



KADIR HAS UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF SOCIAL SCIENCES AND HUMANITIES

**THE EFFECT OF TAXES AND TRANSFERS ON INCOME
POVERTY IN TURKEY FROM 2003 TO 2019**

YASİN TÜZÜN

SUPERVISOR: DOÇ. DR. HASAN TEKGÜÇ

MASTER'S DEGREE THESIS

ISTANBUL, JULY, 2021



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2021

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MASTER'S DEGREE THESIS

SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES

WITH THE AIM TO MEET THE PARTIAL REQUIREMENTS REQUIRED TO
RECEIVE A MASTER'S DEGREE IN THE DEPARTMENT OF ECONOMICS

ISTANBUL, JULY, 2021

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PUBLISHING METHODS

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YASİN TÜZÜN

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JURY:

SIGNATURE:

Doç. Dr. Hasan Tekgüç (Advisor)

Prof. Dr. Özgür Orhangazi

Doç. Dr. Murat Koyuncu

I confirm that the signatures above belong to the aforementioned faculty members.

(Title, Name and Surname)

Director of the School of Graduate Studies

APPROVAL DATE: Day/Month/Year

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LIST of ABBREVIATIONS

AGI	Minimum Subsistence Allowance
CPI	Consumer Price Index
GIB	Revenue Administration
HBS	Household Budget Survey
SCT	Special Consumption Taxes
SGK	Social Security Institution
SILC	Survey on Income and Living Conditions
VAT	Value Added Taxes



THE EFFECT OF TAXES AND TRANSFERS ON INCOME POVERTY IN
TURKEY FROM 2003 TO 2019

ABSTRACT

Unlike developed countries, indirect taxes are main tax revenue in developing countries. In Turkey, the majority of collected taxes are indirect taxes on consumption and the share of these taxes account for 60 percent of total tax revenue in Turkey. Indirect taxes disproportionately affect lower income groups which can impact poverty status. We estimate the fiscal incidence of social security contributions, income taxes, consumption taxes, and social assistance by using Household Budget Survey data. We estimate poverty rate and poverty gap for different income definitions, market, disposable, and consumable incomes. We also estimate poverty transition between high, middle, vulnerable, and poor income households. We find that marginal impact of indirect taxes is generally more than marginal impact of social assistance and minimum subsistence allowance. We find that poverty rate declined significantly over time, but poverty gap and squared poverty gap did not decline as much as poverty rate. Our empirical model indicates that there is opposite relationship between retirement income and poverty status. On the other hand, we find positive association between youth and poverty. If there is any youth in household, this household is more likely to be poor. Therefore, we simulate poverty effect of modest child support scheme due to this positive relationship. We assign 0.4 percent of total GDP as a child support to households which have any youth in their household, then we find approximately one percent decline in poverty rate for both disposable and consumable income.

Keywords: Poverty, Fiscal Incidence, Poverty Transition, Child Support, Turkey

2003'DEN 2019'A TÜRKİYE'DE VERGİ VE TRANSFERLERİN GELİR YOKSULLUĞU ÜZERİNE ETKİSİ

ÖZET

Gelişmiş ülkelerin aksine, gelişmekte olan ülkelerde dolaylı vergiler ana vergi gelirleridir. Türkiye'de tahsil edilen vergilerin büyük çoğunluğu tüketim üzerinden alınan dolaylı vergilerdir ve bu vergilerin payı Türkiye'deki toplam vergi gelirlerinin yüzde 60'ını oluşturmaktadır. Dolaylı vergiler orantısız bir şekilde düşük gelir gruplarını etkiler ve bu da yoksulluk durumunu etkiler. Hanehalkı Bütçe Anketi verilerini kullanarak sosyal güvenlik katkı payları, gelir vergileri, tüketim vergileri ve devlet transferlerinin mali yansımaları tahmin ediyoruz. Yoksulluk oranı ve açığı farklı gelir türleri, piyasa, harcanabilir ve tüketilebilir gelirler için tahmin ediyoruz. Aynı zamanda yüksek, orta, kırılgan ve düşük gelirli haneler arasındaki yoksulluk geçişini tahmin ediyoruz. Dolaylı vergilerin marjinal etkisinin genellikle devlet transferlerinin ve asgari geçim indiriminin marjinal etkisinden daha fazla olduğunu bulduk. Yoksulluk oranının zaman içinde önemli ölçüde azaldığını, ancak yoksulluk açığı ve yoksulluk karesinin yoksulluk oranı kadar azalmadığını bulduk. Ampirik modelimiz, emeklilik geliri ile yoksulluk arasında zıt bir ilişki olduğunu göstermektedir. Öte yandan, gençlik ve yoksulluk arasında pozitif bir ilişki buluyoruz. Hanede genç varsa, bu hanenin yoksul olma olasılığı daha yüksektir. Bu pozitif ilişki nedeniyle makul çocuk nafaka planının yoksulluk etkisini simüle ediyoruz. Hanesinde herhangi bir gencin bulunduğu hanelere toplam gayri safi yurt içi hasılanın yüzde 0.4'ünü çocuk nafakası olarak tahsis ettiğimizde hem harcanabilir hem de tüketilebilir gelir için yoksulluk oranında yaklaşık yüzde bir düşüş görüyoruz.

Anahtar Sözcükler: Yoksulluk, Mali Yansıma, Yoksulluk Geçişi, Çocuk Nafakası, Türkiye

ACKNOWLEDGEMENT

Firstly, I would like to thank my advisor Hasan Tekgüç. I have benefited from his guidance during the thesis. I have learned so much from him especially empirical thinking. I have also always found an answer to my questions during our meetings. I hope that I will also work together with him upon another projects.

I am also grateful to Özgür Orhangazi. He helped me at the beginning of thesis when I confused about my thesis subject and, he reminds me that how good thesis should be during my thesis defense.

I would like to thank my friends Bawer Bilen, Berke Sancaklı and Beyza Aman. I have taken my dataset from their projects work with my advisor Hasan Tekgüç. Their support is very valuable for me.

Lastly, I would like to thank my family. They have always supported to me, and I couldn't finish my thesis without their assistance.



To My Primary School Teacher Murat Dura Tüzün

1. INTRODUCTION

Poverty and taxation relationship is a nascent literature for developing countries in poverty literature. The effect of taxation on poverty is an under-researched area. Historically, taxation and inequality relations received more attention than poverty due to the obvious links between taxation and redistribution. While considerable majority of the taxes collected in developed countries composed of direct taxes, indirect taxes (mostly taxes on consumption) are the main resources of taxes collected in developing countries. Indirect taxes affect not only income distribution but also poverty. Obviously, the effect of indirect taxes on poor and middle-income groups are more apparent than others and high consumption taxes on basic goods lead to higher poverty rates for developing countries (Lustig, 2017). Additionally, in-kind transfers such as education and health received by poor and middle-income groups generally financed by indirect taxes in developing countries (Birdsall, et al., 2014). However, consumption taxes affect differently poor and middle-income groups. The poorest households' incomes are so low that their consumption is low and hence they pay relatively little consumption taxes. Also, poorest groups are more likely to be receiving social assistance. On the other hand, given the varying rates of Special Consumption Taxes (*Özel Tüketim Vergisi* in Turkish, SCT hereafter), we suspect that the group just above the poverty line might carry a disproportionate burden of indirect taxes because they are consuming more of the goods with high SCT such as cigarette compared to poorest groups. In addition to that, they are less likely to be benefiting from social assistance. Therefore, it is important to identify how fiscal policy affects poverty especially for lower middle-income groups and this master thesis seeks an answer to this question.

Like other developing countries, poverty and fiscal incidence analysis have not been discussed widely in Turkey. Most of the papers focus on the relationship between taxation and income distribution (Yılmaz, et al., 2019; Albayrak, et al., 2016). On the other hand, some of the recent papers concentrate on poverty just include one year in their analysis and they do not give longitudinal relationship between fiscal incidence and poverty (Cuevas, et al., 2020). Some other papers analyzing poverty do not cover more recent

data and also, they do not examine the effect of taxation on poverty (Şeker & Dayıođlu, 2015; Şeker & Jenkins, 2015). In short, this master thesis contributes to the literature by looking at this relationship within the time period from 2003 to 2019 for various income definitions including market, disposable, and consumable ones (explained in detail in Chapter 3).

The rest of the thesis is organized as follows. Chapter 2 reviews the literature. We will focus on firstly fiscal incidence analysis for developing countries to be coherent with the literature as we study Turkey. As this thesis uses Lustig & Higgins (2012) methodology, we will start with reviewing the studies following their methodology in estimating fiscal incidence for single country, cross-country, and poverty studies. Then, macroeconomic perspective and simulation studies about fiscal incidence will be explained. In the second part of literature review, we review papers on taxation and poverty around the world. Next, poverty studies in Turkey will be examined in detail. Chapter 3 provides the details of data and methodology. We firstly describe our data resources and then this section continues with the description of how we construct different incomes based on Lustig & Higgins (2012) methodology. This section also covers the poverty statistics calculation and empirical model used in this thesis. Chapter 4 presents our findings. It starts with descriptive findings about market, disposable, consumable incomes, and major taxes. Secondly, poverty analysis findings are presented in detail. Absolute poverty measures, entry-exit from poverty between different income definitions, and poverty transitions between market income and disposable, consumable income tables will help us to understand poverty and taxation connection over time. Then, our empirical model results give the conditional correlations between different household characteristics and poverty for \$5.5, \$10 thresholds, and entry to poverty. We choose youth variable for policy analysis after reviewing the regression findings and we illustrate the youth and poverty relationship under *ceteris paribus* assumption. Chapter 5 describes the youth support policy analysis. We compare the poverty rate and gap before and after youth support for disposable and consumable income. Chapter 6 provides a summary and conclusions of this master thesis.

2. LITERATURE REVIEW

Introduction

In this section, previous research about fiscal incidence and poverty will be deeply investigated by looking at papers written about both developing countries and Turkey. This section firstly covers fiscal incidence papers. These papers especially include CEQ Institute Publications. As this thesis uses the methodology of this institute to derive the formula of different income concepts, these papers are very useful to understand other countries' fiscal incidence analysis. In addition to these papers, other fiscal incidence papers by using macroeconomic perspective and simulation techniques will be evaluated. In the second part of literature review, the poverty issue comes up, which is the main theme of thesis, and this section includes the other countries' experiences and Turkey's experience as well. Finally, the contribution of this thesis to the literature will be mentioned. The questions of how it differs from previous research and how it contributes to recent studies will be answered.

2.1 LUSTIG'S FISCAL INCIDENCE ANALYSIS

Lustig methodology is based on four different income concepts and the details of these concepts will be given in the methodology section. Higgins & Lustig (2012) is the prominent paper for the fiscal incidence analysis and the methodology developed in this paper has been applied to different countries ranging from Latin America countries to China. The methodology is used to describe how taxes, subsidies, and transfers effect the redistribution mechanism and poverty reduction. They aim to compare the performance of different countries within time frame. This fiscal analysis reviews both the inequality and poverty issues.

2.1.1 Cross Country Studies:

Lustig (2016) article looks at the fiscal redistribution in middle income countries by using data around 2010. This study reviews the impact of fiscal policy by separating the 'cash' part of fiscal policy and 'in kind' services which are basically health and education

services. The cash part of fiscal system is always equalizing (of income distribution) in spite of the fact that the decline in inequality can be quite varied across countries. That is to say that South Africa is the most redistributive and Indonesia is the least redistributive country. However, the poverty increases in Brazil because of high indirect taxes on basic goods. In-kind transfers are always equalizing but not always for pro-poor. For the education spending, the total spending is pro-poor except for Indonesia. For the health spending, Brazil, Chile, and South Africa is pro-poor, approximately neutral in Mexico and not pro-poor in Indonesia and Peru. The more comprehensive version of this study is Lustig (2017). This study covers 29 countries including Latin America countries and low-income African countries and data from around 2010 like the previous article. There are two scenarios of contributory pensions which are deferred income and government transfer in this study. This article found that while net direct taxes have equalizing effect for all countries, net indirect taxes are disequalizing in ten countries. On the other hand, fiscal policy increases poverty for six countries due to high consumption taxes on basic goods. Primary and pre-school spending is pro-poor, but secondary school and tertiary education is not pro-poor for all countries. Health spending is always equalizing for twenty-eight countries with the exception of Jordan.

In addition to cross-country studies, some papers look at the fiscal analysis between two countries and Higgins, et al (2016) is one of them. This paper makes a comparison between United States and Brazil fiscal incidence. Since both countries have similar characteristics such as high-income inequality, low intergenerational mobility and low equality of opportunity. The Gini coefficient is decreased by 6.5 percentage in the U.S. via direct transfers, indirect subsidies, and taxes. On the other hand, the Gini percentage decline in the Brazil is only 3.8 per cent. The cash transfers or near cash transfers are smaller than total health and education in both countries and the redistribution is very similar in both countries when in-kind transfers are added to fiscal incidence analysis.

Lustig (2020) brings new dimension to the fiscal incidence issue, time frame is stretched from 1990 to 2017 in Latin American countries. The other studies mentioned on the above focused on the one-year analysis rather than time-series analysis. The article shows that the inequality increased during the 1990s and then thanks to the education spending and government transfer on poor population inequality decreased from 2002 to 2013. Recently, the decline in inequality has increased or stayed constant depending on the

country's fiscal policy. This unstable inequality situation stemmed from lower negative growth rates and unfavorable labor market situations of poor populations. The article also emphasizes that the household surveys do not exactly reflect the income of the rich populations. Lastly, the article finds that even if all fiscal systems reduced inequality, the poverty increased because of the burden of indirect taxes on poor people.

2.1.2 Single Country Studies

The most comprehensive study in this field is Inchauste et al (2017). This book composed of eight countries including from Sri Lanka to Georgia. South Africa is interesting among those countries since it is one of the most unequal countries in the world. South Africa uses fiscal policy efficiently to overcome inequality issue and poverty with the help of progressive tax system and social spending. In addition to South Africa, other countries have made some improvements about poverty and inequality generally but there are some specific actions to be concerned such as indirect taxation burden on poor. Enami et al (2019) reviews the Iran's fiscal policy, inequality, and poverty relationships. They simply found that fiscal system both reduces poverty-head-count-ratio and inequality. The decline in rural poverty is more than urban poverty. The more effective way of decreasing inequality is transfers rather than using taxes. On the other hand, taxes are useful way to raise revenue without any enhancement on poverty ratio. The poverty level can be also decreased with the help of transfers and the main component of these transfers are *Targeted Subsidy Program*. Lustig et al. (2020) is a recent paper reviews the China's fiscal policy impact on inequality, poverty, and urban-rural income gaps. From an inequality perspective, this paper concludes that the only disequalizing tax is consumption tax and all transfer types are equalizing for all groups. Also, the inequality between regions is reduced via fiscal system but the urban-rural income gap increased due to contributory pensions of urban residents are more than contributory pensions of rural residents. From poverty perspective, the fiscal system reduced only urban poverty. Rural poverty increased because of fiscal policy.

2.1.3 Papers on Poverty

Higgins and Lustig (2016) focuses on the fiscal impoverishment aspect in contrast to conventional measures of horizontal equity and progressivity, before and after taxes poverty comparison. Their study includes seventeen developing countries. While fifteen of them has poverty reducing and progressive fiscal policy, the at least one quarter of poor people's tax burden is more than what they receive in subsidies and transfers in ten of these developing countries. Hence, their results can be applicable to compare before and after policy reform. Birdsall et al (2014) reviews the '*strugglers*' group of people who has per capita income between \$4 and 10\$ in Latin America countries. These groups' incoming cash transfers are largely consumed/countered with indirect taxes. On the other hand, the effect of social spending including education and health transfers are not clear after the quality adjustment. There is also marginalization problem that the strugglers and the poor are not represented adequately as a response to their vote share.

In short, the most common findings are that indirect taxes lead to generally increase in inequality and poverty in developing countries since indirect taxes affect poor people than other income groups. In-kind transfers are better instrument for equality policy rather than cash transfers.

2.2 MACROECONOMIC PERSPECTIVE

Leaman & Waris (2013) is comprehensive book about taxation policies and its different incidences on countries such as inequality, poverty, and other social aspects. This book covers not only developed countries' taxation history but also examines the less developed countries' such as Nigeria and Kenya taxation policies. In addition to one-country analyses, cross-country analysis of taxation and their international implications are also investigated. The selected countries of EU which are Germany, England and Portugal fiscal policy resulted in rise of income inequality and high poverty rates because there has been tax policy transformation from progressive direct taxes to regressive indirect taxes. For less developed countries, the tax system has discriminatory structure against women. The burden on women is more apparent for VAT in developing countries since VAT collection is easier than direct taxes, these countries just want to increase their indirect taxes. Caminada et al (2019) looks at the redistributive performances related to social transfers and taxes among 31 countries after Great Recession. English speaking

countries have larger income disparity. On the other hand, EU countries are more successful than other countries to overcome income inequality. The redistributive effect of social transfers and taxes vary from country to country. While the share of social transfers account for 76 percent of total redistribution, the share of income taxes is only 24 percent of total redistribution. The main finding of this paper is that welfare states achieved more redistributive performances even if they are faced with many budget cuts and social reforms during the crisis. Forster et al (2014) examines the IMF structural adjustment programs' impact on inequality of 135 countries from 1980 to 2014. These programs including fiscal consolidation, trade and financial liberalization, domestic financial reforms, external debts all have unfavorable distributive effect on inequality both in the short and medium term. This study recommends that policy makers need to be careful about the distributive result of policies implied by international organizations. Briefly, these studies showed that welfare states are more successful to redistribute social transfer and taxes compared to others. As we indicate previous section, increase in indirect taxes bring more inequality and poverty.

2.3 SIMULATION STUDIES

These studies review the fiscal policy impact with and without scenarios. Additionally, some specific items of fiscal policy such as fuel subsidy impact are reviewed in this section. Coady et al (2015) focuses on the fiscal and welfare effect of rising fuel subsidies in India. This fuel subsidy period under review showed that these subsidies have both inefficient and inequitable structure. The richest ten percent of households receive seven times more benefit than the poorest ten percent of households. On the other hand, removal of these subsidies affects badly household incomes for both poor and rich income groups. The suggestion of better targeted subsidies is coupled with decline in subsidies over the medium term. Kalkuhl et al (2018) reviews relationship between land taxes and their effects on development and distributional issues for developing countries including Rwanda, Peru, Nicaragua and Indonesia. This study showed that land taxes are potential good resources for tax revenues with minimum deadweight losses in contrary to previous studies' findings. If the land ownership is diffused across the country, the linear land tax scheme leads to more burden on poor households. However, the adverse effects on the poor households can be prevented with the help of non-linear land tax scheme.

Administrative costs of land taxes have been reduced thanks to technological developments, but the implementation and observance are still important issue for those countries.

Huynh and Nguyen (2019) look at different aspects of fiscal policy impact which is *shadow economy*, and the study covers a panel data for 24 developing countries from 2002 to 2015. The main findings of this study based on the idea that there is a negative correlation between expansionary fiscal policy and shadow economy. Specifically, both indirect taxes and direct taxes have positive effect on shadow economy and this effect has been intensified by corruption. If the government wants to reduce shadow economy under the condition of controlled corruption, the government should imply expansionary fiscal policy rather than increasing taxes since the government expenditure impact on shadow economy is stronger than taxes impact on shadow economy.

Adam et al (2014) investigates the relationship between public sector efficiency and fiscal decentralization for 21 OECD countries within the period between 1970 and 2000. They found that there is an inverted U-shaped relationship between the government efficiency of education and health services and fiscal decentralization. It can be concluded that higher fiscal decentralization could be useful to provide government efficiently education and health services, but too much fiscal decentralization can be harmful for public sector efficiency. Ichoku & Anuku (2019) analyzes the redistributive impact of taxation between civil servants and political appointees by comparing pre-tax and post-tax situation in Nigeria. The empirical result of this study indicates that increased average tax rate has highly progressive structure. However, high level of horizontal inequality slows down the effect of redistributive impact of taxation. The possible reasons of higher horizontal inequity of political appointees compared to civil servants could be *irregularity, abuse of tax rate and undue political patronage*. The solution to handle with horizontal inequity is equal treatment of equal income groups. Lastly, Berens & Gelepithis (2019) studies the connection between welfare state and public position towards progressive taxation by using cross-sectional analysis of rich democracies. They found that there is close relationship between weaker public support for progressive taxation and progressivity of social expenditure. Also, the inequality issue has been affected by welfare state benefits. The rich's position towards progressive taxation depends on how they benefit welfare

states or pro-poor welfare states. This study also supports the idea that less progressive tax systems finance the larger redistributive effect of welfare states.

General findings of these studies are that redistributive effect of tax policy depends on both political structure and tax progressivity.

2.4 POVERTY AND FISCAL INCIDENCE IN THE WORLD

Dao (2004) empirical analyzes rural poverty determinants on 32 developing countries. Suggested solutions to alleviating rural poverty are specified as more effort to increase the income share of lowest income decile, increasing the productivity of agricultural productivity, increasing the social status and economic situation of especially rural women, anti-discrimination policies against ethnic minority groups, incentives for attractive rural areas and government assistance in irrigation of lands (Tsai, 2006). Tsai (2006) investigates not only economic indicators but also non-economic indicators of poverty in 97 developing countries by using cross-national ridge regression modelling. This empirical study showed that important indicators of poverty reduction are country's income level, tropics, landlockedness, population growth, and secondary schooling opportunity. On the other hand, government social spending has not strong effect on poverty alleviation as mentioned above factors because these social spending based on *patron-client relationship*, and they are not in favor of the poorest among the poor. Also, there is no evidence that the poor benefited from foreign direct investments and trade liberalization contrary to neoliberal school expectations.

Marjit et al (2006) develops *political support model* which demonstrates that the society is aware of the "informality" of the economy. The government can choose *conventional tax-transfer policy* and *unconventional one*. This unconventional tax strategy based on promotion of informal activity for the poor by the weak governance system. They found that poor and more non-egalitarian societies may imply lower tax rate. Both the tax rate and the strength of governance is chosen by government to maximize income of the poor in the informal economy. Ghatak (2015) constructs a model to review alternative scenarios which results in increase poverty traps. Also, the impact of anti-poverty policies including greater access to markets of poor, poor access to public services and infrastructure and redistributive policies are examined. Firstly, this study concludes that single anti-poverty policy is not enough to get rid of poverty traps. Secondly, despite of

these anti-poverty policies poverty traps will not be eliminated in a broad scale. Thirdly, combination of interventions which releases budget constraint of poor will bring better results compared to one intervention that refers to only one of those problems. Then, some interventions have similar impacts. Hence, it is significant to identify which friction is more important. Lastly, the paper wants to answer under which condition conditional cash transfers could be strictly preferred to unconditional cash transfers.

Badenes-Plá & Buenaventura-Zabala (2017) examine the impacts of specific 2015 tax reform of the Spanish personal income tax on different issues including poverty, redistribution, and progressivity via applying microdata. From a poverty perspective using EUROMOD, tax reform decreases all key dimensions of poverty despite comparatively minor decline. From a redistributive perspective (by using Reynolds-Smolensky index), the tax reform reduced inequality compared to before and after-tax payment income. The liquidity raised for all levels of income, and it has progressive effect on the distribution of liquidity. Therefore, percentage increase in disposable income is larger for lower levels of income. This study can be useful for Turkey if Turkey experienced any serious reform tax for the period between 2003-2019.

