Personal income distribution in Turkey: A generalized ordered logit analysis

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Article Info	Abstract
	Income distribution decomposition may be affected by a variety of different factors. The main objective of this study is to examine potential factors of personal income distribution in TRA1 sub-region, the three highest income inequality in Turkey. The dataset was drawn from the Turkish Household Income and Life Conditions Survey. Due to the natural ordering of the dependent variable, a generalized ordered logit model was performed to analyze the data. **Findings/Originality**: The estimation results reveal that gender, age, marital status, educational level, occupational group, and general health status were found to be statistically significant determinants of personal income distribution in TRA1 sub-region of Turkey. The empirical evidence gathered from this study may add an explanation for personal income distribution decomposition in sub-regions of Turkey. In addition, the finding contributes to the human capital theory development that implies the importance of educational policy as one of the effective tools in reducing inequality.

Introduction

Although significant increases in welfare levels are crucial for economies, it cannot be considered as sufficient for economic growth. Income distribution is an essential indicator for economies regardless of their position on economic development. Nowadays, income distribution has widely emerged as not only an economic factor but also a sociological phenomenon that has a significant impact on social structure, especially in emerging economies. The concept of income distribution takes its respectable place in many economic policies, and the unequal distribution for individuals or households is commonly adopted as the failure of the political system and market mechanism. Indeed, self-functioning markets may lead to several major sociological issues in terms of inequality, even under stable conditions (Stiglitz, 2013). Although the potential income inequality issue is devoted to direct individual preferences and productivity by market economy advocates, the socialist view considers income inequality as the result of the functioning of the market mechanism. In this context, the role attributed to the state in combating inequality also differs. Should inequality be intervened by giving and transfers, allowing the free functioning of the market mechanism, or changing the market mechanism that creates inequality? The common point of the debate in economic literature with the concepts of pure redistribution and efficient redistribution is the

evaluation of inequality as a problem requiring state intervention (Piketty & Goldhammer, 2015). Income distribution inequality in an economy leads to a significant decline in economic growth and investments through economic, financial, and political instabilities. Furthermore, income distribution inequality may also cause many several societal issues, including political tensions, increases in crime rates, the formation of new social classes, and migration (Dabla-Norris, Kochhar, Suphaphiphat, Ricka, & Tsounta, 2015). Even if rising levels of inequality do not result in social tensions and violence, the perception of inequality for reforms can limit the ability of governments to implement their economic policies (De Silva & Sumarto, 2014). Since income distribution in a society is considered as a crucial argument, the main determinants of unequal income distribution and its economic and social consequences deserve particular attention.

On the other hand, income inequality is also evaluated in the context of a trickle-down economy. Accordingly, it can be stated that inequality is a phenomenon that supports the accumulation of capital accumulation in high-income groups, namely the productive class, and thus can contribute to social welfare (Akinci, 2018). This inference has been addressed in the economic literature in the context of poverty and economic growth. McKay and Sumner 2008) obtained findings confirming the relationship mentioned in Patel, Doh, and Bagchi (2018), while Akinci (2018), Greenwood and Holt (2010), and Thorbecke (2013) found that the trickle-down effect was not valid.

In economic literature, income distribution inequality is generally examined based on the Kuznets hypothesis. Kuznets (1955) states that inequality will increase and then begin to decline with economic growth due to the sectoral distribution of labor and capital mobility. In this context, income inequality is considered as a natural result of the growth process. Kuznets hypothesis expressing the income inequality and economic growth relationship in reverse-U functional form was supported by many empirical studies Bahmani-Oskooee and Gelan (2008); Jovanovic (2018); Younsi and Bechtini (2020), whereas some other studies Costantini and Paradiso (2018), Gallup (2012), and Huang, Lin, and Yeh (2012), could not confirm the Kuznets hypothesis.

