured inequality of opportunity indexes are lower-bound estimates, real inequality of opportunity levels still wait to be uncovered. To do that, we need a much more detailed survey datasets. We believe that inheritance is one of the most critical circumstances that we do not access via surveys. Inheritance is also out of the control of individuals like gender, parental education or political decisions. It probably has much more impact on the future outcomes of the individuals. Even if it also depends on the exerted effort, IQ is also a needed circumstance, at least in the Turkish case, must be collected to estimate more accurate estimates. Future studies undoubtedly would provide more accurate estimates if stated circumstances are collected in the surveys.

Even if we have lower inequality values than true ones; we think that there is still something to do to reduce inequality of opportunity. Schooling is the first factor that comes to mind. However, although there are still some places, especially in the east part of the country, where school conditions are relatively severe, Turkey does not have severe problems regarding schooling or school attending. Therefore, we suggest that two policy recommendations we think to reduce the effects of circumstances on wage distribution. The first is to raise the capital income and wealth taxes. The second is to promote labour unionisation. Former will redistribute income and wealth, so negative and positive effects of circumstances will be balanced. Later makes labour stronger in the wage bargaining process.

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