Hanna & Olken (2018) analyzes the effects of universal government programs versus targeted transfer mechanisms on poverty. Their study showed that despite imperfect characteristic of targeting transfers, these transfers seem to convey more substantial improvements compared to universal programs in Peru and Indonesia. The reason of this stemmed from the fact that the poor more benefited from targeting transfers using per-beneficiary basis method. The shortcoming of targeting transfers is horizontal equity. Besides, the welfare gains from targeting transfers could be significant for many developing countries. The methodology of this study is applicable for Turkey to compare the effect of universal income and targeted transfers like other developing countries. Gnangnon (2020) focuses on the interactions among fiscal redistribution, poverty and with exchange rate pressure different from other papers by using panel data set from 1980 to 2014 for 90 developing countries including two-step system GMM approach. This study indicates that exchange rate pressure creates favorable effect on poverty with the same importance for both least developed countries (LDC) and non-LDCs. Additionally, fiscal redistribution creates positive effect on poverty, while there is a decline in poverty in LDCs, there is enhancement on poverty in non-LDCs. The paper concludes that well-

designed fiscal redistribution is needed to deal with unfavorable consequences of external economic and financial shocks on poverty in developing countries. As the article pointed out on the conclusion part, the future research could be that what kind of taxes are more beneficial to mitigate the effects of external economic and financial shocks.

In short, poverty alleviation can be possible under the condition of different interventions and political strength. Also, targeting transfers may be beneficial to handle with poverty issue.

2.5 POVERTY AND FISCAL INCIDENCE IN TURKEY

The last part of the literature review analyses both fiscal incidence and poverty studies in Turkey and then the contribution of this paper to the literature will be explained. Baslevant & Dayioglu (2005) studies the regional income inequalities in the urban areas for 1994 and 2003 by using micro household level data. This study differs from other papers to measure the contribution of living in the slums to household incomes. They assume that lowest 20 per cent income groups in the urban areas live in slums and conclude that one per cent of total disposable income comes from these slums for 1994. They ascribe to decline in regional income inequalities to changing macro-economic environment rather than enhancement in low-income households. Their suggestion to deal with diminishing regional gap and income inequality is better allocation of non-labor income through appropriate taxation. Albayrak (2011) compares the effects of VAT and Special Consumption Tax (SCT) on revenue redistribution for 2004 and 2009 by using household budget surveys. She finds that the regressivity of indirect taxes increased from 2004 to 2009. Reductions of VAT and SCT after the 2008 financial crisis are not in favor of lower income groups. However, higher income groups benefited from these reductions mostly. Therefore, VAT and SCT, as an important resource of fiscal policy, leads to more unequal revenue distribution from 1 per cent in 2004 to 3 per cent in 2009. Albayrak (2010) is consistent with her other papers and the regressive effect of indirect taxes increased from 2003 to 2009. Besides, the incidence of indirect taxes depended on the chosen welfare indicator. Even though the indirect taxes decrease expenditure inequality, the effect on income inequality is the opposite of expenditure inequality. Albayrak et al (2016) wants to figure out the effect of both indirect and direct taxes on

individual and household level by using microsimulation model and more importantly the paper aims to estimate income tax burden as implying different scenarios. This paper finds two main results and one of them is that in spite of decrease in VAT for some goods, there was no change neither indirect tax burden nor regressivity of indirect taxes between 2003 and 2013. The other result showed while income tax progressivity increased thanks to subsistence allowance. The effect this allowance on total tax burden is very restricted due to no change in indirect tax burden. This paper does not focus on the impact of subsistence allowance on poverty issue and for this reason future researches do not examine only inequality but also poverty as well.

After explaining the fiscal incidence studies in Turkey, poverty studies will be investigated in detail. Gökşen et al (2008) wants to analyze the relationship between tax design and different kinds of social aspects including poverty, social exclusion by applying both TURKSTAT household surveys and qualitative data on Turkish citizen's thought about taxation. Firstly, this paper quantitatively concludes that taxes intensify the problem of poverty and inequality in Turkey. Also, the poor pays important amount of their income as indirect taxes, especially in Eastern and Southeastern Anatolia, as a consequence of heavily rely on regressive consumption taxes. Secondly, citizens do not feel that tax system is fair and also, they feel social exclusion as a result of tax structure. The separation of regional poverty and inequality could be useful to understand the poverty issue, but household surveys do not include this regional breakdown after 2003. Yentürk (2013) intends to separate supports to the poor different categories and also calculate regular income support within the period 2006-2012. These supports can be divided into three parts including regular income supports, health services and other social services. This paper pointed out that regular income supports in total social assistance raised from 21 percent in 2006 to 34 percent in 2012. Additionally, disabled people get 77 percent of total regular income supports. This paper also offers that regular income supports can be increased through decline in military expenditure since the share of military expenditure in Turkey is significantly high compared to other NATO members. This paper can give good intuition about the supports to the poor, but this paper is not associated with fiscal incidence analysis of poverty.

Şeker & Jenkins (2015) investigates the reasons of poverty trends between 2003 and 2012 by using decomposition methods. This paper differs from previous paper in terms of 3

dimensions including detailed description of poverty by dividing into two periods 2003-8 and 2008-12, the robustness check of their conclusion and decomposition methods of each variable effect. They found that there was rapid decline in absolute poverty between 2003 and 2008 but this decline was slower for the period of 2008-12. These declines comes from both growth effect rather than changes in inequality measures or population composition. The main reason behind the poverty trends is economic growth when we look at macroeconomic indicators such as unemployment rate, minimum pension level and so on. Decomposition methodology can be useful for current studies to understand the poverty trends. By this way, the relationships among growth, fiscal policy and poverty trends could be better understood.

Seker and Dayıođlu (2015) focus on the poverty dynamics in Turkey by using nationally representative panel data from 2005 to 2008 to interpret the issue of poverty exit and entry rates. They indicated that permanent poor are approximately 8 percent of the population or quarter of the poor. The annual entry rate from poverty is found by 8.6 percent and the exit rate is found by 35 percent. Moreover, one year later poverty re-entry rate is 35.5 percent. Hence, poverty is not short-term issue in the view of this information. There is no connection between fiscal policy and poverty issue in this paper. Cuevas et al (2020) has similar features with our paper since they use same methodology of CEQ Institute but there are some differences absolutely. This paper studies the effect of fiscal policy including direct and indirect taxes and social spending by using 2016 Household Budget Survey. This paper pointed out that income inequality has reduced thanks to both overall tax and social spending policy, but the education and health spending are the main contributor of this reduced income inequality in Turkey. On the other hand, the poverty level increased since the effect of indirect taxes are stronger than direct taxes and transfers. Additionally, minimum subsistence allowance (AGI) program towards to poor could be one of the efficient ways to increase the equity effect of fiscal policies. This paper focuses on only 2016 statistics. Hence, it cannot give broad perspective of how poverty and inequality are affected throughout long term.

Bayar & Gönçavdı (2021) looks at firstly the comparison of distributional performance between pre-reform and post-reform period and also specify the impacts of macroeconomic policies by decomposing overall inequality into different income groups in Turkey for the period of 2002-2013. The improvement in income distribution during

the 2002-2007 reform period have been better than for the period after 2007. This improvement mainly derives from the entrepreneurial and financial income groups. Additionally, transfer payments contribute to positively in both the 2002-2007 and 2007-2009 periods in spite of small contribution. On the other hand, transfer payments have negative impact on income distribution for the 2009-2013 period.

Yılmaz & Sefil-Tansever (2019) investigate the relationship between income inequality and redistributive impact of fiscal policy between 2006-2014 by using decomposition method. They found that there was decline in income inequality within this period. They also showed that redistributive policies developed thanks to social transfers rather than tax system. On the other hand, this study does not cover the impact of indirect taxes. As we see clearly from the literature, indirect taxes are essential part of fiscal incidence analysis. Yılmaz et al (2019) looks at redistributive effect of taxes from 2002 to 2013. They simply found that expenditure taxes are regressive. Additionally, expenditure taxes affect more poor and fragile quantiles and because of these taxes inequality remains same level.

Lastly, the thesis differs from previous studies by looking at period within 2003-2019. Other studies mainly study just one year analysis of Turkey fiscal incidence and poverty relations, or they do not reflect current situation of these relations. The thesis will give broad perspective of fiscal incidence analysis including 2003, 2007, 2011, 2015, 2019 household budget surveys. Also, we can infer from this analysis that how specific item of tax policy such as minimum subsistence allowance (AGI) affect poverty before and after its implementation. Additionally, we can answer the question of what the impact of different incomes is including market, disposable, consumable, and final income on poverty. Since these income levels are composed of different tax structure and social spending, the impact of specific tax or social spending on poverty will be determined by each step. As a result, the thesis will contribute to the poverty literature through long term analysis and various income calculations impact on poverty.

3. DATA & METHODOLOGY

3.1 DATA

Data in this thesis is mainly from Household Budget Surveys (HBS) of the TURKSTAT for 2003, 2007, 2011, 2015 and, 2019. HBS provides detailed information about taxable income and untaxed income, such as retirement pensions, social assistance, and other private subsidies. HBS is collected over the year by interviewing 1000-2000 (depending on the year) households each month. Hence, HBS eliminates the consumption seasonality problem since this survey is conducted every month of each year. The number of interviewed households varies from 8,600 in 2007 to 25,000 in 2003, but 2003 was an exceptional year for this survey. The non-response rate of this survey is approximately 75%. TURKSTAT re-weights households to deal with non-response rather than interviewing additional households. An alternative survey for household income is Survey on Income and Living Conditions (SILC). SILC also covers income questions, but SILC does not include consumption pattern questions. Hence, we can calculate indirect taxes only from HBS since it consists of the consumption component. Unlike SILC, we cannot calculate regional poverty statistics from HBS since HBS did not include region information after 2003.

3.2 INCOME METHODOLOGY

Great majority of citizens and residents in Turkey do not file income taxes. Hence, there is no comprehensive income taxes recorded in official data. However, people pay income taxes through their employers. Employers withhold tax and pay to tax office. As a result, we estimate and input income taxes to all individuals who are formally employed based on their employment type. In order to compare our estimation with international scholars, we follow Lustig & Higgins (2013) methodology used in Latin America and many developing economies. We construct four different incomes: market, disposable, consumable, and final. There are some reasons why we use Lustig & Higgins (2013) methodology. Firstly, this methodology is trackable and for each step we observe the marginal effect of every component added to different incomes. Secondly, Lustig and

Higgins (2013) allow us to obtain poverty estimates comparable to other developing countries which share the characteristic of incidence of high rate of indirect taxes. Lastly, this methodology is appropriate to vulnerable income group analysis. Hence, we can find an answer how fiscal policy affects vulnerable income groups thanks to this methodology.

In this master thesis, we use HBS which gives market income and estimate disposable and consumable income. The calculation of these incomes will be given in detail below. There are some adjustments for each income calculation, and we explain how we made these adjustments. Figure 3.1 presents these income concepts, and each step will be detailed below. Figure 3.1 and these steps are from Lustig & Higgins (2013) to produce estimates comparable with the existing literature on many middle-income countries.

1. Step:

Net Market Income: $I^{n1} = W + IC + AC + IROH + PTran + SSP$

W: gross wages and salaries (both cash and in-kind), formal or informal

IC: Income from capital (rent, dividend, interest rate, profit, etc.), formal or informal, excludes capital gain and gifts.

AC: Self-consumption of own production (From HBS consumption module)

IROH: imputed rent for owner-occupied housing.

Ptran: Private transfers from other households (gift, donation, alimony, etc.)

SSP: Retirement pensions from contributory social security system

Market Income: $I^{m1} = I^{n1} + DT + SSC$

DT: Direct taxes on all income sources that are subject to taxation. (Income tax, withholding, etc.).

SSC: Sickness and unemployment part of social security contributions (After 2008 for Social Security Institution (SGK) 15.5%).

2. Step:

Disposable Income: $I^{d1} = I^{m1} - DT - MTV - SSC + GT$

GT: In kind and cash social assistance (public)

3. Step:

Post-Fiscal Income: $I^{c1} = I^{d1} + IndS - IndT$

IndS: Indirect subsidies (private consumption goods that the public produces and sells to consumers below their cost, not valid for Turkey)

IndT: Indirect taxes (VAT, SCT, etc.)

4. Step:

Final Income: $I^{f1} = I^{c1} + InkindT - Copaym$

InkindT: Education and health services provided directly to users by the public (The housing of civil servants will not be in this category but will be considered as in-kind wages.)

Copaym: Contribution fees, especially from health services (From HBS consumption module)

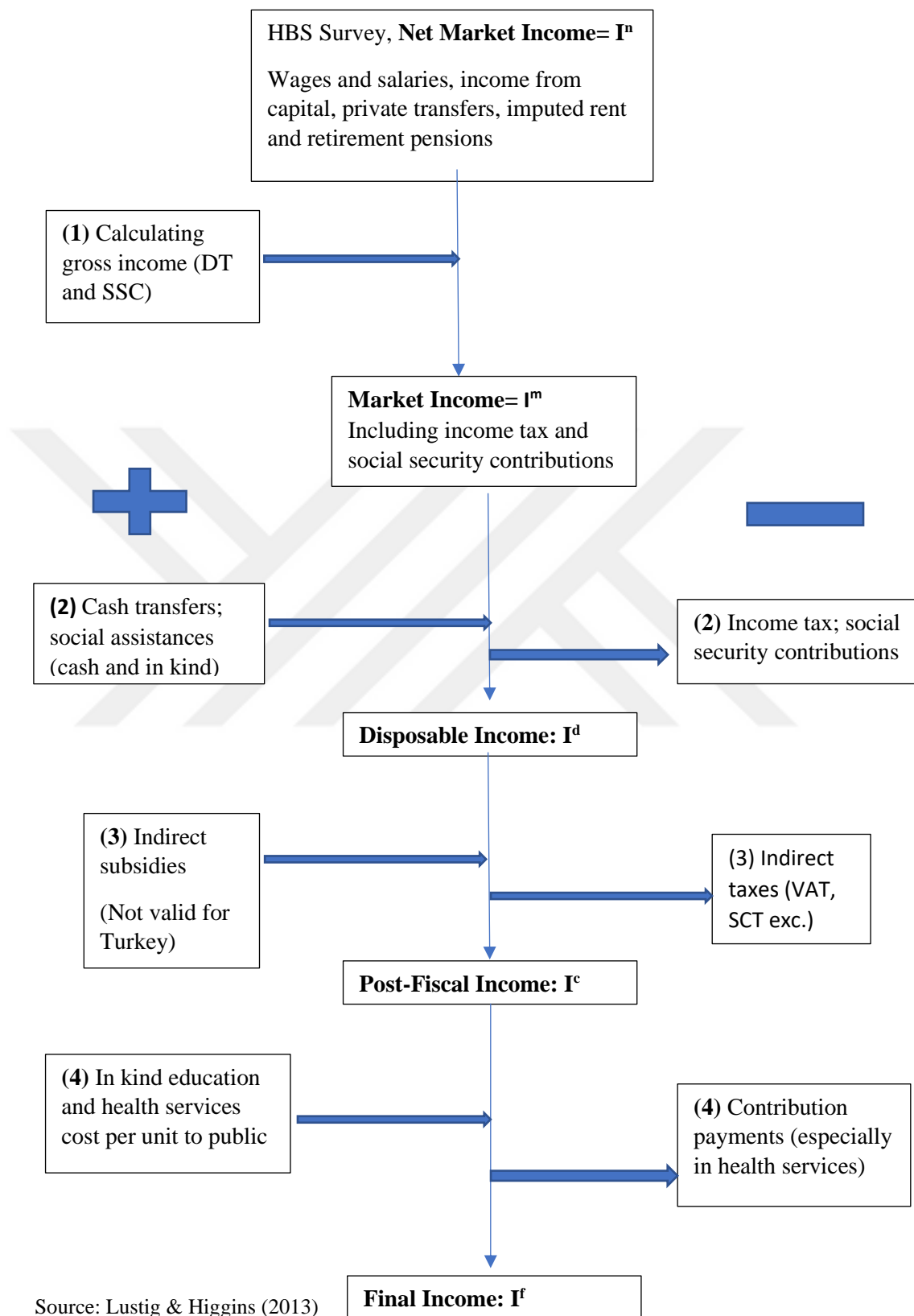


Figure 3.1: Detailed Presentation of Fiscal Incidence Analysis Step by Step

3.2.1 Market Income Calculation from Net Market Income

Firstly, gross income is calculated starting from the household's net income from HBS. Lustig & Higgins (2013) also describes this method in their article when information on taxes and transfers is not enough in the survey. Albayrak et al. (2016) use the similar methodology in their paper but exclude the impact of retirement pensions and social assistance. Also, they do not examine poverty's effects. This master thesis follows Lustig and Higgins's (2013) methodology to calculate market income in Turkey.

Indirect taxes on consumption are the primary sources of taxes, and they will be explained in 3. Step. Other taxes such as corporation tax, stamp tax (except for stamp tax on salaries), and fees are out of this master thesis's scope because these taxes do not associate with households in HBS. Twenty-three percent of total tax revenues in 2011 composed of other direct taxes (BUMKO, 2018).

There are four different income types in HBS: wages and salaries (cash or in-kind), real estate revenues, landholder revenues, and government and private transfers. Only transfer revenues are not liable to income taxes. The weight of rent tax from real estate in total tax revenue is deficient. Therefore, we assume that rent revenues are not reported; hence there is no rent tax from real estate in our analysis. Also, we have no information on vehicle model or age, so we assume that every motor vehicle owner pays the average amount for their motor vehicle. Interest incomes are taxed concerning the average rate every year. Wage tax has the most significant share of direct taxes.

Additionally, social security contributions except for old age/retirement share can be evaluated as income tax. When the person is unemployed, she has a right to receive unemployment pay or health services in return for social security and unemployment contributions (Lustig & Higgins, 2013). Below I discuss the tax and social security contributions in detail.

Survey data will give only a person's net income. Some of them are registered, and some of them are unregistered. We assume that unregistered people pay neither income tax nor social security contributions. Private sector wage-earners with SGK are the biggest group of registered workers. So, how can we reach market income from net income? Firstly, we deduct the minimum allowance (AGI) from net respondent's self-reported income. Officially AGI is part of income tax which is immediately reimbursed back to the wage earner. It is not proportional to the income but depends on demographic characteristics of the wage earner (married or not and number of children). We also assume all income taxes and pension contributions, both employee and employer contributions, are paid by the employee. These taxes include unemployment, old-age and health contributions, and income and stamp tax. Finally, we have market income when we add these components of taxes into net income. An example of market income calculation is given below in table 3.2. In the survey the person in the example below reports net income of 8,809₺ (total of first two rows).

Table 3.1: Calculation of The market income from the net income by the method of imputation (Example)

Annual	2011 (TL)
Net minimum wage	7,734
Subsistence allowance*	1,075
SGK old-age contribution, (% 17)	1,774
SGK health contribution, (% 12.5)	1,305
SGK unemployment contribution (%3)	324
Income and stamp tax**	373
Market Income	12,585

*: For an individual with two children whose spouse is not working. **: After deducting the minimum subsistence allowance.

Source: <https://www.verginet.net/dtt/MaasHesaplama.aspx> & http://www.sgk.gov.tr/wps/portal/sgk/tr/calisan/isveren/isveren_prim_oranlari/isveren_prim_oranlari

It is common that a person's insurance is paid lower than what they earn. SGK's annual statistics in December 2011 showed that 70% of insured people are between 100% and 136% of minimum wages (SGK, 2012). On the other hand, HBS data indicate that 34% of insured people have the same wage range. Therefore, it will be misleading to calculate gross income by using reported HBS net income. Social security contributions and income taxes will be more than the actual figure if imputed in accordance with reported net incomes in HBS.

Albayrak et al. (2016) have reached similar conclusions when comparing the amount of taxes calculated according to the net income in HBS data and GIB data. They found that 40% of the gross revenues of public employees and 50% of the gross incomes of private-sector employees in 2003 and 2006, and 40% of gross incomes of all wage-earners can be assumed as income taxes (Albayrak et al., 2016, p. 259). It means that there is tax evasion for all wage-earners, including public employees.

After ranking individuals increasingly according to their net income, we assumed that individuals up to median income, based on the GIB annual reports, pay income tax from the minimum wage. We do not know if the wage response to the interviewer is the same as wage declared to the tax office or SGK. All we know is that the distribution in the data set is different than official distribution in the GIB reports. In GIB reports where we observe the percentage of wage incomes declared at minimum. We assumed that those who fall between the median income and the threshold income pay income tax on the average income of declared income with the minimum wage. We also assumed that those above the threshold have paid tax on their declared income. However, we realized that there is not much difference between the median income and the wage income of individuals who ranked 65% in the income ranking that constitutes the threshold income in 2015 and 2019. In other words, as of 2015, the share of registered employment in total has increased, but minimum wage earners constitute a large part of the total wage earners, as many newcomers to formal employment have a minimum wage. As a result, there are two groups in 2015 and 2019 and first groups pay taxes at the minimum wage and second groups pay taxes from the amount declared above the threshold. After this change, as the income tax base and income tax of the households that earned wage income changed, the gross incomes of the relevant households and the health, pension, and unemployment insurance premiums they paid changed.

Lastly, if self-employed and farmers have insurance, then they are registered to Bag-Kur. SGK annual statistics showed that 95% of these groups' social security contributions are minimum (SGK, 2012). Therefore, insured people registered to Bag-Kur are assumed to pay their contribution at a minimum level for that year regardless of their income statement.

3.2.2 Disposable Income Calculation from Market Income

Market income includes wages, profits, rent and interest income, private transfers (alimony, gifts, etc.), and retirement pensions for the deferred income version. Firstly, the income and stamp taxes paid over the market income calculated in the first step (also withholding tax for those with interest income) will be deducted from the market income. Additionally, the amounts corresponding to the health and unemployment premiums of the SGK premiums will be deducted from the market income. There is no consensus about the classification of retirement pensions in the fiscal incidence literature. Some argue that retirement pensions should be classified as deferred income.

For this reason, SGK old-age contributions are reviewed as compulsory savings, and they should not be deducted from market income. Other views claim that retirement pensions should be classified as social assistance and that all SGK contributions subtract from market income. In other words, all tax payables on wages are treated as income tax if we consider retirement pensions as social assistance. We follow the first option and treat retirement pensions as deferred income. In the performance where the retirement pension is considered a deferred income, disposable income is found by adding social assistance and unemployment pension to the remaining net salary and movable and real estate income.

3.2.3 Post-fiscal Income Calculation from Disposable Income

Lustig & Higgins (2013) construct consumable income by adding indirect subsidies and deducting indirect taxes. Lustig & Higgins (2013) describe indirect subsidies as fuel, household energy, and agriculture subsidies. Fuel subsidies and household energy subsidies can be viewed as price subsidies. Poor people benefit little from fuel subsidies since they have tiny houses and unlikely to own cars. Therefore, fuel subsidies may be

beneficial for higher-income groups. Household energy subsidies target poor people, but it targets all households in a country such as Kazakhstan, Turkmenistan. However, coal aid is better than household energy subsidies because higher-income groups do not use coal to fuel their household. However, we classify coal aid as social assistance in our analysis rather than household energy subsidy. Because targeted population benefited from coal aid rather than whole population as in the case of household energy subsidy. Lastly, agriculture subsidy affects farmer decision on whether they are engaged in agriculture or not in that given year. As an agriculture journalist and head of TMMOB said, agricultural subsidies can be considered deferred payments in Turkey (Yıldırım, 2019; Suicmez, 2020). Therefore, they do not affect production decisions and are classified as social assistance in this analysis.