Income distribution is generally assessed under four main classifications: functional, individual, sectoral, and geographical. However, classical economic analyzes frequently emphasize functional and personal income distribution. Functional income distribution is defined as the distribution of labor, capital, and land, while personal income distribution concentrates on the distribution of income among individuals and households (Dünhaupt, 2013). Functional income distribution plays a crucial role in economic analyzes of many concepts, including income distribution, price levels, production, and unemployment. In that sense, several functional income distribution theories were proposed compatible with distinctive theories and ideologies (Cowell, 2015). However, personal income distribution has been discussed in the context of the Galton-Pareto paradox and has been tried to be resolved by economists for nearly a century. Today, there are two basic approaches to personal income distribution, namely, stochastic and productivist (Fix, 2017). As personal income distribution is adopted as a phenomenon that may possibly have significant impacts on the social and economic structure of a society and the concept of rational human mainly pursues to maximize self-interest, personal income distribution issue has emerged as a considerable subject within the society.

Among personal income distribution theories, the theory of human capital explained by the productivity approach principally proposes that individuals will have different income levels assuming that individuals have different characteristics. In that sense, there may be significant differences between the productivity of individuals with different hereditary and acquired characteristics (Cowell, 2015). In addition, adapting to changing production conditions and accompanying the development process are among the basic approaches to human capital. Human capital can be represented as the stock of knowledge and skills, and it can be described as one of the components of the production function. In other words, the theory of human capital purposes

to explain the differences in individual income levels by the differences in potential determinants influencing their productivity.

As an emerging economy, Turkey also frequently encounters ongoing debates on income distribution, especially after the 1980s due to several past economic policies including the increase in wages below the inflation rate, concentration on indirect taxes instead of direct taxes, relatively high-interest rate policies in some periods, and economic crises. Despite all recent attempts, the negative aspect of income distribution inequality in Turkey proceeds, as the Gini coefficient of Turkey was still calculated around 0.40 in recent years. Moreover, Turkey takes 33rd place in terms of income distribution inequality among 35 OECD member countries between 2014 and 2017 (OECD, 2019). The 2014 Wave of Turkish Household Income and Life Conditions Survey released by the Turkish Statistical Institute (2014) reports that the TRA1 Sub-Region of Turkey (including Erzurum, Erzincan, and Bayburt provinces) has the highest income distribution inequality of Turkey with a Gini coefficient value of 0.415. In such a circumstance, the main objective of the present paper is to examine the potential determinants influencing income distribution in a particular sub-region of Turkey with an emphasis on personal income distribution and diversification in 2016. Hence, the significant difference in terms of income distribution inequality between 2014 and 2016 can be explained by empirical analysis.

Many earlier studies that emphasize the association with human capital and personal income distribution discuss Mincer's human capital model (such as Paweenawat & McNown, 2014); while education, gender, and job experience of human capital factors were frequently selected as main explanatory variables. Education (Chongvilaivan & Kim, 2016) and educational expenditures (Song & Zhou, 2019) were found as a statistically significant determinant of income inequality in many earlier studies. It indicates that the gender wage gap can be substantially explained by women's relatively low work experience, job tenure, occupational and industrial segregation. Institutional quality was also found as the influencing factor of income inequality (Chong & Gradstein, 2019). Another recent research (Hong Vo, Van, Tran, Vu, & Ho, 2019) finds that the gender wage gap tends to increase at higher income levels. Very recent research (Cavusoglu & Dincer, 2019) puts forward that an increase in the average level of schooling has a decreasing effect on income inequality in the long-run, and additionally, a one-way causality relationship was observed from the average level of schooling and income inequality in the US. Dispersion in years of schooling (Paweenawat & McNown, 2014) was also found as a significant determinant of income inequality. Furthermore, significant regional (Florida & Mellander, 2016; Lessmann & Seidel, 2017; Malkina, 2019) and cross-country differences (Cevik & Correa-Caro, 2015; Nolan, Richiardi, & Valenzuela, 2019) were also highlighted as crucial determinants of income distribution inequality.

The rest of this study is structured as follows. The following section addresses factors that may have an impact on income distribution. The fourth section gives a methodological framework about the generalized ordered logit model. The third section introduces the data, and the fourth section presents empirical findings. The paper concludes with a discussion of estimation results and recommendations for future policies and studies.

Inequalities in income distribution may arise from many sources. Sources such as those emerging from a country's current population, employment and education status, informal economy, inflation, growth, and development level are the most striking structural factors that affect income distribution. The most important point to be considered when discussing these structural factors is the fact that they are to be viewed not as factors that directly cause inequality but as facts that affect income distribution.

An increase in population means that per capita income decreases while other conditions remain constant. Although this means less income for everyone, an increase in population when all other conditions are assumed to be constant disrupts income distributions in different ways such

as causing disruptions in equal opportunities to education, creating an informal population by increasing immigration to developed regions, and lowering productivity due to fragmentation of lands. The negative effects of increases in population on income distribution can be confirmed by Ricardo's theory of income distribution. Malthus law is one of the basic assumptions of Ricardo's theory of income distribution, stating that natural resources increase in arithmetic and the population increases in the form of a geometric sequence, and hence people with low income in society should have few children (Özgüven, 2005). Nevertheless, optimists state that increase in population positively affects growth and development since it creates a valuable asset and increases the creative human stock (Kaya & Yalçınkaya, 2014). As a result, although the effect of population increase on income distribution can be expressed negatively, at first sight, considering the effect of population increase on growth, the direction of the said income distribution change cannot be determined exactly.

One of the most important factors determining the level of income inequality in an economy is undoubtedly employment status. Employment status affects income distribution in different ways. The first point of view is that people must be involved in the production process to get a share of the income generated in the economy. Failure or inability to take any role in the production process is expressed as unemployment. Many economists agree that unemployment has increased income inequality, especially against low-income groups (Cysne, 2009). Another aspect of the employment situation that affects income distribution is the quality of the workforce. Consequently, differences in the quality of the workforce will bring wage differences. Therefore, unqualified individuals will receive fewer wages, while qualified people will earn a higher income. This will create inequality in terms of income distribution (Tayyar, 2011).

The existence of the informal sector in the economy appears as a decrease in tax revenues, unfair effects of welfare on taxpayers, unfair price competition between firms in the formal sector and firms in the informal sector, inefficient distribution of economic resources, low standards in goods and services, and deterioration in income distribution (Elveren & Özgür, 2016). The effect of the informal economy on income distribution manifest on taxes and unmeasurable revenues. Income or revenues are generated from informal economic activities, and consequently, these revenues will not be taxable. This is the first effect of informality on income distribution.

Another factor affecting inequality in income distribution is inflation, expressed as a continuous increase in the general level of prices. The effect of inflation on income distribution can be expressed as being indirect and can be explained by the nature of inflation classified as expected and unexpected. Another effect of unexpected inflation on income distribution is income transfer from employees to employers or vice versa. In collective agreements, the parties agree to increase the real wage level by the difference between the nominal wage increase rate and the expected inflation rate. In the event where the actual inflation rate is higher than the expected inflation rate, the level of increment in real wage decreases and causes income transfer from employees to employers. Therefore, unexpected inflation has a disrupting effect on income distribution.

The effect of growth on income distributions is one of the topics that has been frequently discussed, but there has not been any consensus view on the outcome of its impact. Classical economists see savings as the driving force behind growth. Higher profit rates give rise to a higher level of savings. Increasing savings increases investments. As investments are determined by savings, an income transfer from capitalists to the working class will occur, and savings rates will decrease. This will have an effect that slows down economic growth. According to the view adopted by neo-classical economists, it is natural to have a contrast between economic growth and income distribution. Arguing that full employment is only an exceptional situation, Keynes states that unequal income distribution is one of the obstacles to full employment. According to Keynes, practices that will bring income distribution closer to equality will affect the growth positively by increasing the trend of consumption (Tayyar, 2011). One of the remarkable views on the

relationship between income distribution and growth is the Kuznets hypothesis. According to the hypothesis, income inequality may tend to increase in the early stages of development. However, this hypothesis posits that in the later stages of growth, income inequalities will tend to decrease. The hypothesis in question has not been fully verified by empirical studies (Oğuş, 2005). As a result, the direction of the relationship between growth and income distribution could not be determined exactly. However, this may vary depending on the method applied and the data selected.