While calculating the VAT amounts on the products, we first examined whether there is a different tax on the product. If there is both SCT1 and VAT on a product, the product's price with SCT1 is calculated first, and then VAT is calculated over the price with SCT1. For example, if the net cost of a product is 100₺, the SCT1 tax rate is 7%, and the VAT rate is 18%. The SCT1 of this product is calculated as $100 * 0.07 = 7₺$, and the price with SCT is calculated as $100 + 7 = 107₺$. On the other hand, the VAT on the product is $107 * 0.18 = 19.26₺$, and the final price of the product reaching the consumer is $107 + 19.26 = 126.26₺$. VAT rates are generally 8% for services and 18% for goods, as indicated in official newspapers.

SCT1 added to consumption items is calculated with three different methods. In the first method, there is only the SCT1 rate on the product, the SCT1 of the product is determined by the pace on the net cost to the producer. For example, if a product with a price of 100₺ has 8% SCT1, the amount of SCT1 is calculated as $100 * 8/100 = 8₺$, if we assume that there is only SCT1 on the product, the taxed price of the product is 108₺. The second method includes the SCT1 calculation for only excise tax. The Ministry of Finance determines fixed amounts. Lump-sum is added to each unit of product; For example, if three units of a product with a unit cost of 10₺ are consumed, the specified amount in the total expenditure is $2 * 3 = 6₺$, assuming only the SCT1 is in the product, the total expenditure value is $(10 * 3) + (2 * 3) = 36₺$ calculated. As the unit amount spent on products with only fixed content changes, the amount of SCT1 reflected on households also increases. Finally, in the third method, both the SCT1 rate and the fixed amount are

found in the product. The fixed amount mentioned here is mainly specified as the minimum fixed amount. The purpose of the minimum set amount is to decide to calculate the SCT1 of the product on the minimum fixed amount if the SCT1 amount of the product calculated on the SCT1 rate is lower than the minimum specified amount. For example, the SCT1 rate of a unit product with a raw cost of 100₺ is 7%, and the minimum fixed amount is 8₺. In this case, if we use ad valorem tax, we calculate the SCT1 as 7₺. However, since the minimum fixed amount is 8₺, higher than the SCT1 amount calculated with the rate, the SCT1 of the product is renewed as 8₺. In the opposite case, the SCT1 amount calculated with the rate of the product is taken as a basis.

There is a big difference between the amount of SCT1 obtained from HBS and GIB statistics. Household consumption is not only responsible for this significant difference. Gasoline consumption of corporations and alcohol consumption of tourists could be possible reasons for these differences since these consumptions are not included in HBS. Lastly, SCT2 (Special Communication Tax) tax rates obtained from the official gazette and other sources are adapted to the TURKSTAT Household Budget Survey (HBS). We calculate total SCT2 in Turkey by consuming households' internet, fixed, and mobile phone services.

3.2.4 Final Income Calculation from Post-Fiscal Income

As (Tekgüc, 2018) showed, there is a significant difference between total income in TURKSTAT surveys and total income of households in national accounts (15% for wage-earners). The reason is that households underreport their real net income to pollsters. Since the public's health and education per capita expenditures will be obtained from the administrative registers, these records will give us the exact amount. If these in-kind expenditures are distributed to the households in the survey without any adjustment, the weight of health and education expenditures in the final income will be inflated. Therefore, the first thing to do at this stage is to compare the total market income of households with national accounts for each year and reduce public health and education expenditures at a similar rate following Lustig & Higgins (2013).

Firstly, public education expenditure per user will be determined. From the HBS, I identify students who continue their education and the level of these students by using student and continuing education variables. In addition to that, from the consumption module of the HBS, I identify likely students attending private school by and these students will be excluded from those who receive public in-kind education services. The total expenditure for each education level and the number of students at each education level are accessible from the administrative and statistical annuals of the Ministry of National Education (MEB, 2003-2004, 2007-2008, 2011-2012, 2015-2016, 2019-2020,) as well as from TURKSTAT Education Statistics. From these two data, MEB's expenditure per student for each level can be calculated. In the next stage, I figure for each student at the public school. The cost of students at each education level of the Ministry of National Education will be added to the consumable income of the household.

Secondly, health expenditure per user will be determined. There is information on whether everyone has health insurance (health variable) or not in the HBS. However, there is no data on which individuals use the public health system. From the annual administrative reports of the TURKSTAT and HBS, data are available on the total health expenditure of the public. Many people are insured, so it is possible to calculate the health expenditure per guaranteed (TURKSTAT, 2019). We assumed that the weight of age groups in the population and the rates of public health expenditure by age groups remained constant. Following Mollahaliloğlu et al. (2006), we used per capita spending rates for the 0-4, 5-14, 15-44, 45-59, and 60+ age groups of 1.1, 0.6, 0.7, 1.7, and 2.5, respectively. However, imposing the distribution of health expenditures by the age of 2000 on subsequent years led to an overestimation of total health expenditure. In other words, it was scaled to the total health expenditure with 93% of 2003; 2007 with 94%; 2011 with 94%; 2015 with 87%; 2019 with 84% to converge official data. After adding public education and health expenditure, we construct the final income. However, we do not use final income in our analysis since Lustig & Higgins (2013) do not include final income in their analysis. They use final income for inequality analysis. Then, this section lastly explains poverty statistics calculation.

3.3 POVERTY STATISTICS CALCULATION

For other types of income except for the final income, Foster et al.'s (1984) method will calculate the poverty rate, poverty gap, and square of poverty gap for absolute poverty. Since 2009, TSI has not updated the absolute poverty threshold for Turkey. There are \$1.9, \$3.2, and \$5.5 poverty rates per person per day in the World Bank data (World Bank, 2018). I use \$ 5.5 threshold in this master thesis to compare with international literature and the \$ 10 threshold like Lustig (2016).

Foster et al. (1984) poverty measures are calculated with the formula below. In this formula, when $\alpha = 0$, the poverty rate; When $\alpha = 1$, the poverty gap, and when $\alpha = 2$, the square of the poverty gap is calculated.

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^H \left(\frac{z - y_i}{z} \right)^{\alpha} I(y_i < z), \quad \alpha \geq 0,$$

In the above formula, z represents the poverty threshold, y_i represents per capita household income (whatever type of income it is), and N represents the population.

This thesis firstly constructs relative and absolute poverty measures for both the OECD scale and per capita level. Each step contains poverty rate, poverty gap, and Poverty square calculations. This analysis is composed of five different incomes, including market income(M), disposable income except for social assistance (D-Gtran), disposable income (D), consumable income (C+SCT2), and consumable income (C). \$10 absolute poverty threshold is our first entry-exit point to be coherent with literature. On the other hand, 60 percent of median income is the relative poverty threshold used in some papers (Badenes-Plá & Buenaventura-Zabala, 2017). Using absolute poverty measures stemmed from most articles focusing on poverty in developing countries using absolute thresholds (Tsai, 2006; Higgins & Lustig, 2016; Birdsall et al., 2014). The relative poverty measure compares calculation and TURKSTAT official poverty rates (TURKSTAT, 2006-2019).

Entry and Exit: We identify the poor as those below the \$ 10 per day income level and the non-poor as upper \$ 10 per day.

3.4 EMPIRICAL MODEL

The empirical model used to investigate the relationship between household characteristics and poverty is as follows,

$$y_i = a_0 + \sum \alpha_i * x_i + e_i \quad (3.1)$$

Where y_i refers to poverty status of market, disposable, and consumable income for both \$5.5 and \$10 absolute poverty thresholds for each household, also it refers to entry to poverty from market income to disposable income and consumable income. Where x_i are survey year, seniors (aged 65 and over), youth (between 0 and 19), household size, household type, average education of adults (aged 25-64) in the household. Where a_0 is constant and e_i is error term. This model is used in tables 5a, 5b and 5c.

Another empirical model studies the association between each independent variable and poverty by interacting survey year variable with other household characteristics in the household. This model is as follows

$$y_i = \beta_0 + \sum \beta_i * (x_i * year) + e_i \quad (3.2)$$

Where y_i is same as previous model except for entry rate. Where β_0 is constant and e_i is error term. Where x_i refers to seniors, youth, household size, household type, average adult education year. Where $year$ is survey year. This model is used in graphs 2, 3, 4, 5, 6, 7.

4. FINDINGS

4.1 DESCRIPTIVE FINDINGS

After explaining data and methodology section, we indicate our descriptive findings about market, disposable, and consumable incomes, income taxes, social security contributions, indirect taxes, and social assistance. Tables 4.1, 4.2, 4.3, 4.4, 4.5 give these descriptive findings.

Table 4.1: Descriptive Findings of 2003

2003	N	Mean	St. dev	Min	p10	Median	p90	Max
Market	25,764	13,978	20,668	-	2,960	9,208	26,826	1,782,854
Disposable	25,764	12,741	18,231	-	2,956	8,520	24,211	1,509,117
Consumable	25,764	11,226	16,588	-	2,499	7,449	21,504	1,479,132
Income taxes	25,764	780	3,126	-	-	-	1,928	203,964
SGK Contributions	25,764	518	955	-	-	-	1,432	13,454
Consumption taxes	25,764	1,582	2,920	37	330	969	3,098	174,135
Social Assistance	25,764	80	490	-	-	-	9	26,187

Notes: All the prices are inflated to 2019 December prices. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.2: Descriptive Findings of 2007

2007	N	Mean	St. dev	Min	p10	Median	p90	Max
Market	8,548	17,259	16,631	-	3,831	13,068	33,788	241,874
Disposable	8,548	15,589	14,502	-	4,031	11,883	30,647	239,884
Consumable	8,548	13,470	13,218	-	3,136	10,188	26,972	221,597
Income taxes	8,548	1,101	2,426	-	-	410	2,726	76,824
SGK Contributions	8,548	748	1,247	-	-	306	1,954	14,927
Consumption taxes	8,548	2,216	2,374	-	541	1,567	4,365	46,445
Social Assistance	8,548	167	889	-	-	-	279	32,479

Notes: All the prices are inflated to 2019 December prices. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.3: Descriptive Findings of 2011

2011	N	Mean	St. dev	Min	p10	Median	p90	Max
Market	9,918	19,928	24,426	-	3,937	13,963	40,274	756,309
Disposable	9,918	18,181	21,455	-	4,261	13,194	35,773	726,155
Consumable	9,918	15,284	19,485	-	2,995	10,862	30,842	702,150
Income taxes	9,918	1,113	3,344	-	-	147	2,889	87,910
SGK Contributions	9,918	897	1,570	-	-	347	2,494	15,787
Consumption taxes	9,918	3,115	4,662	-	670	2,014	5,970	173,620
Social Assistance	9,918	266	1,021	-	-	-	619	19,806

Notes: All the prices are inflated to 2019 December prices. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.4: Descriptive Findings of 2015

2015	N	Mean	St. dev	Min	p10	Median	p90	Max
Market	11,491	28,371	43,197	-	6,215	18,570	55,532	963,504
Disposable	11,491	25,320	37,764	295	6,326	17,150	47,708	958,744
Consumable	11,491	21,759	34,954	-	4,890	14,318	41,105	909,013
Income taxes	11,491	1,890	7,158	-	-	294	4,388	209,393
SGK Contributions	11,491	1,365	2,399	-	-	577	3,620	18,461
Consumption taxes	11,491	3,712	5,549	-	791	2,282	7,178	104,781
Social Assistance	11,491	251	1,097	-	-	-	506	28,184

Notes: All the prices are inflated to 2019 December prices. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.5: Descriptive Findings of 2019

2019	N	Mean	St. dev	Min	p10	Median	p90	Max
Market	11,521	29,243	31,131	-	7,014	20,602	59,369	632,983
Disposable	11,521	25,858	25,845	-	6,994	18,970	51,260	617,816
Consumable	11,521	22,127	23,095	-	5,453	15,806	44,361	527,255
Income taxes	11,521	2,041	5,173	-	-	457	5,191	103,126
SGK Contributions	11,521	1,598	2,790	-	-	666	4,268	27,867
Consumption taxes	11,521	3,946	4,910	-	889	2,673	8,058	123,124
Social Assistance	11,521	267	1,331	-	-	-	378	69,233

Notes: All the prices are inflated to 2019 December prices. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

We infer from these descriptive findings tables those median incomes have increased in real terms within time. On the other hand, maximum incomes have decreased within time due to right truncation. More than half of the households pay income tax at any year. As we estimate SGK contributions proportionally to the household income, registered

workers reach up to 50 percent of total employment. We did not drop any observation. That is why minimum consumption taxes are zero.

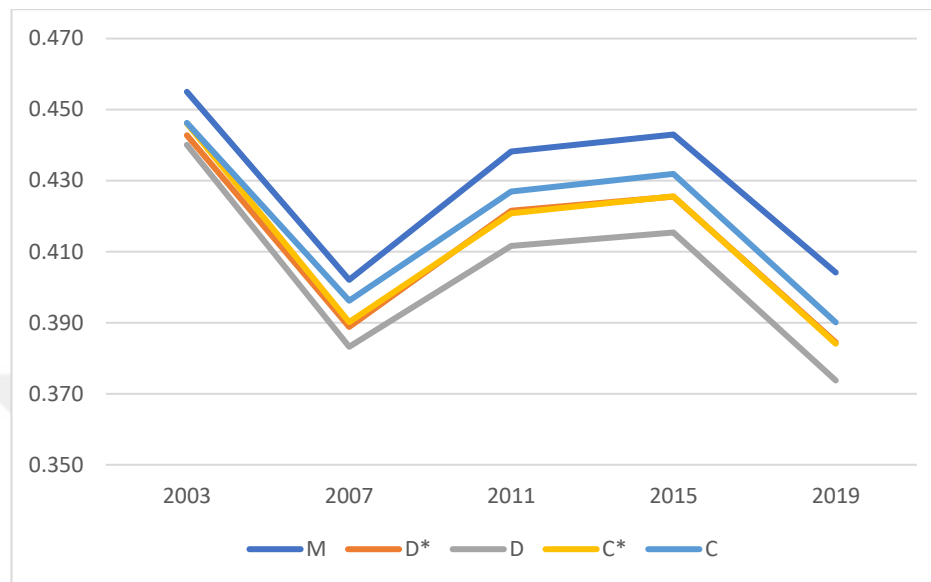


Figure 4.1: Gini Coefficients by year

Notes: We explained market income(M) in section 3.2.1. D* is disposable income before social assistance. For the details of disposable income (D), see section 3.2.2. C* accounting for VAT but not SCT. For the details of C, see the section 3.2.3.

Figure 1 shows Gini coefficients by year. This graph indicates a general tendency to decline Gini coefficients for all income levels between 2003 and 2007, 2015 and 2019. On the other hand, Gini coefficients increased gradually between 2007 and 2015, but the slope of this graph between 2007 and 2011 is steeper than between 2011 and 2015. This graph is essential since it is compatible with our relative poverty analysis stated in Annex A.1

4.2 POVERTY ANALYSIS

Table 4.6 shows absolute poverty measures in terms of poverty rate, poverty gap, and poverty square. We choose firstly the \$10 daily absolute poverty threshold for vulnerable poor. Additionally, we also select 5\$ daily absolute poverty threshold for very poor. Then, according to official data, purchasing power parity in 2019 is 2.11 (WB Databank, 1990-2019). Finally, we get 7702\$ for vulnerable poor by multiplying $10 \times 2.11 \times 365$ and 4236\$

for very poor by multiplying $5.5 \times 2.11 \times 365$. If household income is lower than 7702₺ and more than 4236₺, this household is vulnerable poor. If household income is low than 4236₺, this household is very poor. We keep these thresholds constant from 2003 to 2019. With rising incomes over time, the poverty rate has almost decreased for all income levels within time.

Our 2015 data showed that market income poverty increased from 21.9 percent to 31.9 percent in consumable income poverty for vulnerable poor incomes. Disposable income has the lowest all FGT rates for all years since it includes social assistance and minimum subsistence allowance. On the other hand, the poverty rate increased from market income to disposable income before social assistance due to social security contributions. Still, the poverty gap and poverty square decreased or the same for all years. For consumable incomes, FGT rates increased from disposable income to consumable incomes for all years because of the effect of VAT on C+SCT and SCT on C.

Absolute poverty measure based on household size is comparable with Cuevas et al. (2020). According to our calculations in 2015, we found that market income poverty is 8.1 percent, disposable income poverty is 7.4 percent and consumable income poverty is 12.7 percent for \$5.5 absolute poverty threshold. On the other hand, they found that market income poverty in 2016 is 16 percent, disposable income poverty is 10.3 percent and, consumable income poverty in 2016 is 16.4 percent for \$5.5 absolute poverty threshold. For the international comparison, we look at poverty rate of different countries using Lustig methodology. They begin with \$4 absolute poverty threshold, and they adjust this threshold with their 2011 PPP. The comparison is given in Table 4.7.

Table 4.8 shows absolute poverty (per capita) entry-exits. Market income is the starting point, and entry-exit rates for other incomes are calculated according to market income. It seems that our poverty measures described in table 4.6 are compatible with entry-exit levels in table 4.8. Since we measure poverty in absolute terms, our threshold is stable, and while the poverty entry rate decline within years, the poverty exit rate increased slightly for all income levels. On the other hand, the poverty rate declined in the 2003-2011 period because employment income increased. Hence, some employed households went up absolute poverty thresholds, and some unemployed families did not rise above the poverty threshold in this period. The significant decline in the 2011-2015 period can

be explained as retirement pensions contribution. The marginal effect of indirect taxes is generally higher than the minimum subsistence allowance and social assistance. The marginal impact of VAT is also more than SCT, as is expected. VAT is value-added taxes, and SCT includes both special consumption taxes and special communication taxes.

Table 4.6: Absolute Poverty Measures for both \$5.5 and \$10 Per Capita Level

2003	\$5.5 Absolute Poverty (per capita)					\$10 Absolute Poverty (per capita)				
	M	D*	D	C*	C	M	D*	D	C*	C
FGT(0)	24.2%	26.3%	25.8%	30.1%	32.2%	50.1%	54.6%	54.1%	59.0%	61.2%
FGT(1)	37.4	35.9	35.2	36.7	36.9	43.5	43.6	43.2	45.6	46.9
FGT(2)	0.22	0.21	0.21	0.23	0.23	0.26	0.26	0.26	0.27	0.28
2007										
FGT(0)	16.7%	17.7%	16.7%	20.0%	22.4%	33.4%	38.0%	37.1%	42.3%	45.6%
FGT(1)	42.2	41.1	39.1	41.7	43.3	45.1	42.1	40.9	42.6	44.2
FGT(2)	0.26	0.25	0.23	0.26	0.28	0.28	0.26	0.25	0.27	0.28
2011										
FGT(0)	15.8%	17.0%	14.7%	18.5%	21.6%	32.5%	36.1%	33.5%	39.3%	43.8%
FGT(1)	39.7	38.6	36.5	40.5	43.6	43.7	42.3	40.5	42.6	44.3
FGT(2)	0.26	0.25	0.23	0.28	0.32	0.27	0.27	0.25	0.27	0.30
2015										
FGT(0)	8.2%	9.6%	7.4%	10.6%	12.7%	21.9%	25.9%	23.2%	28.8%	31.9%
FGT(1)	30.6	28.8	26.6	26.3	29.9	35.9	35.2	33.2	35.1	37.2
FGT(2)	0.16	0.15	0.12	0.15	0.19	0.20	0.19	0.17	0.19	0.21
2019										
FGT(0)	6.7%	7.9%	5.8%	8.5%	10.5%	18.6%	23.3%	20.2%	25.4%	28.1%
FGT(1)	26.3	26.6	21.0	24.4	26.2	35.0	32.6	30.2	33.6	36.1
FGT(2)	0.16	0.15	0.11	0.13	0.17	0.19	0.18	0.15	0.17	0.20

Notes: We explained market income (M) in section 3.2.1. D* is disposable income before social assistance. For the details of disposable income (D), see section 3.2.2. C* accounting for VAT but not SCT. For the details of C, see the section 3.2.3. FGT (0) refers to poverty rate, FGT (1) refers to poverty gap and FGT (2) refers to poverty square. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.7: Comparison of Turkey and peer countries of different incomes' poverty rate

Country	Poverty line: \$4 2005PPP/day			
	Poverty line: \$4 2005PPP/day converted to 2011PPP	Market income	Disposable income	Consumable income
Argentina* (2012)		17.3%	7.3%	12.5%
Armenia (2011)	6.0	58.8%	56.1%	62.8%
Brazil (2008)	4.0	35.9%	27.6%	32.9%
Chile (2013)	5.2	8.9%	4.4%	5.7%
Colombia (2014)	5.2	34.0%	31.2%	31.8%
Costa Rica (2010)	4.9	13.1%	9.6%	11.7%
Croatia (2014)	4.9	7.1%	5.3%	11.5%
Ecuador (2011)	4.8	26.2%	21.3%	20.6%
Mexico (2014)	4.4	28.3%	25.1%	25.9%
Russia (2010)	4.8	20.5%	4.4%	5.1%
Turkey(2011)	5.0	15.8%	14.7%	21.7%
Turkey(2015)	5.0	8.2%	7.4%	12.7%

Source: <https://commitmenttoequity.org/datacenter/> * There is no poverty line conversion since omitted for being unreliable data in original file.

Table 4.8: \$10 Absolute Poverty Entry-Exit Levels

Entry	2003	2007	2011	2015	2019
Market Income					
Disposable Income*	4.4%	4.7%	3.7%	4.0%	4.7%
Disposable Income	4.3%	4.4%	2.0%	2.3%	2.5%
Consumable Income*	9.1%	9.3%	7.3%	7.4%	7.4%
Consumable Income	11.2%	12.5%	11.8%	10.4%	10.0%
Marginal effect of AGI & Gtran	-0.1%	-0.3%	-1.7%	-1.7%	-2.2%
Marginal effect of VAT	4.8%	4.9%	5.4%	5.1%	4.9%
Marginal effect of SCT	2.1%	3.2%	4.4%	3.0%	2.6%
Exit	2003	2007	2011	2015	2019
Market Income					
Disposable Income*					
Disposable Income	0.3%	0.7%	0.9%	1.0%	0.9%
Consumable Income*	0.2%	0.4%	0.5%	0.5%	0.5%
Consumable Income	0.1%	0.3%	0.4%	0.4%	0.5%

Notes: We explained market income in section 3.2.1. Disposable income* is disposable income before social assistance. For the details of disposable income, see section 3.2.2. Consumable income* accounting for VAT but not SCT. For the details of consumable income, see the section 3.2.3. AGI is equal to minimum subsistence allowance. Gtran refers to social assistance. VAT is value added tax and SCT is special consumption tax. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.9: Absolute Poverty Distribution from Market to Disposable Income

2003	M distr	disposable income distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	3.5%	79.6%	20.4%	0.0%	0.0%
middle inc	46.4%	0.0%	90.7%	9.3%	0.0%
vulnerable poor	25.9%	0.0%	1.2%	91.0%	7.8%
very poor	24.2%	0.0%	0.1%	1.6%	98.3%
D distr		2.8%	43.1%	28.3%	25.8%
2007					
high inc	4.9%	71.8%	28.2%	0.0%	0.0%
middle inc	61.7%	0.0%	92.9%	7.1%	0.0%
vulnerable poor	16.7%	0.0%	3.5%	92.0%	4.5%
very poor	16.7%	0.0%	0.4%	4.3%	95.3%
D distr		3.6%	59.3%	20.4%	16.7%
2011					
high inc	7.3%	76.9%	23.1%	0.0%	0.0%
middle inc	60.2%	0.1%	96.6%	3.3%	0.0%
vulnerable poor	16.7%	0.0%	4.6%	92.5%	2.9%
very poor	15.8%	0.0%	0.9%	9.1%	90.0%
D distr		5.7%	60.8%	18.9%	14.7%
2015					
high inc	11.3%	77.1%	22.9%	0.0%	0.0%
middle inc	66.9%	0.1%	96.5%	3.5%	0.0%
vulnerable poor	13.7%	0.0%	6.4%	90.2%	3.4%
very poor	8.2%	0.0%	1.9%	13.2%	84.9%
D distr		8.7%	68.1%	15.7%	7.4%
2019					
high inc	13.7%	75.4%	24.6%	0.0%	0.0%
middle inc	67.7%	0.0%	96.3%	3.6%	0.0%
vulnerable poor	11.9%	0.0%	5.4%	90.7%	3.9%
very poor	6.7%	0.0%	3.7%	16.5%	79.7%
D distr		10.3%	69.5%	14.4%	5.8%

Notes: We define a household as 'high-income if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.10: Absolute Poverty Distribution from Market to Consumable Income

2003	M distr	consumable income distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	3.5%	62.7%	37.3%	0.0%	0.0%
middle inc	46.4%	0.0%	75.9%	23.8%	0.4%
vulnerable poor	25.9%	0.0%	0.5%	68.5%	31.0%
very poor	24.2%	0.0%	0.0%	0.9%	99.1%
C distr		2.2%	36.6%	29.0%	32.2%
2007					
high inc	4.9%	53.7%	46.2%	0.1%	0.1%
middle inc	61.7%	0.0%	79.7%	19.6%	0.6%
vulnerable poor	16.7%	0.0%	1.5%	64.6%	34.0%
very poor	16.7%	0.0%	0.3%	2.3%	97.4%
C distr		2.7%	51.7%	23.3%	22.4%
2011					
high inc	7.3%	52.1%	47.5%	0.2%	0.2%
middle inc	60.2%	0.0%	80.5%	18.4%	1.2%
vulnerable poor	16.7%	0.0%	2.2%	63.2%	34.6%
very poor	15.8%	0.0%	0.2%	3.7%	96.1%
C distr		3.8%	52.3%	22.2%	21.7%
2015					
high inc	11.3%	56.9%	42.4%	0.2%	0.6%
middle inc	66.9%	0.0%	84.5%	14.6%	0.8%
vulnerable poor	13.7%	0.0%	2.4%	65.4%	32.3%
very poor	8.2%	0.0%	0.9%	6.1%	93.0%
C distr		6.4%	61.7%	19.3%	12.7%
2019					
high inc	13.7%	55.8%	44.0%	0.1%	0.1%
middle inc	67.7%	0.0%	85.3%	13.6%	1.2%
vulnerable poor	11.9%	0.0%	2.9%	66.1%	31.1%
very poor	6.7%	0.0%	2.8%	7.5%	89.7%
C distr		7.6%	64.3%	17.6%	10.5%

Notes: We define a household as 'high-income' if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable' if their per capita income is between \$5.5 and \$10, and 'poor' if their per capita income is less than \$5.5. We obtain the index values from CPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table 4.9 shows the distribution of four different income groups for both market income and disposable income. We define a household as 'high-income' if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5 (Birdsall et al., 2014; Cuevas et al., 2020). For market income distribution, the proportion of high-income and middle-income increased, vulnerable poor, and very poor income groups' weight decreased from 2003 to 2019. Middle-income households are two-thirds of all households as of 2019. On the other hand, high-income and middle-income households' share also increased from 2003 to 2019 in disposable income. However, approximately 70 percent of all households are middle-income households in disposable income distribution in 2019. Still, the enhancement ratio of high income from market income to disposable income is more than middle income. This table also showed that the proportion of vulnerable households increased from market income to disposable income three for every year. The opposite of this situation prevailing for poor people, and their weight decreased from market income to disposable income for every year. The only transition is middle-income groups for the high-income distribution, and primarily high-income households replace middle incomes except for around 20 percent for 2011 and 2015. However, this transition is less than one percent. The change comes from vulnerable households to middle-income households, and this transition is between 1.2 percent and 6.4 percent. However, the evolution of vulnerable households comes from not only middle incomes but also poor households. The change from vulnerable poor households to middle incomes is more than vulnerable poor households to very poor households except for 2003. Lastly, very poor households replace with both middle-income and vulnerable households. In this case, very poor to vulnerable poor is more than poor to middle-incomes for every year, and the weight of these transitions increased from 2003 to 2019.

Table 4.10 indicates the distribution of four different income groups for market income and consumable income two. The proportion of high and middle-income groups increased from 2003 to 2019 in consumable income similarly to disposable income case. Still, the percentage increase is lower than the disposable income case for both high-income and middle-income groups. On the other hand, the proportion of vulnerable poor and very poor households decreased from 2003 to 2019 for consumable income. Still, firstly, their

total share for consumable income is higher than disposable income in 2003. Despite gradually declining in both groups, their share in consumable income is more than disposable income in 2019. A substantial decline in very poor and vulnerable poor groups has occurred between 2011 and 2015. The regression findings section will discuss possible reasons for this. High-income groups replace with only middle-income ones from market income to disposable income transitions. However, high-income groups substitute with both vulnerable poor and very poor households even if these transitions constitute only less than one percent of total households. There is no transition from middle-income to high-income—the major transition for middle-income groups actualized between middle-income and vulnerable poor households.

Nevertheless, middle-income groups become very poor households from market income to consumable income about one percent of total households. Vulnerable poor households mainly replace with very poor households, approximately 30 percent of total households. The transition of vulnerable poor to middle-income groups has increased from 0.5% in 2003 to 2.9% in 2019, and this transition always tends to increase. Lastly, very poor households substitute with both vulnerable poor and middle-income groups, but they are more likely to replace vulnerable poor households within the range of 0.9% and 7.5%. Very poor and the middle-income transition happened less than one percent until 2011. After 2011, this transition increased considerably, but the reasons for this transition are not clear from Table 4.10.

5. REGRESSION & POLICY ANALYSIS

5.1 REGRESSION FINDINGS

Our regression analysis is based on the relationship between household characteristics and poverty variables. We want to present research that is helpful to predict poverty. Factors affecting poverty such as occupation, education, and dependency have individual characteristics. On the other hand, poverty is calculated at the household level. To reconcile them, we try to create variables that help to represent the whole household to predict poor households. These variables are easily observable, and we want to develop policy analysis thanks to these observable household characteristics. We seek an answer to the question – “are there any easily identifiable household characteristics that match with poverty?”. Social assistance is open to corruption. In emergency cases, governments look at visible variables when they give social assistance to households. For example, people who paid SGK premiums for 450 days in the last three years, subject to the service contract for the previous 60 days, benefited from a short working allowance (ISKUR, 2021). Visible variables are enough to identify if the government decision and actual situation coincide with no mismatch between households and social assistance. However, these visible variables are not enough to cover false negatives. One of the possible reasons for this is outdated administrative data. More importantly, if we want to identify false negatives, we need to know the association between poverty and household characteristics. Therefore, our analysis becomes useful as it indicates how we construct suitable policy applications to cover all poor people. In other words, our research is focused on identifying variables to predict poverty hence we do not make any claims on causation and rather focus on associations between household characteristics and poverty status.

In our regression analysis, the first household level variable considered is household type by source of income. We divide households into six sub-groups according to their dominant income type. If one income type of shares are more than 50 percent of total household income, then this income type is the household's primary income type. Our household type includes wage, entrepreneur, rentier, retirement, transfer, and no

dominant type. Our second group of household variable is concerned with household size and age structure. A household can be composed of three sub-groups, including youth between 0 and 19 years, seniors 65+ years, and adults between 25 and 65 years. The number of people determines household size live in a house without considering the age of people. Finally, we calculate the average education year as the total realized education level of adults in a house divided by number of adults between 25 and 65 years. We perform three groups of regression analyses. The first two are absolute poverty per capita by using \$5.5 and \$10 thresholds. The last one is poverty entry regression from market income to both disposable and consumable income threshold. Table 5.1 shows regression analysis for \$5.5 thresholds. Table 5.2 indicates regression analysis for \$10 thresholds. Table 5.3 shows regression analysis for poverty entry for \$10 threshold.

Firstly, we look at the relationship between household type and poverty characteristics. If a household's majority income is entrepreneur, poverty and entrepreneur income are negatively correlated (compare to wage income households) as expected. On the other hand, the relationship between rentier income and being poor is not clear as entrepreneur income. For absolute poverty thresholds, rentier income is correlated with being poor except for consumable income \$10 thresholds. This unexpected finding may be due to the fact imputed rent for owner occupied households account for a large share of rentier income. There is a negative correlation between rentier income and being poor for both disposable and consumable income at one percent significance level for market entry. A great majority of social assistance cover retirement pensions in Turkey. Therefore, if a household's majority income is retirement pensions, this household is less likely to be poor. Naturally, if a household's majority income is either social transfers or no dominant type, this household is highly associated with becoming poor. Surprisingly, there is a negative relationship between poverty entry and both social transfer and no dominant type.

Table 5.1: Absolute Poverty (5.5 PPP USD per day)

	market	disposable	consumable
omitted category: wage income household			
entrepreneur	-0.0120*** (0.0038)	-0.0177*** (0.0039)	-0.0338*** (0.0048)
rentier	0.0379*** (0.0045)	0.0337*** (0.0046)	0.0296*** (0.0055)
retirement	-0.0264*** (0.0030)	-0.0219*** (0.0029)	-0.0414*** (0.0039)
social assistance	0.2141*** (0.0073)	0.0953*** (0.0062)	0.1119*** (0.0071)
no dominant type	0.1883*** (0.0107)	0.1843*** (0.0104)	0.1726*** (0.0111)
seniors	0.0093*** (0.0024)	-0.0054** (0.0022)	-0.0172*** (0.0026)
youth	0.0592*** (0.0019)	0.0645*** (0.0019)	0.0722*** (0.0022)
household size	0.0065*** (0.0014)	0.0046*** (0.0014)	0.0114*** (0.0017)
Avg .adult .educ . year	-0.0108*** (0.0003)	-0.0097*** (0.0003)	-0.0133*** (0.0003)
omitted category: 2003			
2007	-0.0476*** (0.0042)	-0.0617*** (0.0042)	-0.0665*** (0.0049)
2011	-0.0352*** (0.0039)	-0.0572*** (0.0039)	-0.0494*** (0.0046)
2015	-0.0654*** (0.0035)	-0.0904*** (0.0035)	-0.1001*** (0.0041)
2019	-0.0760*** (0.0037)	-0.1040*** (0.0037)	-0.1138*** (0.0044)
constant	0.0964*** (0.0058)	0.1155*** (0.0058)	0.1642*** (0.0069)
Adj. R-Square	0.2339	0.2264	0.2383
Sample Size	67242	67242	67242

Notes: ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. Heteroscedasticity robust standard errors are in parenthesis. Surveys and weights are applied.

Table 5.2: Absolute Poverty (10 PPP USD per day)

	market	disposable	consumable
omitted category: wage income household			
entrepreneur	-0.0402*** (0.0056)	-0.0604*** (0.0058)	-0.0741*** (0.0063)
rentier	0.0201*** (0.0061)	0.0071 (0.0063)	-0.0114* (0.0068)
retirement	-0.0792*** (0.0046)	-0.0985*** (0.0047)	-0.1138*** (0.0053)
social assistance	0.2625*** (0.0084)	0.1331*** (0.0080)	0.1265*** (0.0084)
no dominant type	0.1441*** (0.0111)	0.1135*** (0.0110)	0.0809*** (0.0116)
seniors	-0.0039 (0.0033)	-0.0197*** (0.0033)	-0.0388*** (0.0037)
youth	0.0772*** (0.0024)	0.0874*** (0.0025)	0.0817*** (0.0027)
household size	0.0267*** (0.0019)	0.0261*** (0.0019)	0.0375*** (0.0021)
Avg. adult educ. year	-0.0224*** (0.0004)	-0.0225*** (0.0004)	-0.0256*** (0.0004)
omitted category: 2003			
2007	-0.1309*** (0.0057)	-0.1378*** (0.0059)	-0.1329*** (0.0062)
2011	-0.1179*** (0.0051)	-0.1458*** (0.0052)	-0.1236*** (0.0056)
2015	-0.1725*** (0.0048)	-0.2080*** (0.0048)	-0.2076*** (0.0053)
2019	-0.1889*** (0.0050)	-0.2252*** (0.0051)	-0.2300*** (0.0055)
constant	0.3140*** (0.0079)	0.3659*** (0.0080)	0.4396*** (0.0087)
Adj. R-Square	0.3222	0.3319	0.3213
Sample Size	67242	67242	67242

Notes: ***: p<0.01, **: p<0.05, *: p<0.1. Heteroscedasticity robust standard errors are in parenthesis. Surveys and weights are applied.

Table 5.3: Absolute Poverty Entry (10 PPP USD per day)

	entry M to D	entry M to C
omitted category: wage income household		
entrepreneur	-0.0197*** (0.0026)	-0.0338*** (0.0049)
rentier	-0.0104*** (0.0031)	-0.0295*** (0.0052)
retirement	-0.0295*** (0.0020)	-0.0413*** (0.0041)
social assistance	-0.0376*** (0.0023)	-0.0729*** (0.0053)
no dominant type	-0.0262*** (0.0031)	-0.0623*** (0.0079)
seniors	-0.0053*** (0.0010)	-0.0279*** (0.0025)
youth	0.0066*** (0.0010)	0.0028 (0.0020)
household size	-0.0001 (0.0007)	0.0101*** (0.0015)
Avg. adult educ. year	-0.0014*** (0.0001)	-0.0041*** (0.0003)
omitted category: 2003		
2007	-0.0023 (0.0028)	0.0006 (0.0047)
2011	-0.0213*** (0.0021)	-0.0021 (0.0042)
2015	-0.0231*** (0.0021)	-0.0280*** (0.0040)
2019	-0.0224*** (0.0023)	-0.0305*** (0.0041)
constant	0.0588*** (0.0035)	0.1320*** (0.0065)
Adj. R-Square	0.0198	0.0223
Sample Size	67242	67242

Notes: ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. Heteroscedasticity robust standard errors are in parenthesis. Surveys and weights are applied.

We defined seniors as people 65+ years old. These groups cover not only retired people but also the non-earning person in the house. Hence, seniors and the poor are negatively correlated with each other similarly to the relationship between retirement and poor except for market income at \$5.5 poverty level. However, youth and the poor association is not the same as seniors and poor ones. Youth and poor are associated positively. It seems that youth under 19 years don't contribute to the household's budget. We will discuss in policy analysis a broader perspective. Household size and poor are correlated negatively except for entry from market income to disposable income, but this coefficient is not statistically significant. Lastly, average education year and poor are associated with negatively as expected. When we look at poor and year relationships, we see that year and poverty status is related inversely. There is a huge gap between 2011 and 2015 for absolute poverty thresholds, but we are not sure why this considerable gap happened. For poverty entry, 2015 and 2019 years are negatively connected with the poor. 2007 and 2011 coefficients are positive, but they are statistically insignificant except for 2011 entry from market income to disposable income. Household income has increased years despite constant absolute poverty thresholds. Hence, these negative coefficients are in line with our expectations. For the adjusted R^2 , the \$10 absolute poverty line has the highest value compared to other regressions. As there is an inverse relationship between youth and poverty, we want to examine this relationship by looking at other variables constant. Figures 5.1, 5.2, 5.3, 5.4, 5.5, and 5.6 give this youth and poverty relationship.

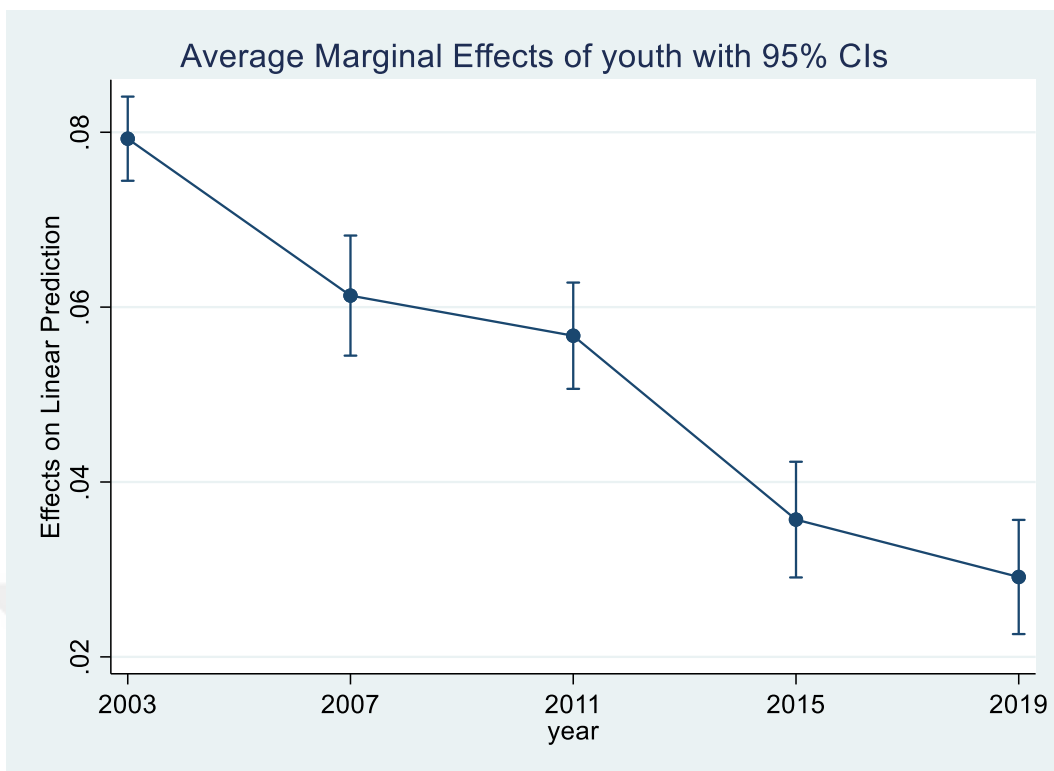


Figure 5.1: Market Income Youth (5.5 PPP USD per day)

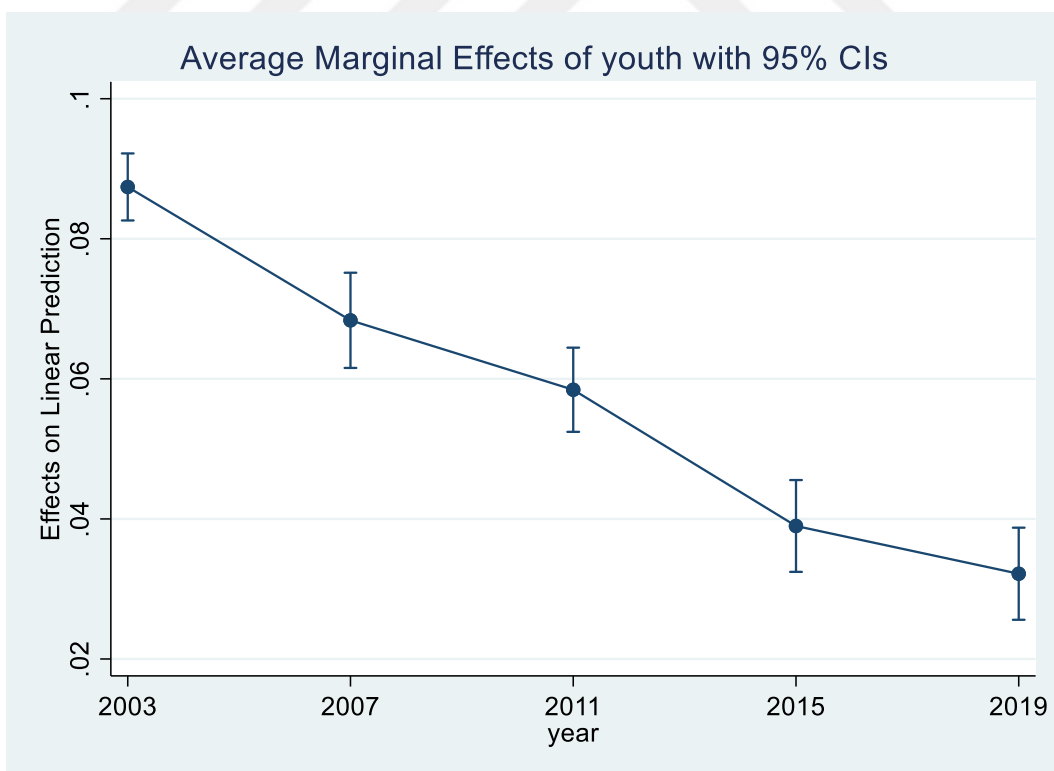


Figure 5.2: Disposable Income Youth (5.5 PPP USD per day)

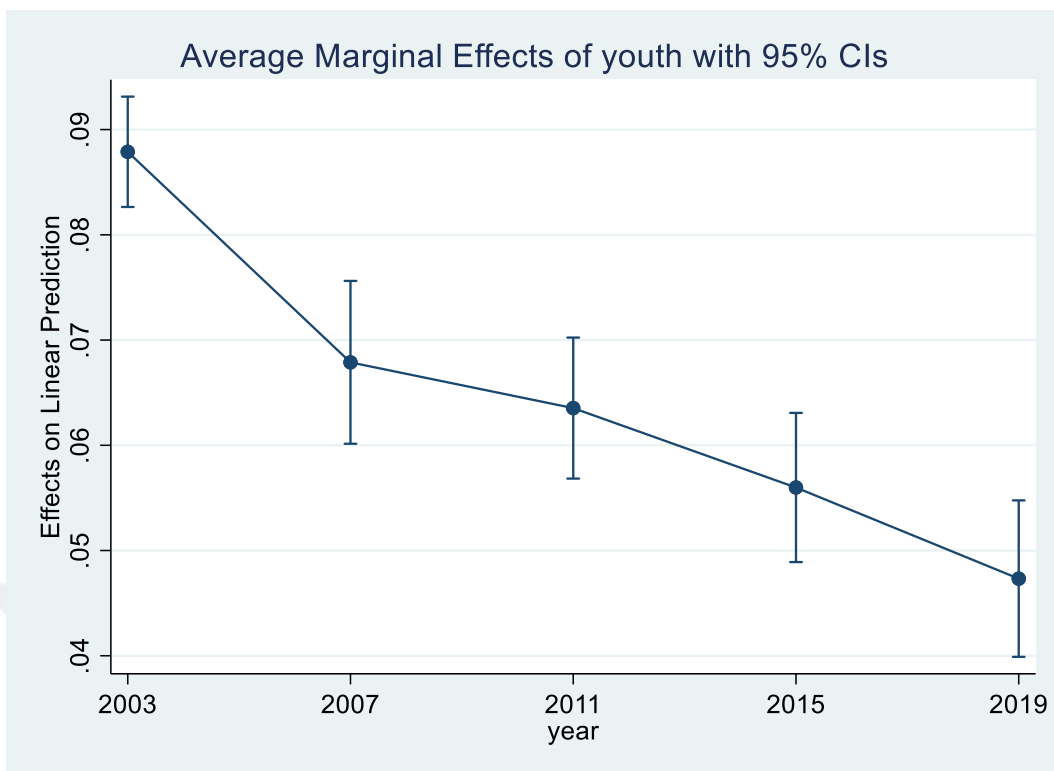


Figure 5.3: Consumable Income Youth (5.5 PPP USD per day)