Wealth is one of the important sources of income that can be obtained through accumulation and inheritance. Imbalances in wealth distribution are among the reasons that may cause inequality in personal income distribution. Wealth policies are important in eliminating the imbalance in income distribution related to wealth. The acquisition and preservation of wealth in democratic countries is guaranteed by the constitutional provisions. It is necessary to divide wealth into two, namely previously acquired wealth and newly created wealth. In the practice of spreading income and wealth distribution, there should be no intervention targeted at previously earned wealth. Policies aimed at changing wealth distribution are valid for newly created wealth. The main purpose of this policy is to increase the saving powers of the wider sections and to spread the wealth to the wider masses, especially those within the wage section (Yücel, 2011).

Wealth owners have the opportunity to convert their earnings into investments and earn more income, whereas people with low income will only be operating at subsistence level can be expressed as another means in which wealth distribution increases income inequalities. Although tangible assets come to mind when wealth is mentioned, human capital can also be considered as wealth and can be passed on to others as an inheritance. With both material and human capital, wealth can lead to inequality. For example, wealthy and well-educated parents have the opportunity to ensure that their children receive a good education. In other words, they can transfer their human wealth as well as their financial wealth to their children (Şit, 2008).

Methods

The ordered logit model is adopted as a variant of logistic regression particularly designed for ordinal-level dependent variables. Let the response variable has J ordered categories for $i = 1, 2, \ldots, J$, the jth cumulative odds are defined as the ratio of the probability of being in category j or lower on Y to the probability of being in category $j + 1$ or higher. In other words, suppose $O_{\leq j}$ denotes the jth cumulative odds and π_j denotes the probability of being category j on Y, then, $O_{\leq j}$ can be defined as follows:

$$O_{\leq j} = \frac{\pi_1 + \pi_2 + \ldots + \pi_j}{\pi_{j+1} + \pi_{j+2} + \ldots + \pi_J} \tag{1}$$

Based on a set of K explanatory variables, one specific model for the cumulative logits can be defined as

$$log\, O_{\leq j} = \beta_0^j + \beta_1^j X_1 + \beta_2^j X_2 + \ldots + \beta_K^j X_K \tag{2}$$

In equation (2), the superscripts on the coefficients of the regressors measure the effects of the regressors can change with respect to the cut point j. In case of the effects of predictors are invariant to the cut point, equation (2) can be rewritten as

$$log\, O_{\leq j} = \beta_0^j + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_K X_K \tag{3}$$

and the model in equation (3) is also referred to as the ordered logit model.
The generalized ordered logit model can be defined as

$$P(Y_i > j) = g(X\beta_j) = \frac{exp(\alpha_j + X_i\beta_j)}{1 + [exp(\alpha_j + X_i\beta_j)]}, j = 1, 2, \ldots, K - 1 \tag{4}$$

where *M* is the number of categories of the ordinal dependent variable. Moreover, the parallel lines model estimated by the ordered logit model is a special case of the generalized ordered logit model that can be written as

$$P(Y_i > j) = g(X\beta) = \frac{exp(\alpha_j + X_i\beta)}{1 + [exp(\alpha_j + X_i\beta)]}, j = 1, 2, \ldots, K - 1 \tag{5}$$

The parallel lines model differs from the standard generalized ordered model, except for the β's that are the same for all categories.

The dataset for this study was drawn from the 2016 Wave of Turkish Household Income, and Life Conditions Survey with a particular 827 responses for the TRA1 sub-region of Turkey (Turkish Statistical Institute, 2016). The Turkish Statistical Institute uses a two-phase stratified sampling methodology for the corresponding survey. The dependent variable was selected as the amount of annual income of respondents, and this variable was considered in five income groups ranging from low to high. The independent variables were selected as gender, age, marital status, educational level, occupational group, general health status, and constraints on daily activities within the availability of data. Approximately 72% of respondents were men, and the mean of the respondent's age was approximately 46. More than 65% of the respondents were married; approximately 44% of them were primary-educated. Approximately 31% of the respondents were currently working as technicians, office and customer services, service and sales workers, while approximately 70% of them claimed that their current health status could be considered as good. Finally, more than 82% of the respondents claimed that their daily activities were not constrained.