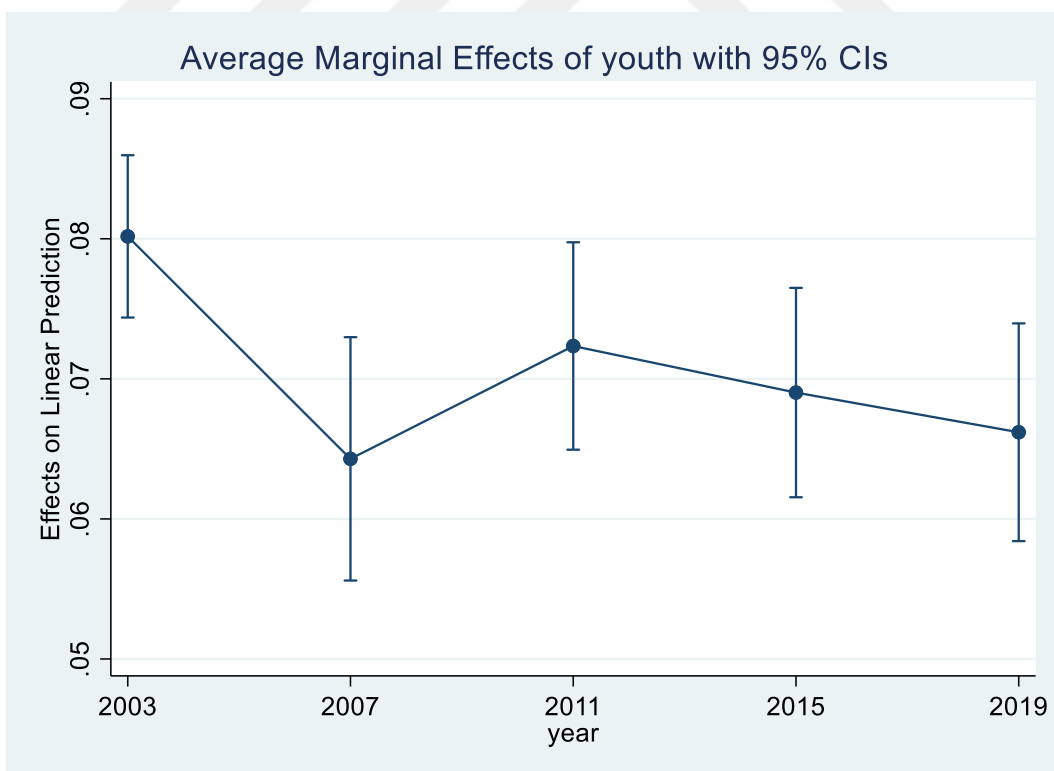


Figure 5.4: Market Income Youth (10 PPP USD per day)

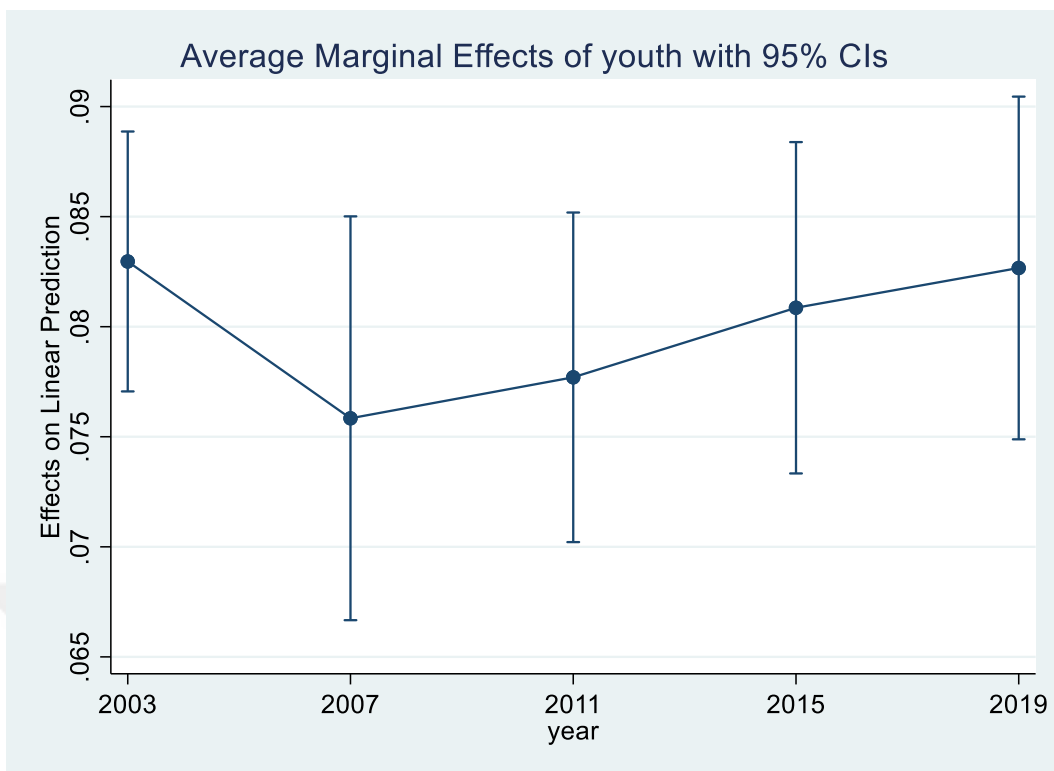


Figure 5.5: Disposable Income Youth (10 PPP USD per day)

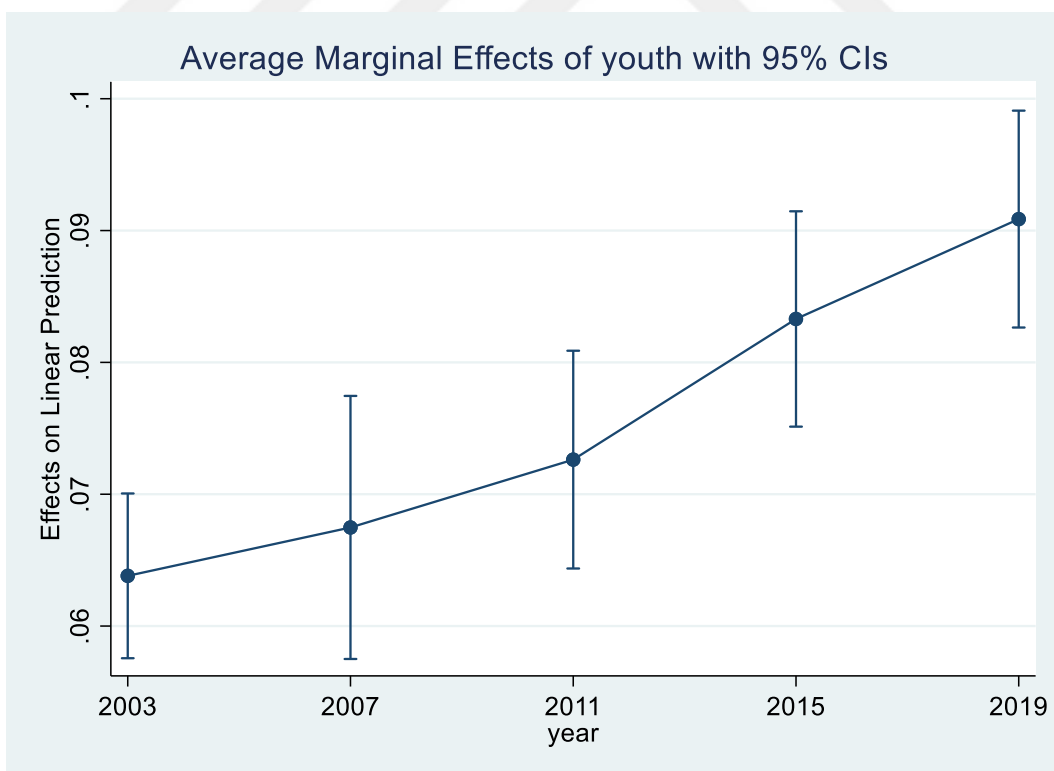


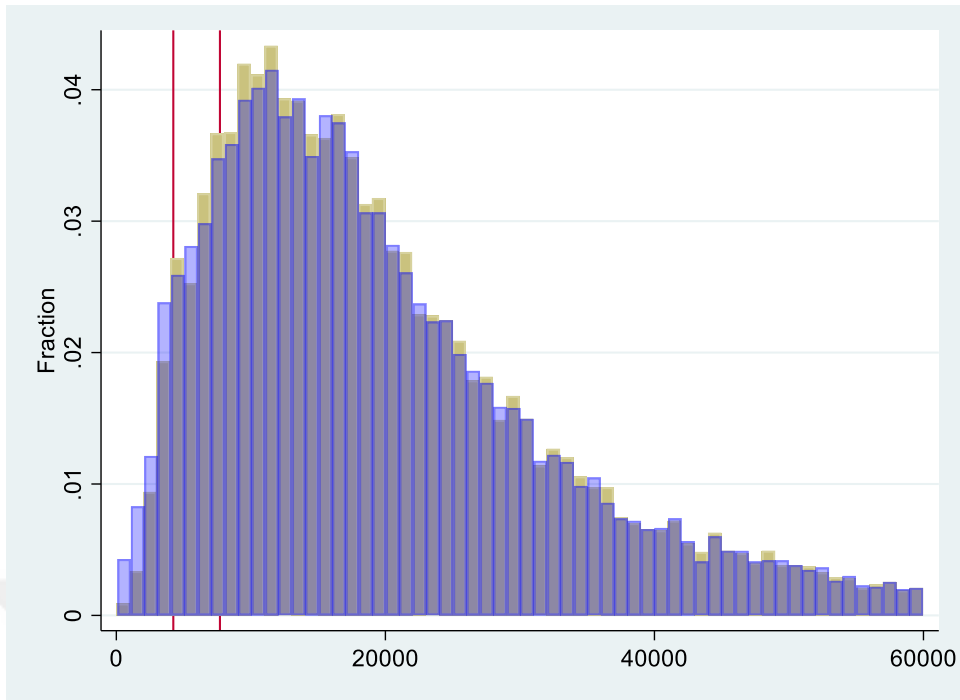
Figure 5.6: Consumable Income Youth (10 PPP USD per day)

We obtain regression results for Equation 2 by interacting household characteristics with survey year. Since this analysis resulted in many coefficient estimates, we present the findings of Equation 2 regression analysis with graphs for brevity. The relationship between youth and \$5.5 poverty indicates that the effect of youth declined seriously over the years. While the youth slope in 2003 was approximately 0.9 percent, this slope has been around 0.4 percent for all income levels. However, the association between youth and the \$10 poverty threshold is not the same as the \$5.5 poverty threshold. For market and disposable income, there was a gradual decline between 2003 and 2007 and just after the tiny increase in 2011 and stable for 2015 and 2019 years. For the consumable income, the youth effect increased gradually from 2003 to 2019. For other interaction graphs, see the Annex B.

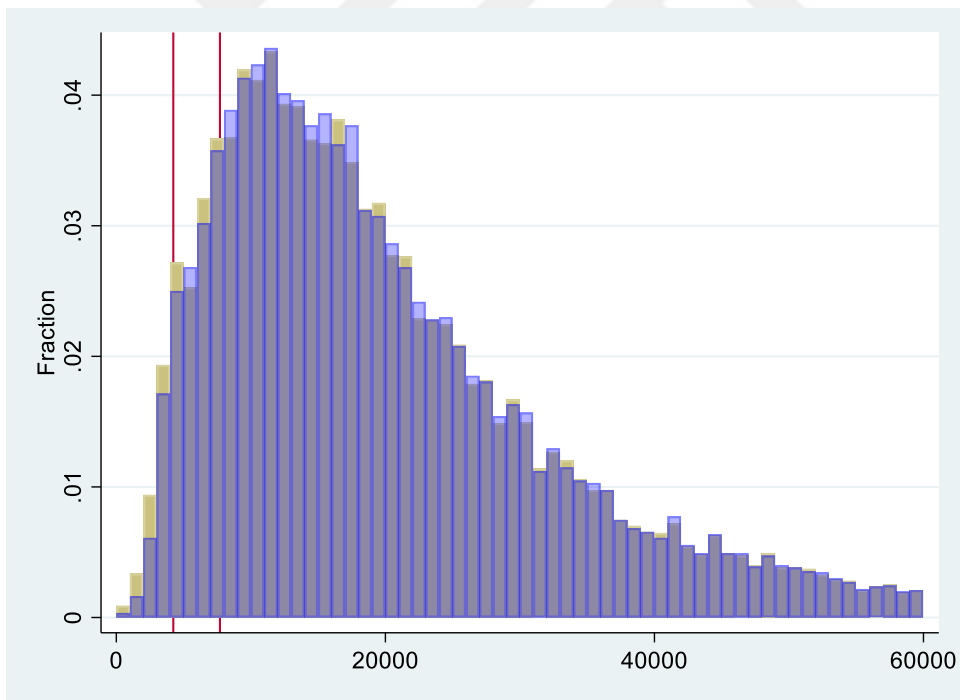
5.2 POLICY ANALYSIS

We want to examine the relationship between poverty and household characteristics variables in the regression section. For the policy analysis, we focus on youth groups which are between 0 and 19 years old. as there is an inverse relationship between poor and youth, and this group nearly has no contribution to the family budget. Additionally, we choose youth groups since their coefficients are the biggest one among all variables and also, we want to make policy analysis that is universal rather than means tested. There are some papers which found that child poverty is an important part of poverty policy (Dayioğlu & Demir Şeker, 2016; Tekdemir & Yılmaz, 2020). We find a recent paper about the impact of supporting social care on income poverty in Turkey (Ilkcaracan, et al, 2021). Their social care spending makes up roughly 1.8 percent of GDP. Given such huge transfer they employ a structural model to dynamically estimate the general equilibrium effects. We do not model the whole economy and in order to produce estimate within the bounds of static analysis we assume modest transfers per child and youth. In other words, we give government transfer to households if there is any youth in their household. This child and youth support is 300₺ in 2003, 400₺ in 2007, 500₺ in 2011, 600₺ in 2015, and 700₺ in 2019 and these amounts are annual rather than monthly. We increase our child and youth support by 100₺ every four years to keep our analysis simple. Our total child and youth support is around 0.4 percent of GDP. We chose this amount to resemble the actual government transfer share in HBS and the share of child support in GDP is approximately equal to the government transfer share in HBS. Actually, we

use two scenarios to see the impact of child and youth support. Firstly, we give child and youth support as a substitute to social assistance, and this is budget neutral scenario. Second one is child and youth support as a complement to social assistance. When we add this child and youth support into the social assistance, then social assistance become double. When we compare social assistance and our child and youth support policy, we see that while social assistance is generally means tested (Tekgüç, 2018), child and youth support policy is administratively easier and universal program compared to social assistance. Social assistance does not cover everyone since they are bureaucratic and intrusive. Also, social assistance based on outdated data rather than current household revenue. Hence, social assistance' marginal impact are not high as compared to child and youth support that is universal and easier.

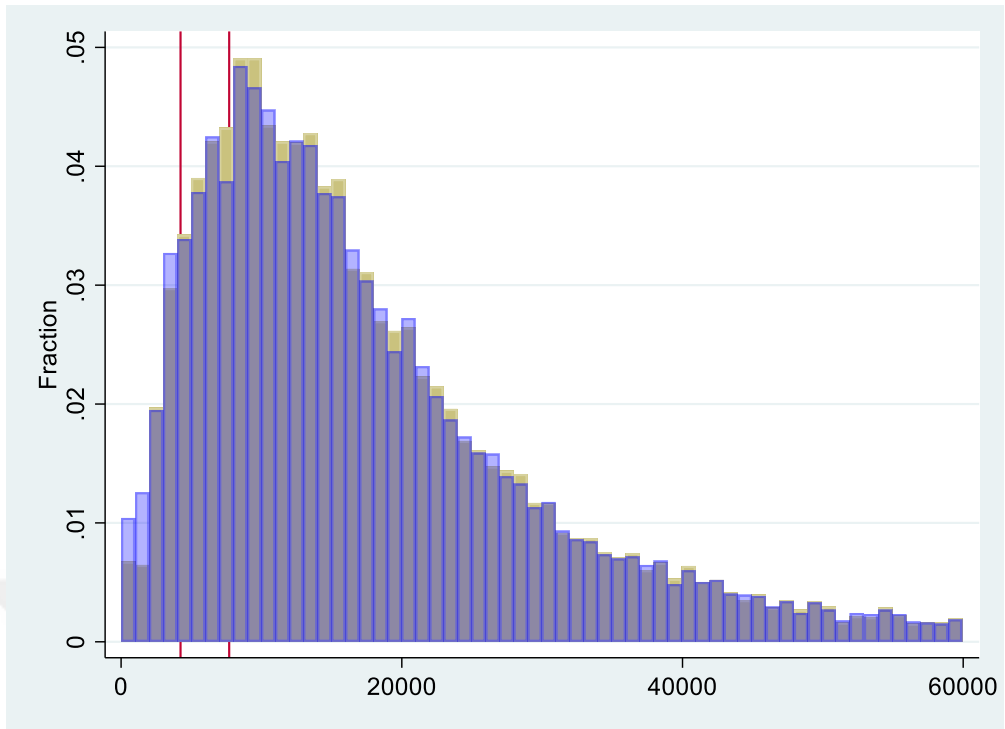


(A) excluding existing social assistance

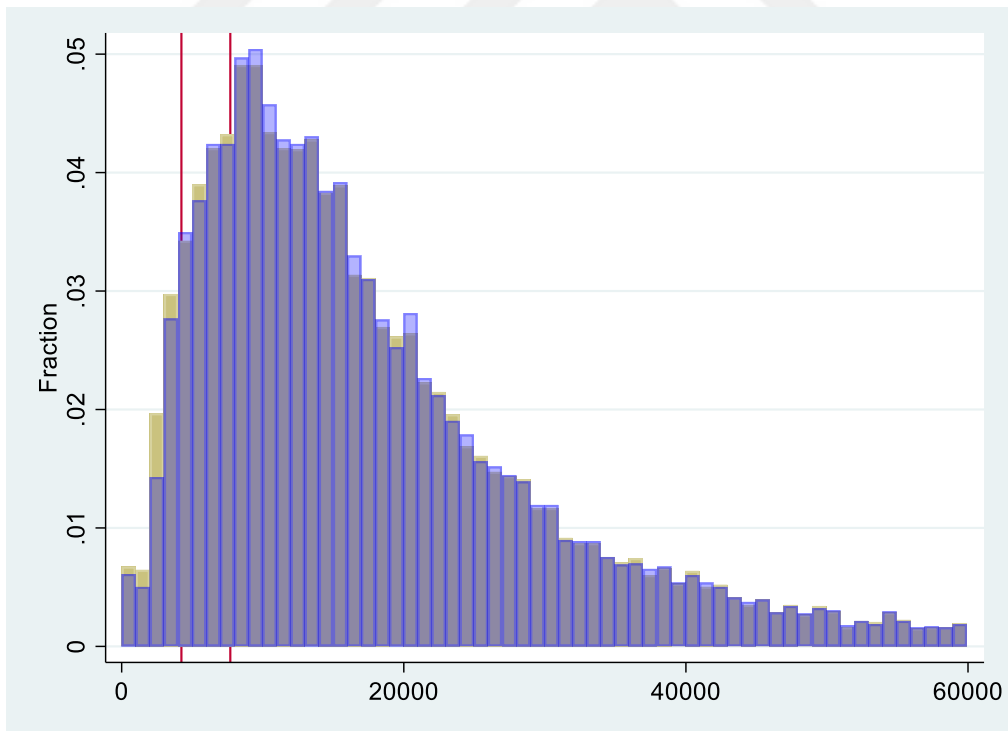


(B) including existing social assistance

Figure 5.7: Comparison of disposable income before and after child and youth support



(A) excluding existing social assistance



(B) including existing social assistance

Figure 5.8: Comparison of consumable income before and after child and youth support

Figure 5.7 A and B gives the image of disposable income before and after child and youth support in 2019. Figure 5.8 A and B indicates the picture of consumable income before and after child and youth support in 2019. Households go up into the poverty thresholds in disposable income are more apparent than consumable income. Maximum change for both graphs occurred between 2000₺ and 3000₺ income groups. The reason for why we use these histograms based on that we want to see the change the redistribution below the poverty line. It seems from these histograms that households who have no child are likely to be losers of this child and youth support policy.

Table 5.4 gives more detailed information about the before and after child and youth support policy about the poverty rate and gap. When we compare the poverty rates between before child and youth support and complement to social assistance, we can deduct from this table that there is nearly a one percent difference between disposable and consumable income before and complement child and youth support policy. It can be less than one percent for some years, such as 0.6 percent disposable income in 2015, but it does not exceed 1.1 percent. On the other hand, the poverty gap mostly changed from 1.5 percent to 2 percent. The poverty gap fluctuates more than the poverty rate since the poverty gap gives more weight to extreme points. The minimum poverty gap is 0.5 percent, and the maximum is 4.2 percent in 2015 5.5 poverty thresholds. One interesting point in this policy analysis is that the poverty gap increased a little bit for 5.5\$ poverty threshold consumable income despite child and youth support contribution.

When we compare the before and substitute youth and child support policy, we expect that there will be poverty rate increase as a result of substitution policy analysis. However, there is not much change in poverty rate. As household become more crowded, then this household is more likely to be poor and these families benefit from this child and youth support. Actually, targeting mechanism is not perfect and households which are not poor but have a child and youth also get this child and youth support. Hence, some part of our alternative policy will go to the rich pocket.

Table 5.4: Comparison of before and after child and youth support for D and C

	\$5.5 a day, per capita		\$10 a day, per capita	
	D	C	D	C
2003				
FGT(0)	25.8%	32.2%	54.1%	61.2%
FGT(0) excluding SA	25.0%	31.3%	53.8%	60.9%
FGT(0) including SA	24.5%	30.8%	53.2%	60.6%
FGT(1)	35.2	36.9	43.2	46.9
FGT(1) excluding SA	34.2	36.0	42.4	46.1
FGT(1) including SA	33.7	35.4	42.1	45.8
2007				
FGT(0)	16.7%	22.4%	37.1%	45.6%
FGT(0) excluding SA	16.6%	22.5%	37.0%	45.9%
FGT(0) including SA	15.5%	21.2%	36.0%	44.9%
FGT(1)	39.1	43.3	40.9	44.2
FGT(1) excluding SA	38.9	42.9	40.7	44.4
FGT(1) including SA	36.6	41.6	39.9	42.6
2011				
FGT(0)	14.7%	21.6%	33.5%	43.8%
FGT(0) excluding SA	15.4%	21.7%	33.9%	44.2%
FGT(0) including SA	13.5%	20.1%	32.7%	42.9%
FGT(1)	36.5	43.6	40.5	44.3
FGT(1) excluding SA	37.2	45.4	41.1	44.3
FGT(1) including SA	35.1	43.8	38.4	43.0
2015				
FGT(0)	7.4%	12.7%	23.2%	31.9%
FGT(0) excluding SA	7.9%	12.7%	23.3%	31.7%
FGT(0) including SA	6.5%	11.3%	21.7%	30.5%
FGT(1)	26.6	29.9	33.2	37.2
FGT(1) excluding SA	27.5	34.3	33.2	37.7
FGT(1) including SA	21.4	29.1	31.1	36.1
2019				
FGT(0)	5.8%	10.5%	20.2%	28.1%
FGT(0) excluding SA	6.4%	10.9%	19.9%	28.1%
FGT(0) including SA	4.5%	9.3%	18.7%	27.0%
FGT(1)	21.0	26.2	30.2	36.1
FGT(1) excluding SA	21.4	26.3	32.1	35.8
FGT(1) including SA	19.7	23.5	28.5	34.2

Notes: SA: Social Assistance. FGT (0) is equal to poverty rate, FGT(0) including SA is equal to poverty rate after child support included, and FGT(0) excluding SA refers to the poverty rate includes child support but excludes social assistance . FGT (1) is equal to poverty gap and FGT(1) including SA is equal to poverty gap after child support included and, FGT(1) excluding SA is equal to the poverty gap includes child support but excludes social assistance . We obtain the index values from TUFECPI for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

6. CONCLUSION

In this study, we want to answer the relationship between poverty and taxation. In addition to that, we want to estimate association between household characteristics and poverty variables since the identification of this relationship is important to build appropriate policy tools for reducing poverty.