Results and Discussion

Table 1 presents the estimation results of the fitted generalized ordered logit model. Since the standard ordered logit model violates restrictive parallel lines assumption, an alternative ordered response model, namely a generalized ordered logit model, was performed. The estimated generalized ordered logit model was fitted by a user-written program (-gologit2-) in Stata MP13. As shown in Table 1, the fitted generalized ordered logit model was statistically significant ($p = 0.000$), and the pseudo R^2 value of the model was 0.230. In terms of goodness-of-fit, Louviere, Hensher, and Swait (2000) recommend that the underlying value principally varies between 0.20 and 0.40, implying that the fitted generalized ordered logit model can be used for estimation purposes. The interpretation of estimation results is made using odds ratio (OR) values to explain the magnitude of the relationship between a dependent variable and independent variables. When the dependent variable was statistically significant for more than one income group, only the highest OR value was interpreted for brevity. Estimation results revealed that gender was found as a statistically significant determinant of individual income groups. Accordingly, male individuals were approximately three times (OR = 3.15, $p < 0.01$), more likely to involve the second 20% income group than female counterparts.

Income inequality between male and female employees can be evaluated within the context of human capital theory and discrimination based on productivity differences (Tunc, 2018). It has been supported by many studies that women are exposed to inequalities based on human capital in recruitment, remuneration, and promotion processes, inequalities based on family structure, and inequality based on discrimination (Böheim & Stöllinger, 2020; Calcagno & Montgomery, 2020; Hong Vo et al., 2019). The study findings reveal that income inequality against women is also valid in the TRA1 region. In addition, it is observed that the inequality in the lowest income group is lower than the other groups. In previous studies, it was found that gender inequality was reported as lower in the lowest and highest income groups. The situation in the region can be based on the low participation rate of women in the labor force at 26.7% and a traditional approach to women's place in the family.

Table 1. Estimation results of the generalized ordered logit model

Independent variable	OR	Coeff.	z-value
Gender			
Male [1]	1.62**	0.484	2.01
Male [2]	3.15*	1.147	5.25
Male [3]	2.84*	1.044	4.01
Age [1]	1.05*	0.048	6.10
Age [2]	1.04*	0.044	5.53
Age [3]	1.05*	0.048	5.25
Age [4]	1.05*	0.053	4.71
Marital status			
Married [1]	1.84*	0.610	2.74
Married [2]	2.08*	1.036	4.43
Married [3]	2.82*	1.036	4.43
Married [4]	3.46*	1.242	3.81
Education level			
Literate (without school diploma) [2]	2.23***	0.803	1.74
Primary education [1]	4.95*	1.600	4.68
Primary education [2]	6.28*	1.837	4.73
Primary education [3]	4.33*	1.466	2.64
Secondary education [1]	5.43*	1.692	4.20
Secondary education [2]	9.35*	2.235	5.24
Secondary education [3]	12.32*	2.511	4.32
Secondary education [4]	9.22**	2.222	2.10
Tertiary education [1]	14.08*	2.644	5.17
Tertiary education [2]	23.67*	3.164	6.70
Tertiary education [3]	30.33*	3.412	5.62
Tertiary education [4]	36.09*	3.586	3.38
Occupational group			
Professional occupational groups and managers [1]	5.72*	1.743	3.14
Professional occupational groups and managers [2]	6.38*	1.853	4.37
Professional occupational groups and managers [3]	20.14*	3.002	7.46
Professional occupational groups and managers [4]	31.00*	3.434	8.01
Technicians, office and customer services, service and sales workers [1]	5.23*	1.654	5.93
Technicians, office and customer services, service and sales workers [2]	3.62*	1.287	5.15
Technicians, office and customer services, service and sales workers [3]	5.51*	1.707	5.98
Technicians, office and customer services, service and sales workers [4]	4.61*	1.529	4.17
Skilled agricultural, animal husbandry, forestry, and fishery workers [1]	5.46*	1.698	4.01
Skilled agricultural, animal husbandry, forestry, and fishery workers [2]	5.36*	1.678	5.06
Skilled agricultural, animal husbandry, forestry, and fishery workers [3]	11.98*	2.483	7.53
Skilled agricultural, animal husbandry, forestry, and fishery workers [4]	9.68*	2.270	5.59
Crafts and other related works [1]	4.49*	1.501	3.46
Crafts and other related works [2]	3.87*	1.354	3.65
Crafts and other related works [3]	4.88*	1.586	4.04
Crafts and other related works [4]	3.85**	1.348	2.40
Elementary occupations [1]	2.32*	0.842	1.81
Elementary occupations [2]	1.06	0.054	0.14
Elementary occupations [3]	4.00*	1.387	3.14
Elementary occupations [4]	3.68**	1.303	2.03
General health status			
Bad [1]	0.48***	−0.739	−1.86
Constant term [1]		−3.526*	−5.79
Constant term [2]		−5.828*	−8.83
Constant term [3]		−7.632*	−8.98
Constant term [4]		−9.157*	−7.26