When we look at the poverty rate over time, we see that there is serious decline in poverty rate from 2003 to 2019. The reason of this decline resulted from the fact that our absolute poverty threshold is constant but there is significant increase in real incomes over time. On the other hand, poverty gap and squared poverty gap did not decline as much as poverty rate. The reason of this could be that some of the poor people may go over the absolute poverty threshold but some of the poorest people fail to achieve sufficient income increase.

For the regression analysis, we found that there is inverse relationship between retirement income and poverty. It means that if the dominant household income is retirement income, this household is less likely to be poor. However, if there is any youth in household this household is more likely to be poor. Therefore, we use child support for to policy analysis tool to examine the effect of this policy on poverty. When we distribute 0.4 percent of total GDP as child and youth support to households with any youth in their house, then there is approximately one percent decline in disposable and consumable income for the poverty rate. For the poverty gap, this difference is generally more than one percent.

We have examined the poverty and taxation relationship within the following limitations. Firstly, we could not indicate regional poverty statistics since we use HBS as our main data resource and HBS does not include region information after 2003. We could use SILC for the regional poverty analysis, but SILC does not cover consumption related questions. Therefore, SILC is not useful for studying the relationship between indirect taxation and poverty. Secondly, the total amount of special consumption taxes estimated in our analysis do not match the administrative records for special consumption taxes. Thirdly, we made some assumptions to calculate income tax. For the wageworker, it is very common that a person's insurance is paid lower than what they actually earn. For the entrepreneur and farmers, we are not sure that there is no difference between the

income reported to interviewer and the income declared to the tax office or SGK. Therefore, there could be some misleading answers in HBS, and we need some assumptions to calculate income tax but of course it does not perfectly reflect the income tax paid to office tax or SGK.

The latest data we have belong to 2019 year. We could not analyze how the pandemic affect the poverty and taxation relationship since 2020 HBS will publish at the end of 2021 year. Therefore, future study on this issue could be the comparison between before and after pandemic taxation and poverty relationship.



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CURRICULUM VITAE

Personal Information

Name and surname: Yasin Tüzün

Academic Background

Bachelor's Degree Education:Boğaziçi University

Post Graduate Education

Foreign Languages:English

Work Experience

Institutions Served and Their Dates:

ANNEX A: ADDITIONAL TABLES

Table A.1: \$10 Absolute Poverty Measures for OECD scale

Absolute Poverty (OECD scale)					
2003	M	D*	D	C*	C
FGT(0)	13.9%	14.9%	14.4%	17.8%	19.3%
FGT(1)	32.3	30.9	30.1	30.9	31.8
FGT(2)	0.21	0.20	0.19	0.21	0.21
2007					
FGT(0)	9.4%	9.8%	8.7%	11.0%	13.0%
FGT(1)	36.0	35.3	32.0	35.0	36.3
FGT(2)	0.23	0.23	0.20	0.24	0.26
2011					
FGT(0)	8.9%	9.5%	7.9%	10.5%	12.9%
FGT(1)	38.7	37.9	32.8	38.9	44.8
FGT(2)	0.26	0.26	0.22	0.28	0.35
2015					
FGT(0)	4.2%	4.5%	2.9%	4.3%	5.9%
FGT(1)	32.5	32.0	20.1	25.3	28.1
FGT(2)	0.18	0.18	0.10	0.15	0.20
2019					
FGT(0)	3.1%	3.6%	1.9%	3.2%	4.3%
FGT(1)	34.0	29.2	18.6	22.1	24.9
FGT(2)	0.22	0.20	0.11	0.15	0.22

Notes: We explained market income(M) in section 3.2.1. D* is disposable income before social assistance . For the details of disposable income (D), see section 3.2.2. C* accounting for VAT but not SCT. For the details of C, see the section 3.2.3. FGT (0) refers to poverty rate, FGT (1) refers to poverty gap and FGT (2) refers to poverty square. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.2: Relative Poverty Measures for both OECD scale and Per Capita Level

2003	Relative Poverty (OECD scale)					Relative Poverty (per capita)				
	M	D*	D	C*	C	M	D*	D	C*	C
FGT(0)	21.1%	23.5%	23.0%	27.4%	29.3%	45.8%	50.1%	49.7%	54.6%	56.7%
FGT(1)	32.7	31.2	29.8	31.6	32.3	40.8	41.6	41.0	43.4	44.4
FGT(2)	0.20	0.19	0.18	0.20	0.21	0.24	0.24	0.24	0.26	0.26
2007										
FGT(0)	21.4%	24.0%	23.1%	27.6%	31.4%	44.5%	49.7%	49.0%	54.6%	57.7%
FGT(1)	38.5	35.3	32.8	35.3	35.9	40.4	41.2	40.0	42.5	44.4
FGT(2)	0.23	0.22	0.20	0.22	0.24	0.26	0.25	0.24	0.26	0.28
2011										
FGT(0)	22.5%	25.8%	23.2%	28.6%	33.0%	44.5%	49.6%	47.2%	53.7%	57.7%
FGT(1)	38.4	35.9	34.4	36.7	37.8	42.0	42.8	40.9	43.5	46.0
FGT(2)	0.25	0.24	0.22	0.25	0.34	0.27	0.27	0.25	0.27	0.30
2015										
FGT(0)	19.8%	23.7%	21.3%	26.7%	30.4%	41.5%	47.4%	45.0%	50.7%	54.2%
FGT(1)	30.6	30.5	28.2	30.9	32.9	38.3	40.7	38.4	41.2	43.2
FGT(2)	0.18	0.17	0.14	0.17	0.22	0.22	0.23	0.21	0.23	0.25
2019										
FGT(0)	18.4%	23.4%	20.7%	26.8%	30.4%	39.5%	46.1%	43.7%	49.9%	53.0%
FGT(1)	30.5	28.5	25.7	28.7	30.5	38.0	39.4	38.2	41.1	43.0
FGT(2)	0.18	0.17	0.13	0.15	0.19	0.22	0.23	0.20	0.23	0.25

Notes: We explained market income(M) in section 3.2.1. D* is disposable income before social assistance. For the details of disposable income (D), see section 3.2.2. C* accounting for VAT but not SCT. For the details of C, see the section 3.2.3. FGT (0) refers to poverty rate, FGT (1) refers to poverty gap and FGT (2) refers to poverty square. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1. We found that there is less than one percent difference between our disposable income poverty estimation and TURKSTAT official data and we explain this difference due to different data sets, while we are using HBS for our calculation, TURKSTAT uses SILC for their analysis.

Table A.3: 10\$ Absolute Poverty Entry-Exit (OECD Scale)

Entry	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2	1.1%	0.4%	0.7%	0.3%	0.5%
Disposable Income 3	1.0%	0.3%	0.3%	0.2%	0.2%
Consumable Income 1	4.2%	2.3%	2.5%	1.3%	1.2%
Consumable Income 2	5.7%	4.2%	4.8%	2.7%	2.4%
Marginal effect of AGI & Gtran	-	-	-	-	-
	0.1%	0.0%	0.3%	0.2%	0.3%
Marginal effect of VAT	3.2%	2.0%	2.2%	1.1%	1.0%
Marginal effect of SCT	1.5%	1.9%	2.3%	1.4%	1.1%
Exit	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2					
Disposable Income 3	0.5%	1.1%	1.3%	1.4%	1.5%
Consumable Income 1	0.3%	0.7%	0.8%	1.1%	1.2%
Consumable Income 2	0.3%	0.7%	0.7%	1.0%	1.1%

Notes: We explained market income in section 3.2.1. Disposable income* is disposable income before social assistance. For the details of disposable income, see section 3.2.2. Consumable income* accounting for VAT but not SCT. For the details of consumable income, see the section 3.2.3. AGI is equal to minimum subsistence allowance. Gtran refers to social assistance. VAT is value added tax and SCT is special consumption tax. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.4: Relative Poverty Entry-Exit (OECD Scale)

Entry	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2	2.4%	2.6%	3.3%	3.9%	5.0%
Disposable Income 3	2.3%	2.4%	1.8%	2.3%	3.0%
Consumable Income 1	6.5%	6.6%	6.7%	7.3%	8.8%
Consumable Income 2	8.4%	10.2%	11.0%	10.8%	12.4%
Marginal effect of AGI & govt tran.	-0.1%	-0.2%	-1.4%	-1.7%	-2.0%
Marginal effect of VAT	4.2%	4.2%	4.9%	5.0%	5.8%
Marginal effect of SCT	1.9%	3.6%	4.3%	3.6%	3.6%
Exit	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2					
Disposable Income 3	0.4%	0.7%	1.1%	0.8%	0.7%
Consumable Income 1	0.2%	0.4%	0.6%	0.4%	0.4%
Consumable Income 2	0.2%	0.2%	0.5%	0.3%	0.3%

Notes: We explained market income in section 3.2.1. Disposable income* is disposable income before social assistance. For the details of disposable income, see section 3.2.2. Consumable income* accounting for VAT but not SCT. For the details of consumable income, see the section 3.2.3. AGI is equal to minimum subsistence allowance. Gtran refers to social assistance. VAT is value added tax and SCT is special consumption tax. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.5: Relative Poverty Entry-Exit (Per Capita)

Entry	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2	4.3%	5.2%	5.0%	5.9%	6.6%
Disposable Income 3	4.2%	4.9%	3.4%	4.0%	4.6%
Consumable Income 1	9.0%	10.3%	9.5%	9.5%	10.6%
Consumable Income 2	11.1%	13.3%	13.4%	12.9%	13.8%
Marginal effect of AGI & govt tran.	-0.1%	-0.3%	-1.6%	-1.9%	-2.0%
Marginal effect of VAT	4.8%	5.4%	6.1%	5.5%	6.0%
Marginal effect of SCT	2.0%	3.1%	3.9%	3.4%	3.2%
Exit	2003	2007	2011	2015	2019
Market Income					
Disposable Income 2					
Disposable Income 3	0.3%	0.4%	0.7%	0.4%	0.4%
Consumable Income 1	0.2%	0.2%	0.4%	0.2%	0.2%
Consumable Income 2	0.1%	0.1%	0.3%	0.2%	0.2%

Notes: We explained market income in section 3.2.1. Disposable income* is disposable income before social assistance. For the details of disposable income, see section 3.2.2. Consumable income* accounting for VAT but not SCT. For the details of consumable income, see the section 3.2.3. AGI is equal to minimum subsistence allowance. Gtran refers to social assistance. VAT is value added tax and SCT is special consumption tax. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.6: Absolute Poverty Distribution from Market to Disposable Income*

2003	disposable income* distribution				
	M distr	high inc	middle inc	Vulnerable poor	Very poor
high inc	3.5%	79.6%	20.4%	0.0%	0.0%
middle inc	46.4%	0.0%	90.4%	9.6%	0.0%
vulnerable poor	25.9%	0.0%	0.0%	91.8%	8.2%
very poor	24.2%	0.0%	0.0%	0.0%	100.0%
D* distr		2.8%	42.6%	28.3%	26.3%
2007					
high inc	4.9%	71.7%	28.3%	0.0%	0.0%
middle inc	61.7%	0.0%	92.5%	7.5%	0.0%
vulnerable poor	16.7%	0.0%	0.0%	94.3%	5.7%
very poor	16.7%	0.0%	0.0%	0.0%	100.0%
D* distr		3.5%	58.4%	20.4%	17.7%
2011					
high inc	7.3%	73.6%	26.4%	0.0%	0.0%
middle inc	60.2%	0.0%	93.9%	6.1%	0.0%
vulnerable poor	16.7%	0.0%	0.0%	93.0%	7.0%
very poor	15.8%	0.0%	0.0%	0.0%	100.0%
D* distr		8.4%	64.2%	15.6%	11.8%
2015					
high inc	11.3%	72.4%	27.6%	0.0%	0.0%
middle inc	66.9%	0.0%	94.0%	6.0%	0.0%
vulnerable poor	13.7%	0.0%	0.0%	89.8%	10.2%
very poor	8.2%	0.0%	0.0%	0.0%	100.0%
D* distr		8.2%	66.0%	16.3%	9.6%
2019					
high inc	13.7%	69.9%	30.1%	0.0%	0.0%
middle inc	67.7%	0.0%	93.1%	6.9%	0.0%
vulnerable poor	11.9%	0.0%	0.0%	90.0%	10.0%
very poor	6.7%	0.0%	0.0%	0.0%	100.0%
D* distr		9.6%	67.2%	15.4%	7.9%

Notes: We define a household as 'high-income' if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.7: Absolute Poverty Distribution from Market to Consumable Income*

2003	M distr	consumable income* distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	3.5%	67.6%	32.4%	0.0%	0.0%
middle inc	46.4%	0.0%	80.4%	19.5%	0.1%
vulnerable poor	25.9%	0.0%	0.6%	75.9%	23.5%
very poor	24.2%	0.0%	0.1%	1.0%	98.9%
C* distr		2.4%	38.6%	29.0%	30.1%
2007					
high inc	4.9%	59.7%	40.3%	0.0%	0.0%
middle inc	61.7%	0.0%	84.9%	15.0%	0.1%
vulnerable poor	16.7%	0.0%	1.8%	75.8%	22.4%
very poor	16.7%	0.0%	0.4%	2.6%	97.0%
C* distr		3.0%	54.7%	22.3%	20.0%
2011					
high inc	7.3%	63.0%	37.0%	0.0%	0.0%
middle inc	60.2%	0.0%	87.8%	12.0%	0.2%
vulnerable poor	16.7%	0.0%	2.8%	77.1%	20.1%
very poor	15.8%	0.0%	0.4%	4.5%	95.1%
C* distr		4.6%	56.1%	20.8%	18.5%
2015					
high inc	11.3%	63.9%	36.1%	0.0%	0.0%
middle inc	66.9%	0.0%	88.9%	11.0%	0.1%
vulnerable poor	13.7%	0.0%	3.0%	74.6%	22.4%
very poor	8.2%	0.0%	1.2%	6.7%	92.1%
C* distr		7.2%	64.0%	18.1%	10.7%
2019					
high inc	13.7%	62.2%	37.8%	0.0%	0.0%
middle inc	67.7%	0.0%	89.1%	10.5%	0.4%
vulnerable poor	11.9%	0.0%	2.9%	77.7%	19.4%
very poor	6.7%	0.0%	3.0%	9.2%	87.8%
C* distr		8.5%	66.1%	17.0%	8.5%

Notes: We define a household as 'high-income' if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.8: Absolute Poverty Distribution from Disposable* to Disposable Income

2003	D* distr	disposable income distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	2.8%	100.0%	0.0%	0.0%	0.0%
middle inc	42.6%	0.0%	100.0%	0.0%	0.0%
vulnerable poor	28.3%	0.0%	1.5%	98.5%	0.0%
very poor	26.3%	0.0%	0.1%	1.9%	98.0%
Ddistr		2.8%	43.1%	28.3%	25.8%
2007					
high inc	3.5%	100.0%	0.0%	0.0%	0.0%
middle inc	58.4%	0.0%	100.0%	0.0%	0.0%
vulnerable poor	20.4%	0.0%	4.2%	95.8%	0.0%
very poor	17.7%	0.0%	0.4%	5.2%	94.4%
Ddistr		3.6%	59.3%	20.4%	16.7%
2011					
high inc	5.4%	100.0%	0.0%	0.0%	0.0%
middle inc	58.5%	0.5%	99.5%	0.0%	0.0%
vulnerable poor	19.2%	0.0%	12.8%	87.2%	0.0%
very poor	17.0%	0.0%	0.8%	12.6%	86.6%
Ddistr		5.7%	60.8%	18.9%	14.7%
2015					
high inc	8.2%	100.0%	0.0%	0.0%	0.0%
middle inc	66.0%	0.8%	99.2%	0.0%	0.0%
vulnerable poor	16.3%	0.0%	15.7%	84.3%	0.0%
very poor	9.6%	0.0%	1.7%	20.9%	77.4%
Ddistr		8.7%	68.1%	15.7%	7.4%
2019					
high inc	9.6%	100.0%	0.0%	0.0%	0.0%
middle inc	67.2%	1.1%	98.9%	0.0%	0.0%
vulnerable poor	15.4%	0.0%	18.6%	81.5%	0.0%
very poor	7.9%	0.0%	3.2%	23.2%	73.7%
Ddistr		10.3%	69.5%	14.4%	5.8%

Notes: We define a household as 'high-income if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.9: Absolute Poverty Distribution from Disposable to Consumable Income*

2003	D distr	consumable income* distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	2.8%	84.9%	15.1%	0.0%	0.0%
middle inc	43.1%	0.0%	88.5%	11.4%	0.1%
vulnerable poor	28.3%	0.0%	0.0%	85.0%	15.0%
very poor	25.8%	0.0%	0.0%	0.0%	100.0%
C* distr		2.4%	38.6%	29.0%	30.1%
2007					
high inc	3.6%	83.2%	16.8%	0.0%	0.0%
middle inc	59.3%	0.0%	91.2%	8.7%	0.1%
vulnerable poor	20.4%	0.0%	0.0%	83.9%	16.1%
very poor	16.7%	0.0%	0.0%	0.0%	100.0%
C* distr		3.0%	54.7%	22.3%	20.0%
2011					
high inc	5.7%	81.4%	18.6%	0.0%	0.0%
middle inc	60.8%	0.0%	90.6%	9.3%	0.2%
vulnerable poor	18.9%	0.0%	0.0%	80.4%	19.6%
very poor	14.7%	0.0%	0.0%	0.0%	100.0%
C* distr		4.6%	56.1%	20.8%	18.5%
2015					
high inc	8.7%	82.8%	17.2%	0.0%	0.0%
middle inc	68.1%	0.0%	91.8%	8.2%	0.1%
vulnerable poor	15.7%	0.0%	0.0%	79.7%	20.3%
very poor	7.4%	0.0%	0.0%	0.0%	100.0%
C* distr		7.2%	64.0%	18.1%	10.7%
2019					
high inc	10.3%	82.5%	17.5%	0.0%	0.0%
middle inc	69.5%	0.0%	92.5%	7.2%	0.3%
vulnerable poor	14.4%	0.0%	0.0%	83.2%	16.8%
very poor	5.8%	0.0%	0.0%	0.0%	100.0%
C* distr		8.5%	66.1%	17.0%	8.5%

Notes: We define a household as 'high-income' if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

Table A.10: Absolute Poverty Distribution from Consumable* to Consumable Income

2003	C* distr	consumable income distribution			
		high inc	middle inc	vulnerable poor	very poor
high inc	2.4%	92.6%	7.4%	0.0%	0.0%
middle inc	38.6%	0.0%	94.5%	5.4%	0.1%
vulnerable poor	29.0%	0.0%	0.0%	92.9%	7.1%
very poor	30.1%	0.0%	0.0%	0.0%	100.0%
C distr		2.2%	36.6%	29.0%	32.2%
2007					
high inc	3.0%	89.9%	10.1%	0.0%	0.0%
middle inc	54.7%	0.0%	94.0%	5.9%	0.1%
vulnerable poor	22.3%	0.0%	0.0%	89.9%	10.1%
very poor	20.0%	0.0%	0.0%	0.0%	100.0%
C distr		2.7%	51.7%	23.3%	22.4%
2011					
high inc	4.6%	82.5%	17.2%	0.0%	0.3%
middle inc	56.1%	0.0%	91.9%	7.6%	0.5%
vulnerable poor	20.8%	0.0%	0.0%	86.1%	13.9%
very poor	18.5%	0.0%	0.0%	0.0%	100.0%
C distr		3.8%	52.3%	22.2%	21.7%
2015					
high inc	7.2%	89.1%	10.8%	0.0%	0.2%
middle inc	64.0%	0.0%	95.1%	4.5%	0.4%
vulnerable poor	18.1%	0.0%	0.0%	90.4%	9.6%
very poor	10.7%	0.0%	0.0%	0.0%	100.0%
C distr		6.4%	61.7%	19.3%	12.7%
2019					
high inc	8.5%	89.7%	10.3%	0.0%	0.1%
middle inc	66.1%	0.0%	96.0%	3.7%	0.3%
vulnerable poor	17.0%	0.0%	0.0%	89.0%	11.0%
very poor	8.5%	0.0%	0.0%	0.0%	100.0%
C distr		7.6%	64.3%	17.6%	10.5%

Notes: We define a household as 'high-income if their per capita income is more than \$50, 'middle income' if their per capita income is between \$10 and \$50, 'vulnerable poor' if their per capita income is between \$5.5 and \$10, and 'very poor' if their per capita income is less than \$5.5. We obtain the index values from (CPI) for 2003= 4.2307, 2007= 3.0219, 2011= 2.1932, 2015=1.6343, 2019=1.

ANNEX B: ADDITIONAL FIGURES

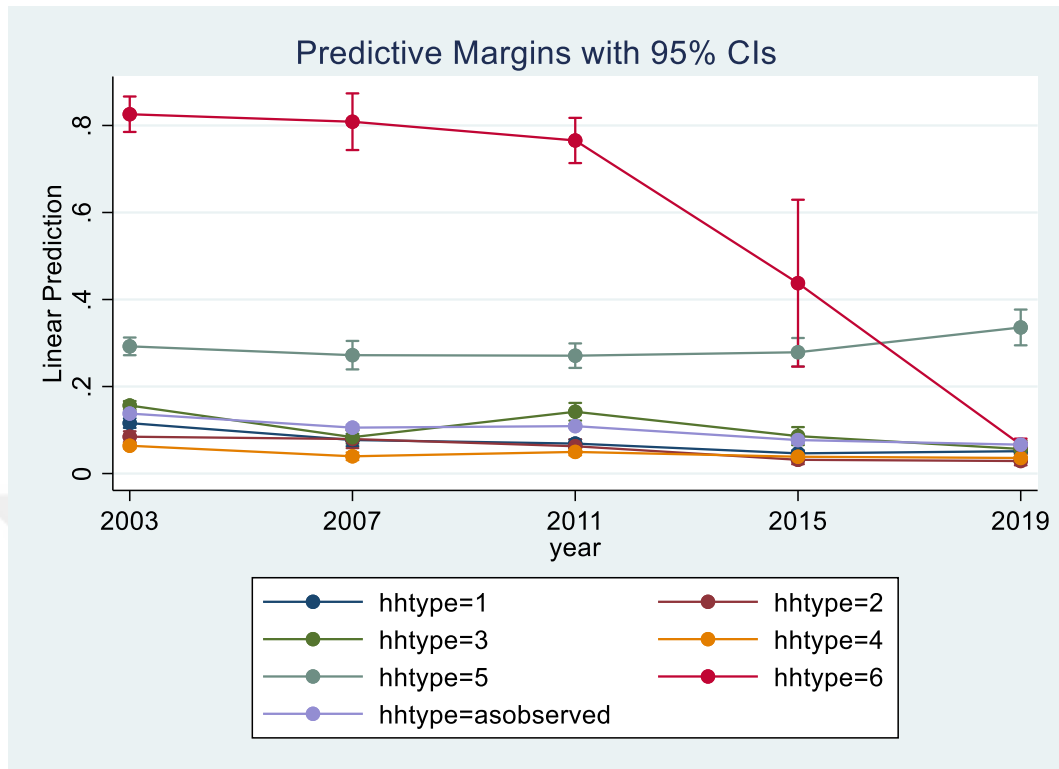


Figure B.1: Market Income Household Type (5.5 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

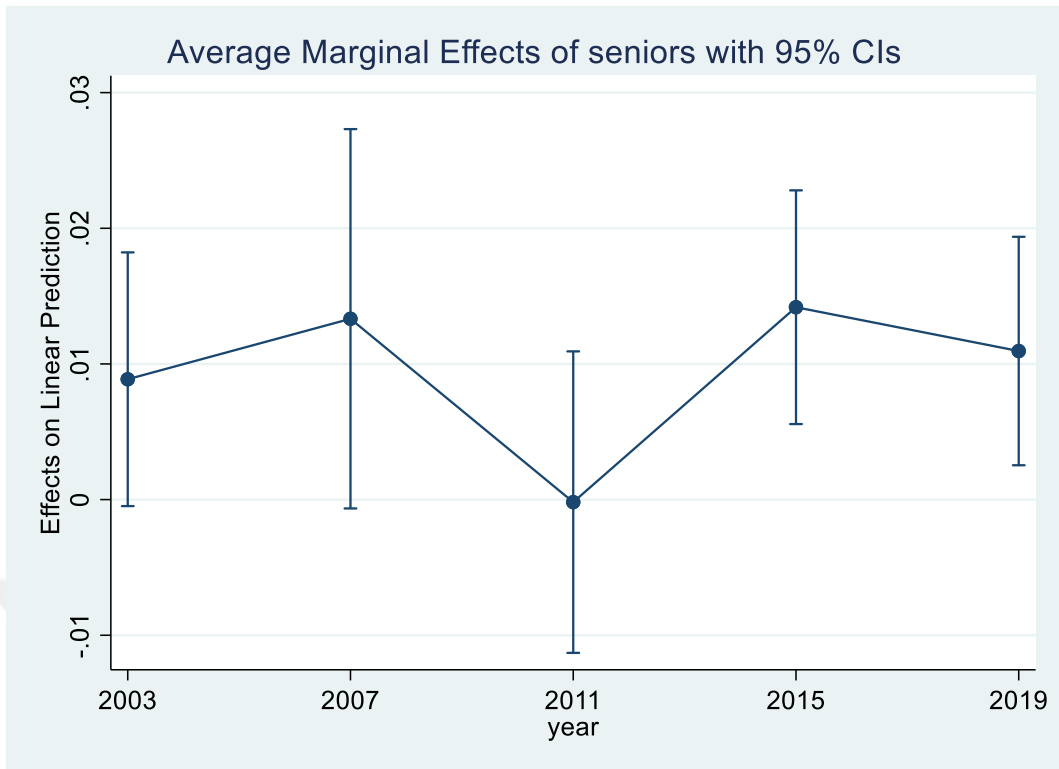


Figure B.2: Market Income Seniors (5.5 PPP USD per day)

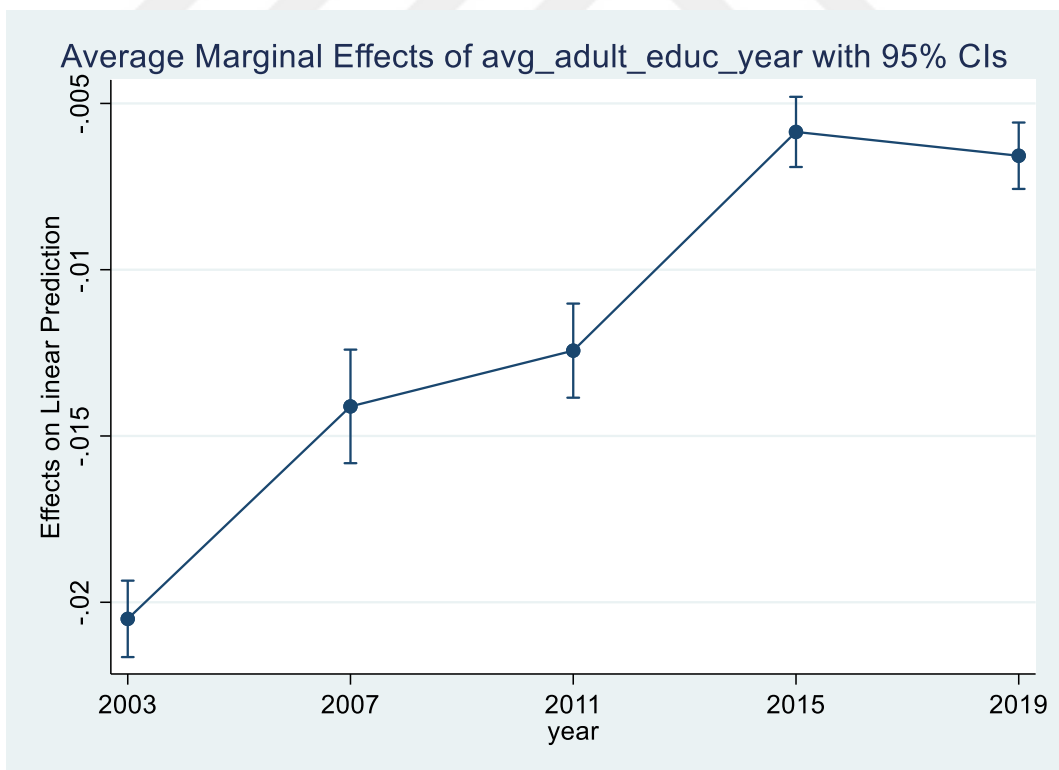


Figure B.3: Market Income Average Adult Education Year (5.5 PPP USD per day)

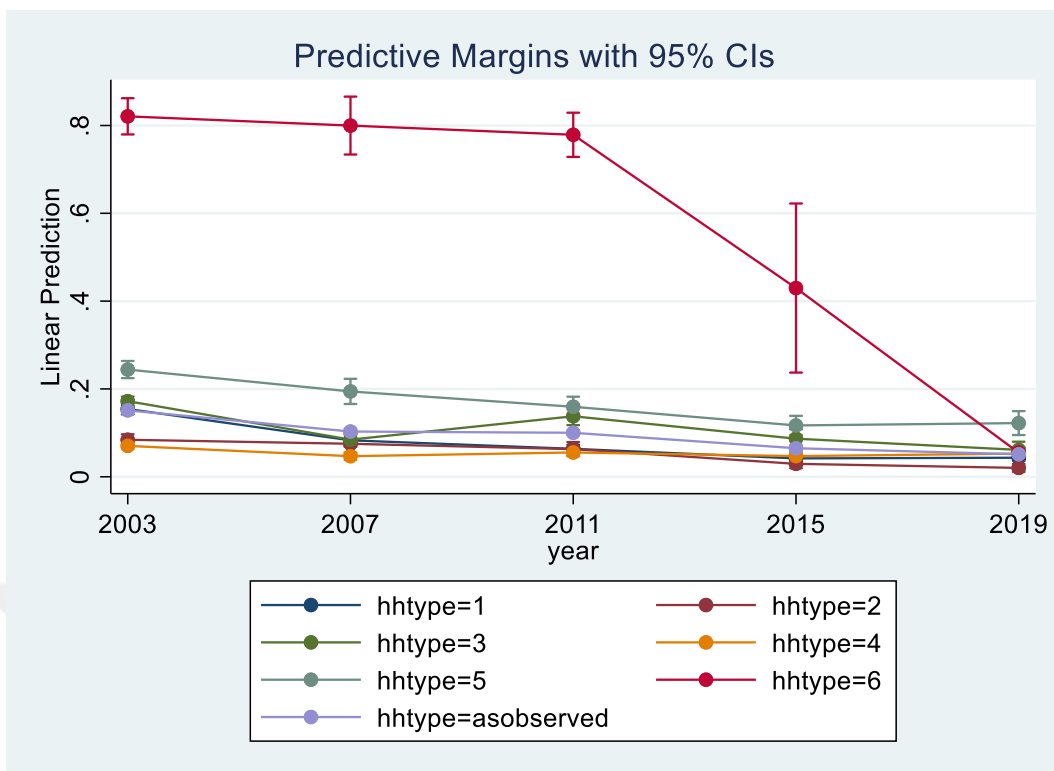


Figure B.4: Disposable Income Household Type (5.5 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

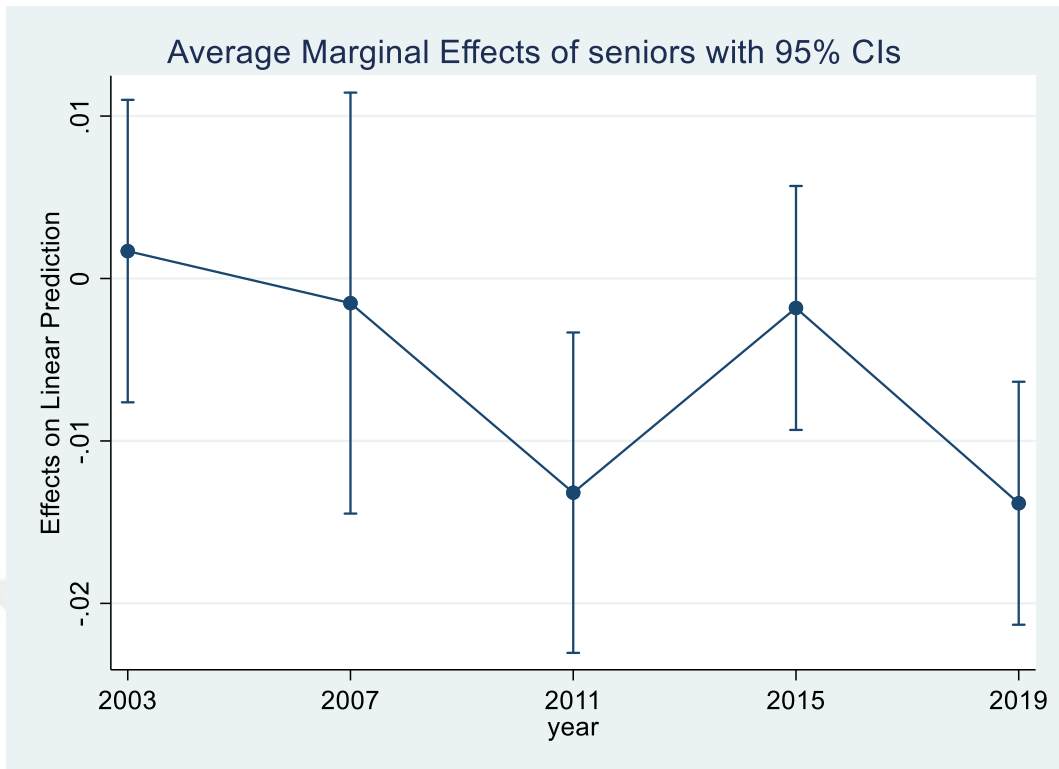


Figure B.5: Disposable Income Seniors (5.5 PPP USD per day)

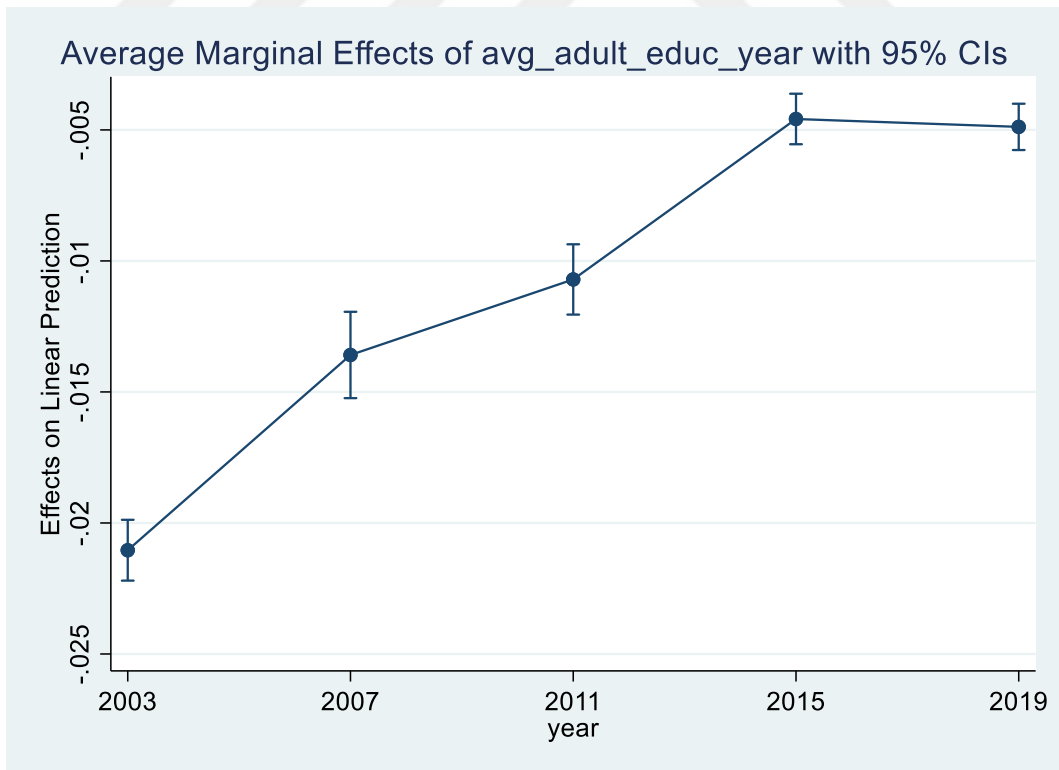


Figure B.6: Disposable Income Average Adult Education Year (5.5 PPP USD per day)

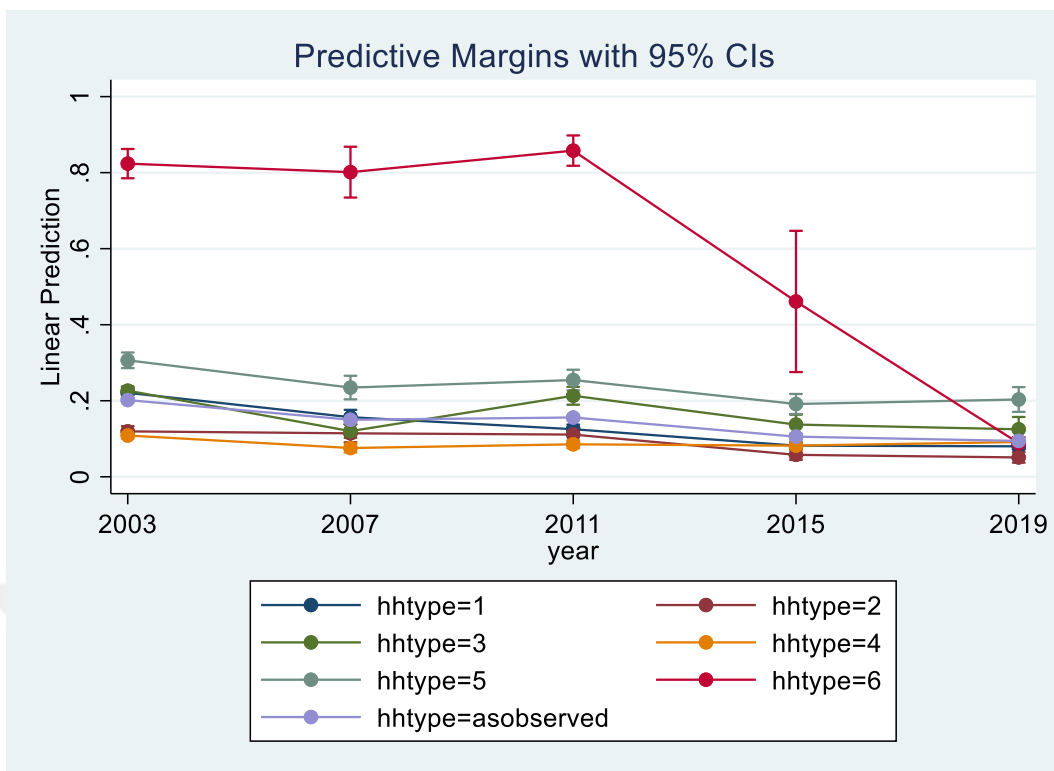


Figure B.7: Consumable Income Household Type (5.5 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

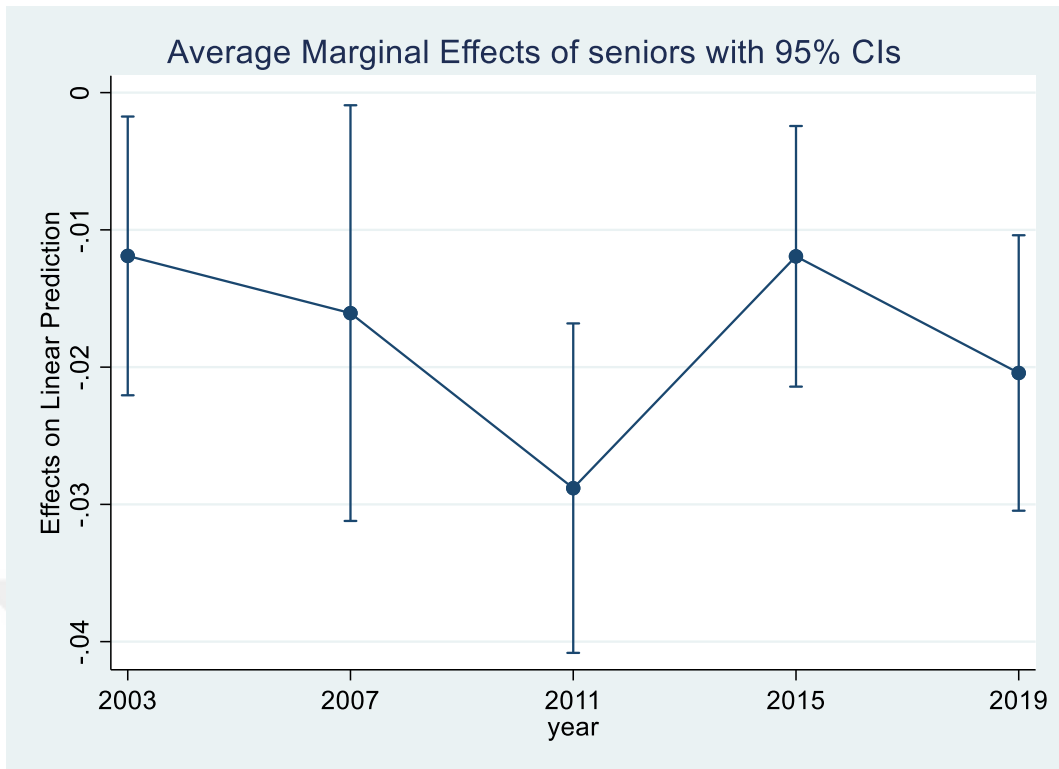


Figure B.8: Consumable Income Seniors (5.5 PPP USD per day)

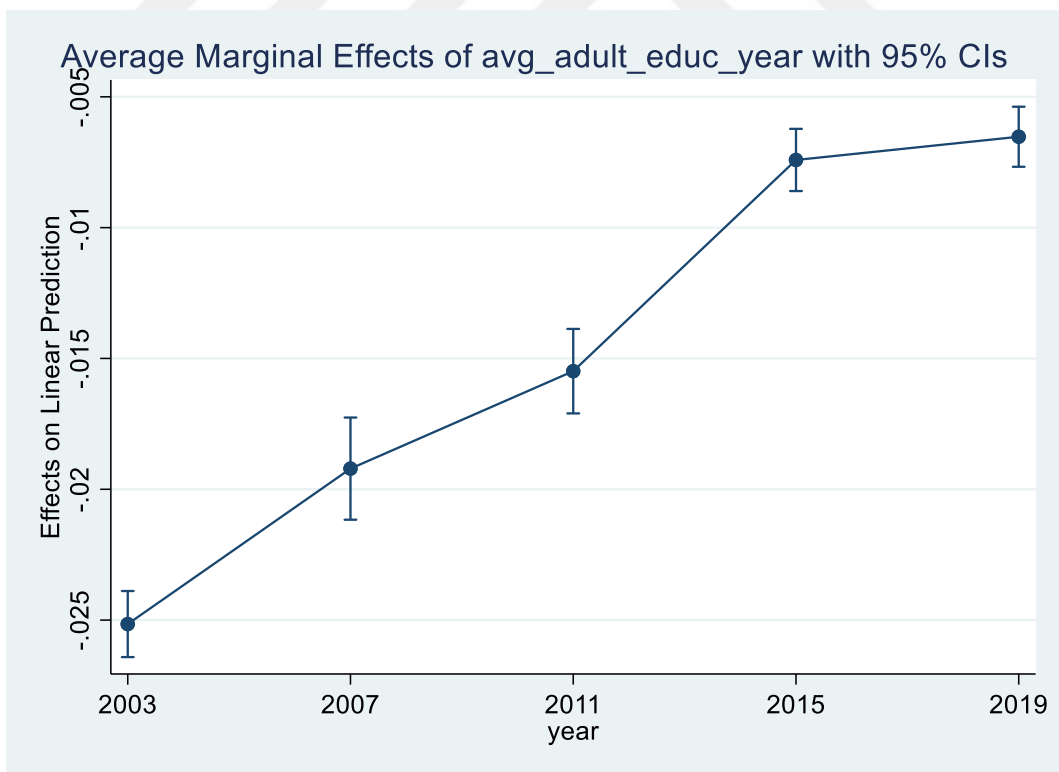


Figure B.9: Consumable Income Average Adult Education Year (5.5 PPP USD per day)