[1] first 20% income group; [2] second 20% income group; [3] third 20% income group; [4] fourth 20% income group; OR values are not calculated for constant terms. Insignificant variables were not presented for brevity.
*significant at 1% level; **significant at 5% level; significant at 10% level

The respondent's age was also found to have a statistically significant positive impact on their income groups. When the respondent's age increases, they were approximately one time (OR = 1.05, $p < 0.01$) more likely to involve in first and third income groups than other combined income groups. With the age variable representing work experience in the earning equation, as skills and knowledge increase, it can be expected that their earnings will increase (Luong & Hébert, 2009). However, there are studies in the literature on the subject that state that after a certain age is passed, the wage level will decrease due to the decrease in productivity; that is, there will be no significant difference between wages and productivity (Dostie, 2011). However, according to the findings obtained in some other studies, it has been stated that the age variable does not have any effect on hourly wages, and the general wage level decreases due to the shortening of working hours or retirement (Casanova, 2013; Rupert & Zanella, 2015). Considering that general income level, including social transfers, is considered as the dependent variable in this study, it can be stated that age in the region represents the experience variable appropriately. Whether age causes productivity-related income differences in the region should be investigated further.

Marital status was also positively correlated with an individual's income group. Particularly, married individuals were approximately 3.5 times (OR = 3.46, $p < 0.01$), more likely to involve in the fourth 20% income group than single counterparts. Although the marital status is often overlooked in explaining individual income differences, it can be stated as the general finding in the literature that marriage has a positive effect on earnings (Ahituv & Lerman, 2007; Bardasi & Taylor, 2008; Cheng, 2015). In this study, individual income calculated according to household disposable income was used. In this context, the marital status variable, which was included in the model by predicting that it would increase the household income, was determined as one of the factors affecting the income distribution in the region.

Estimation results also indicated that higher-educated individuals were more likely to involve in higher-income groups. Tertiary-educated individuals were approximately 36 times (OR = 36.09, $p < 0.01$), more likely to involve in the fourth 20% income group than illiterate counterparts. Secondary-educated individuals were approximately twelve times (OR = 12.32, $p < 0.05$) more likely to involve in the third 20% income group than illiterate individuals. On the other hand, primary-educated individuals were approximately six times (OR = 6.28, $p < 0.01$) more likely to involve in the second 20% income group than the illiterate base category. The results of the analysis are in line with the findings of the study dealing with the education-wage relationship (Atangana Ondoa, 2019; Caglayan Akay, Oskonbaeva, & Sacakli-Sacildi, 2019; Chongvilaivan & Kim, 2016).