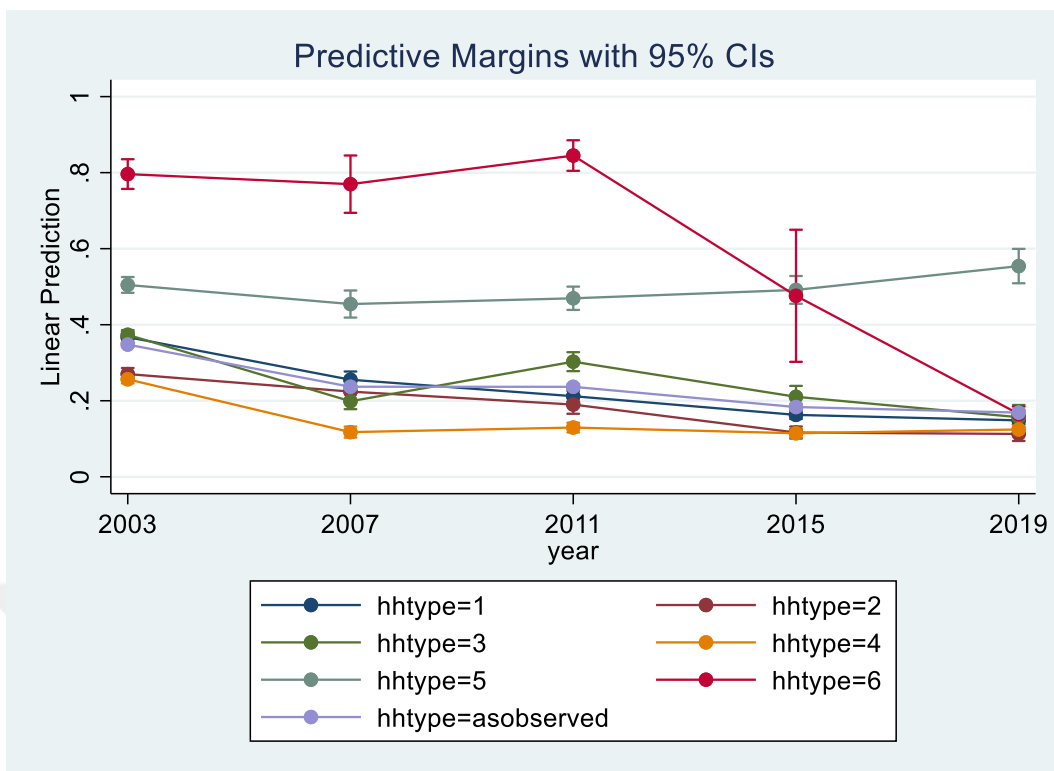


Figure B.10: Market Income Household Type (10 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

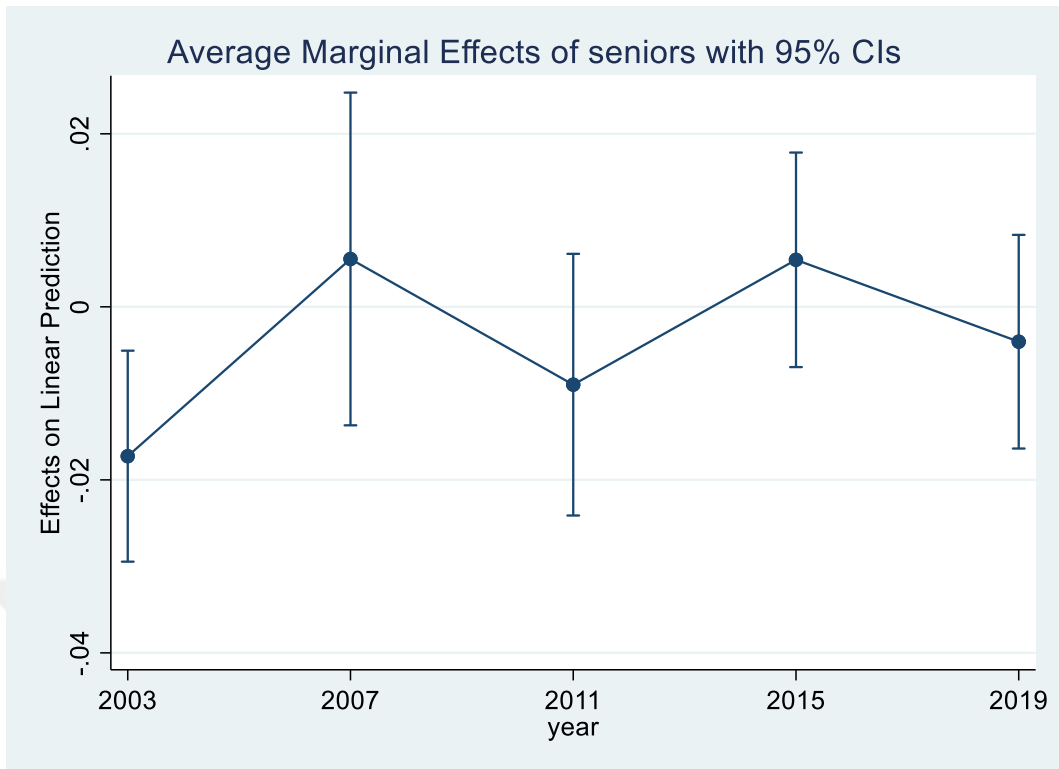


Figure B.11: Market Income Seniors (10 PPP USD per day)

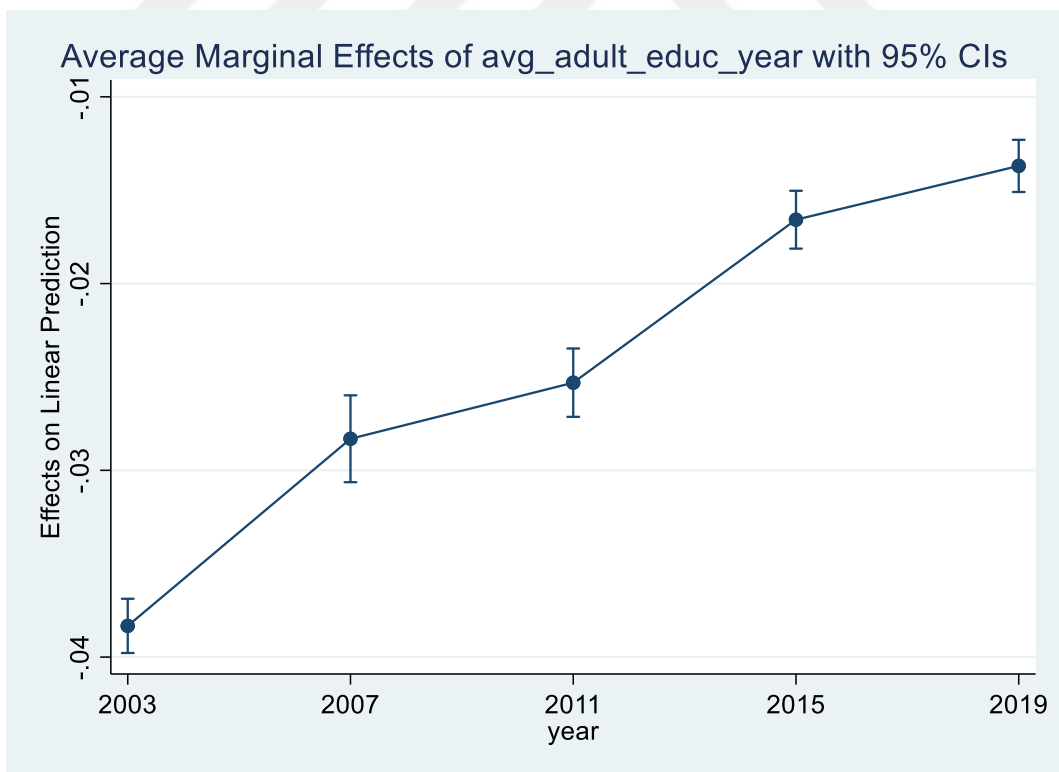


Figure B.12: Market Income Average Adult Education Year (10 PPP USD per day)

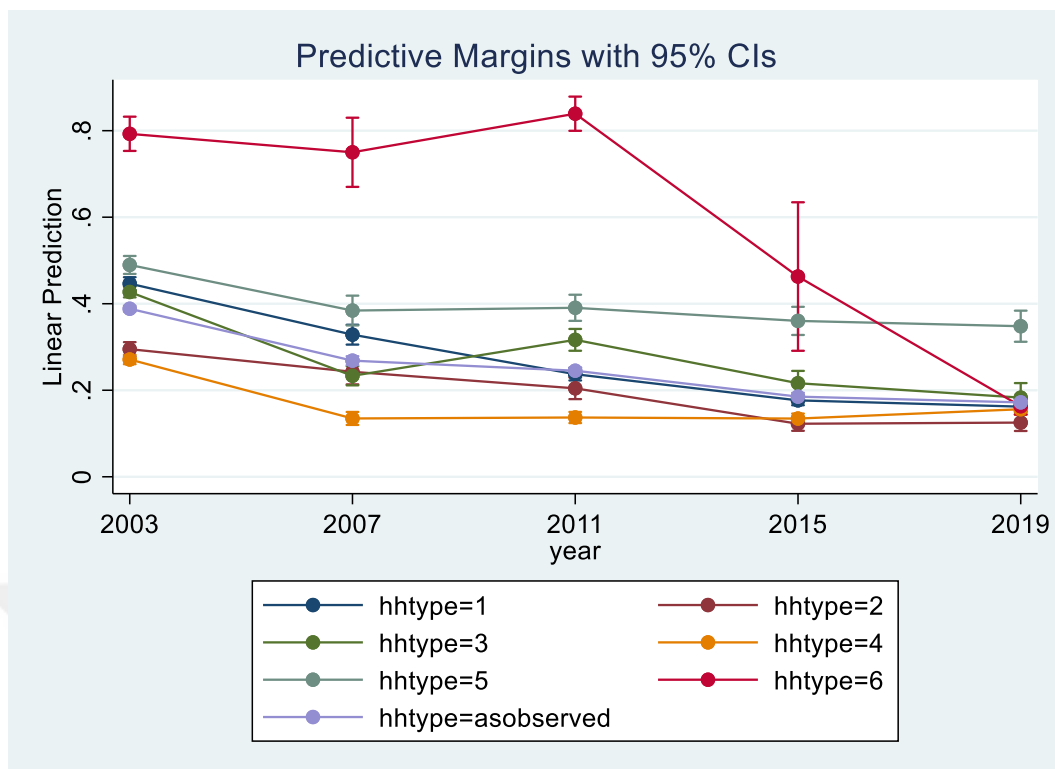


Figure B.13: Disposable Income Household Type (10 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

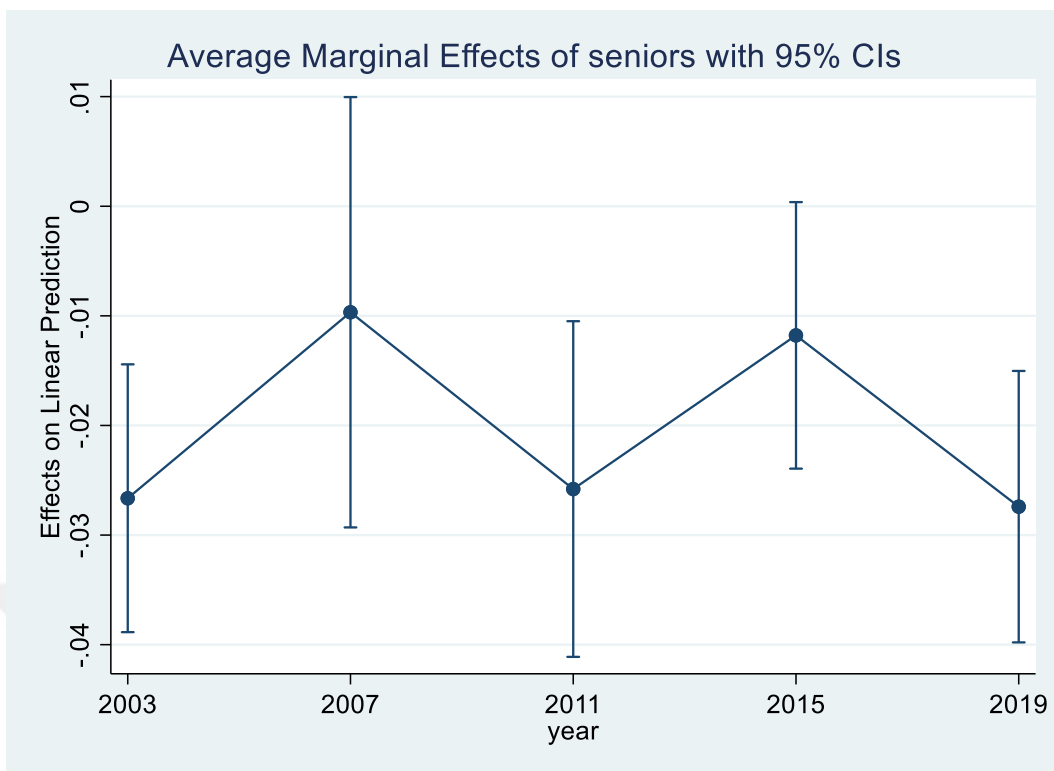


Figure B.14: Disposable Income Seniors (10 PPP USD per day)

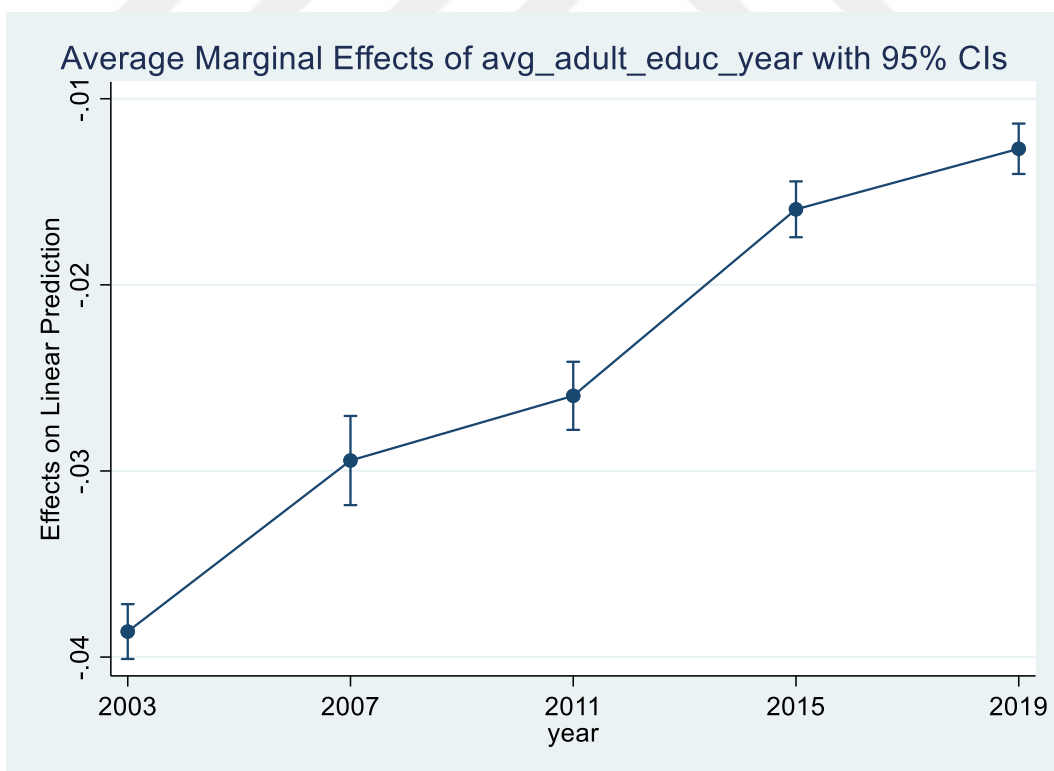


Figure B.15: Disposable Income Average Adult Education Year (10 PPP USD per day)

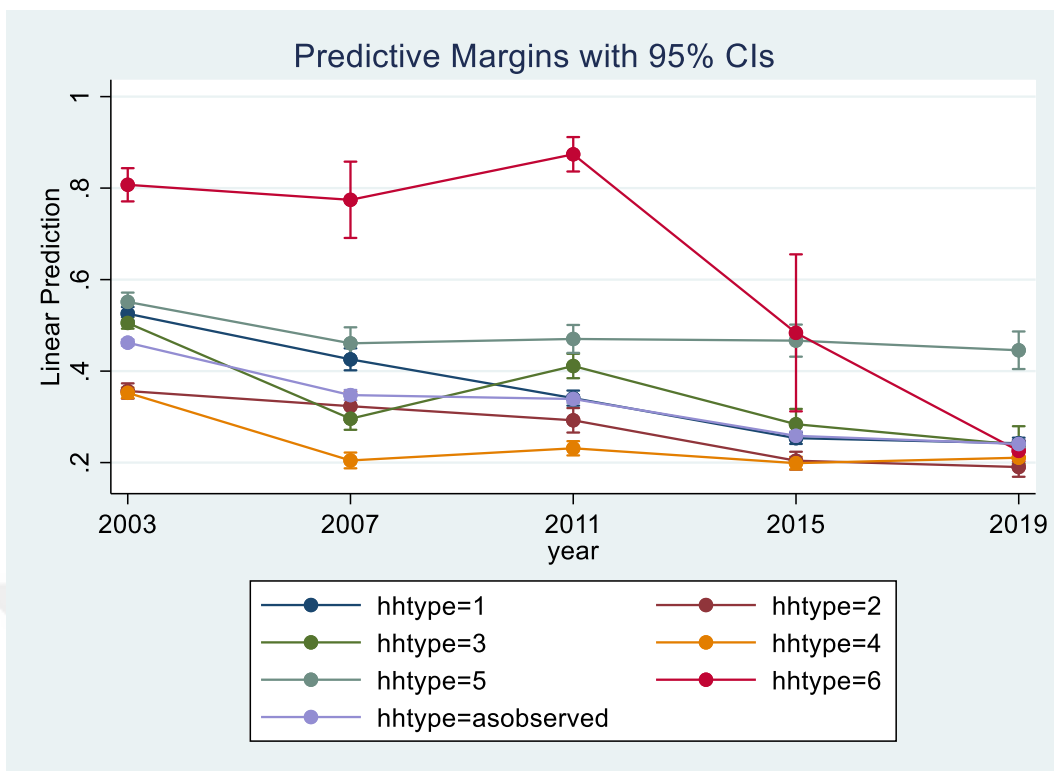


Figure B.16: Consumable Income Household Type (10 PPP USD per day)

Notes: For the household type, hhtype 1 is wage income, hhtype 2 is entrepreneur, hhtype 3 is rentier, hhtype 4 is retirement, hhtype 5 is social transfers, and hhtype 6 is no dominant income type.

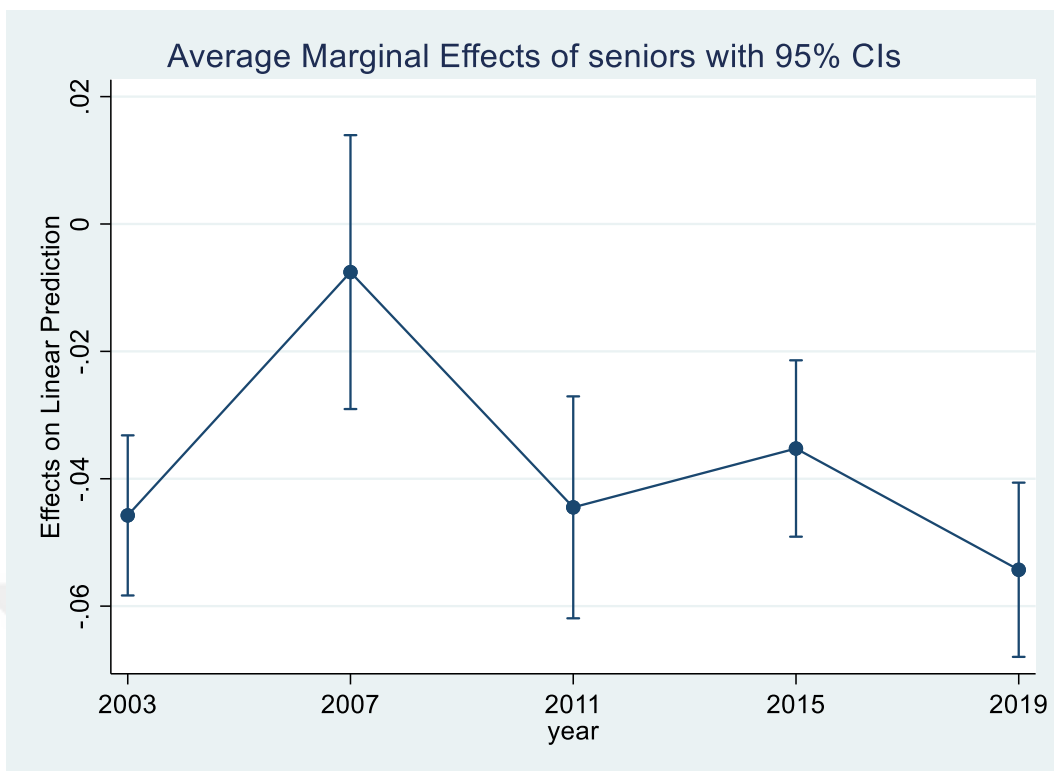


Figure B.17: Consumable Income Seniors (10 PPP USD per day)

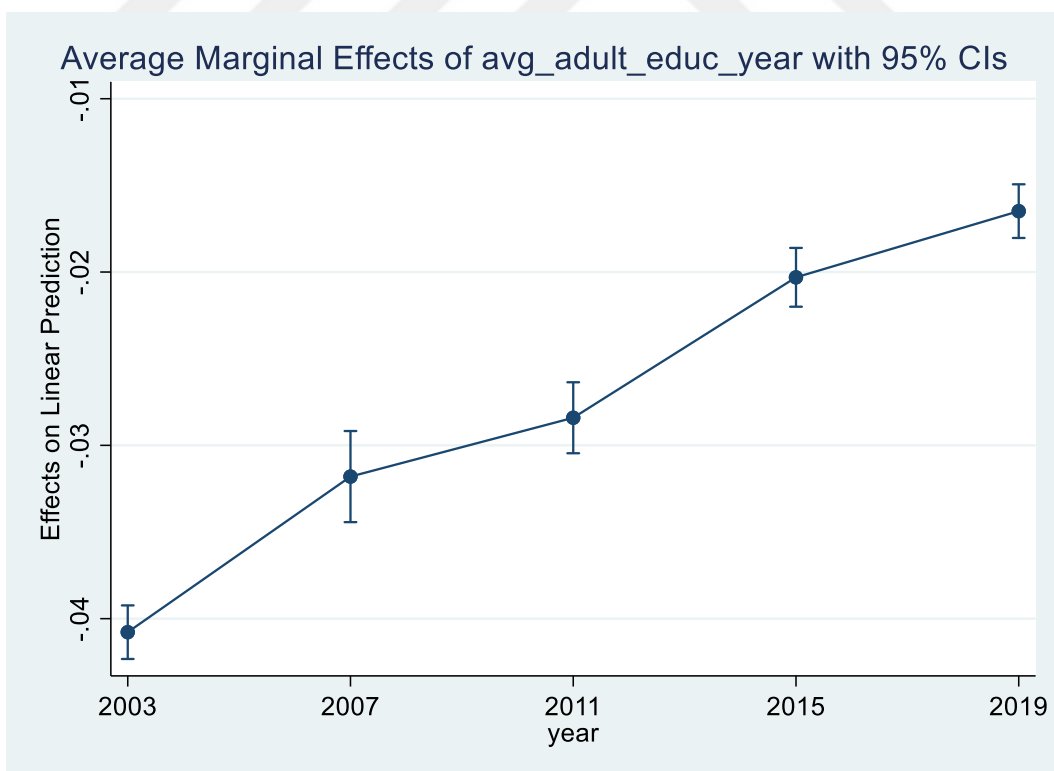


Figure B.18: Consumable Income Average Adult Education Year (10 PPP USD per day)