Educational level was also found an important determinant of personal income distribution in Northern Turkey, while the possibility of involvement in a higher income group principally increases with increasing educational levels. However, the possibility of being a low-income group was found as more than expected, which can be interpreted as higher-educated individuals might have experienced temporary unemployment. Based on this inference, policymakers are expected to develop active employment policies in the transition from higher education to employment. In this context, on-site and applied training strategy can be expressed as some employment policies recommended to make department and quota plans in line with market needs and to update training and certification conditions in specific business processes. In addition, taking into account that the share of agriculture in employment in the TRA1 region is 45%, it is expected that agricultural education opportunities will be developed, and intensive agricultural techniques will be expanded in the region. Considering the region, it can be stated that traditional agricultural policies are maintained; that is, there is no need for advanced education levels in the agricultural sector. Implementation of transformation strategies in the agricultural sector is expected to increase the educational level of the agricultural population, increase marginal efficiency of labor in agriculture, support regional development moves, and reduce income distribution inequality. The effect of

agricultural policies on income inequality can be explained by the pattern that the income level of the agricultural sector, which is assumed to have low income and low inequality level, will increase, and the income gap will decrease with other sectors.

Occupational status was also found to have a statistically significant impact on the involvement of individual's income groups. On the one hand, professional occupational groups and managers were 31 times (OR = 31.00, $p < 0.01$) more likely to involve in the fourth 20% income group than unemployed respondents. On the other hand, technicians, office and customer services, service, and sales workers were approximately 5.5 times (OR = 5.51, $p < 0.01$), more likely to be in the third 20% income group than unemployed counterparts. Skilled agricultural, animal husbandry, forestry, and fishery workers were also approximately twelve times (OR = 11.98, $p < 0.01$) more likely to involve in the third 20% income group than unemployed respondents. Crafts and other related workers were approximately 4.9 times (OR = 4.88, $p < 0.01$), more likely to be in the third 20% income group than other combined income groups. Finally, respondents who work at elementary occupations were four times (OR = 4.00, $p < 0.01$) more likely to involve in the third 20% income group. Individuals at higher occupational status are generally expected to be at higher personal income groups. As expected, the probability of involvement in the fourth personal income group was found as the highest for professional occupational groups and managers.

Conclusion

There is an overwhelmingly increasing attention on income distribution inequality in the last three decades since income distribution decomposition has many direct negative impacts on, especially emerging economies. The income distribution issue is also affected by a variety of structural factors along with economic policies. Particularly; population, employment level, informal employment, wealth distribution, and educational levels are generally considered as important determinants of income distribution inequality.

The estimation results reveal that several variables, including age, gender, marital status, and occupational status, were found as statistically significant determinants of personal income distribution in Northern Turkey with expected signs. The empirical evidence gathered from this study indicates that the personal income inequality issue being encountered in the TRA1 sub-region of Turkey can be mainly explained by human capital theory. In addition, the income variable in the study of Rupert and Zanella (2015), unlike its use in studies such as Hong Vo et al. (2019) includes subsidies and some other payments. This feature of the dependent variable allows the results of the study to be directly evaluated in the context of the secondary income distribution.

Since the crucial contribution of fiscal, monetary, and wage policies on ongoing income distribution inequality in Turkey is separately considered, future educational policies can be utilized as an important instrument on decreasing personal income distribution decomposition in Turkey. Based on the view that education expenditures will reduce income inequality, increasing education expenditures can be one of the effective policy tools in combating inequality. Future educational regulations may concentrate on overcoming inequality of opportunity in education on the way to reach a higher educational level with higher personal income levels. On the other hand, several points at issue may be carefully discussed in terms of future educational policies, including the value of labor in education and whether or not future educational improvements would facilitate to a significant efficiency increase. In that sense, a successful comparison of marginal efficiency and marginal income of educational level can be recommended as a future study. As a result of the study, it can be explained by the fact that the gender variable has a significant effect on personal income with the findings of income variations against women, the low marginal productivity of the female workforce, and social segregation against women in the society. The legally prioritized assessment of areas where women are expected to have higher efficiency can eliminate two issues that are the basis of income inequality against women. Future studies may focus more on possible

sources of income inequality and solutions for women, and they may also consider other sub-regions of Turkey as other specific samples, and their results can be compared to contribute to more effective future policies in terms of decreasing personal income distribution inequality in Turkey.

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