THE REPUBLIC OF TURKEY
CUKUROVA UNIVERSITY
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DEPARTMENT OF ECONOMICS

THREE ESSAYS ON POVERTY ALLEVIATION PROGRAMMES: BASIC INCOME, NEGATIVE INCOME TAX AND CHILD BENEFIT

ZEYNEP GIZEM CAN

DOCTORAL THESIS

ADANA / 2022

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Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Müdürlüğüne;

Bu çalışma, jürimiz tarafından İKTİSAT Ana Bilim Dalında DOKTORA TEZİ olarak kabul edilmiştir.

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ÖZET

YOKSULLUĞU AZALTMA PROGRAMLARI ÜZERİNE ÜÇ DENEME: TEMEL GELİR, NEGATİF GELİR VERGİSİ VE ÇOCUK YARDIMI

ZEYNEP GİZEM CAN

Doktora Tezi, İktisat Ana Bilim Dalı
Danışman: Prof. Dr. Harun BAL
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Sosyal politika iktisadı ile birlikte önem kazanan yoksullukla mücadele, kalkınma iktisadı literatüründe yapılan çalışmaların odak noktasını oluşturmaktadır. Bu tezde, yoksullukla mücadelede öne çıkan konular arasında yer alan; temel gelir, negatif gelir vergisi ve çocuk yardımı politikaları, birey ve hane bazında geniş bir veri seti ve mikrosimülasyon yöntemi kullanılarak incelenmektedir.

Birinci Bölüm çalışmanın çerçevesini, amacını ve organizasyonunu ortaya koymaktadır. İkinci Bölüm yoksulluk kavramı ile ilgili teorik çerçeveyi, yoksulluk ve gelir dağılımı ile ilgili önemli göstergeleri ve Türkiye'deki sosyal politikaların ve yardımların kapsamlarını açıklamaktadır.

Üçüncü Bölüm, yoksulluk problemine birinci çözüm olarak sunulan temel gelir politikasının etkinliğini incelemektedir. Temel gelir, bireylerin gelir düzeyinden ve çalışma koşullarından bağımsız olarak devlet tarafından tüm vatandaşlara ödenecek nakdi geliri ifade etmektedir. TÜİK tarafından 2018 yılında derlenen ve 2020 yılında yayınlanan Gelir ve Yaşam Koşulları anketindeki birey ve hane verileri birleştirilerek mikrosimülasyon analizi yapılmaktadır. Yoksulluk sınırı olarak da adlandırılan medyan gelirin %50'si kişi başı temel gelir olarak kabul edilmekte ve eşdeğerlik ölçütüne göre hanehalkına verilmektedir. Bütçe denkliğini sağlayabilmek için, başlangıçtaki vergi geliri ve temel gelir desteği toplamı kadar nihai vergi toplanmakta, vergilendirme sabit oranlı ve artan oranlı vergilendirme şeklinde iki farklı vergilendirme şeması ile yapılmaktadır. Hane bazlı analiz sonuçlarına göre, temel gelirin sabit oranlı vergi ile finanse edilmesi sonucunda Atkinson endeksi 0.123'ten 0.040'a, Gini endeksi 0.381'den 0.202'ye, Theil endeksi ise 0.284'ten 0.095'e gerilemektedir. Temel gelirin artan oranlı vergi ile finanse edilmesi sonucunda ise Atkinson endeksi 0.123'ten 0.034'e, Gini endeksi 0.381'den

0.190'a, Theil endeksi ise 0.284'ten 0.079'a düşmektedir. Bu durum, temel gelir politikasının gelir dağılımı eşitsizliğini azalttığını ve artan oranlı vergilendirme stratejisinin daha etkin olduğunu ortaya koymaktadır. Denk bütçe kapsamında nihai durumda hanehalklarından %62.01 sabit oranlı vergi veya başlangıçtaki vergi yükünün 2.89 katı vergi alınması gerektiği gösterilmektedir. Temel gelir vergiden muaf olduğu için minimum garanti edilmiş gelir olarak da tanımlanmaktadır. Tüm hanelerin gelirlerinin yoksulluk sınırının üzerinde veya eşit olması nedeniyle yoksulluk ortadan kaldırılmaktadır

Dördüncü Bölüm, yoksulluk problemine ikinci çözüm olarak sunulan negatif gelir vergisi politikasının etkinliğini ortaya koymaktadır. Negatif gelir vergisi, belirli bir eşik değer altında geliri olan hanelerin vergi ödemesi almasına, belirlenen eşik değerin üzerinde geliri olan hanelerin ise ödenecek vergi ödemelerini finanse etmesine dayanan politikayı ifade etmektedir. TÜİK tarafından 2018 yılında derlenen ve 2020 yılında yayınlanan Gelir ve Yaşam Koşulları anketinde seçilen birey ve hane verileri birleştirilerek mikrosimülasyon analizi yapılmaktadır. Medyan gelir eşik değer olarak kabul edilmekte, eşik değerin altında eşdeğer geliri olan hanelere eşik değer ile eşdeğer hane gelirinin farkının yarısı kadar vergi ödemesi yapılmaktadır. Bütçe denkliğini sağlayabilmek için, başlangıçtaki vergi geliri ve negatif gelir vergisi ödemesi toplamı kadar nihai vergi toplanmakta, vergilendirme sabit oranlı ve artan oranlı vergilendirme şeklinde iki farklı vergilendirme şeması ile yapılmaktadır. Hane bazlı analiz sonuçlarına göre, temel gelirin sabit oranlı vergi ile finanse edilmesi sonucunda Atkinson endeksi 0.123'ten 0.055'e, Gini endeksi 0.381'den 0.240'a, Theil endeksi ise 0.284'ten 0.133'e gerilemektedir. Temel gelirin artan oranlı vergi ile finanse edilmesi sonucunda ise Atkinson endeksi 0.123'ten 0.044'e, Gini endeksi 0.381'den 0.216'ya, Theil endeksi ise 0.284'ten 0.104'a düşmektedir. Bu durum, negatif gelir vergisi politikasının gelir dağılımı eşitsizliğini azalttığını ve artan oranlı vergilendirme stratejisinin daha etkin olduğunu ortaya koymaktadır. Denk bütçe kapsamında nihai durumda hanehalklarından %41.94 sabit oranlı vergi veya başlangıçtaki vergi yükünün 1.85 katı vergi alınması gerektiği gösterilmektedir. Hiç geliri olmayan bir hane bile yoksulluk eşiği kadar vergi ödemesi alacağı için, negatif gelir vergisi minimum garanti edilmiş gelir olarak da tanımlanmaktadır. Tüm hanelerin gelirlerinin yoksulluk sınırının üzerinde veya eşit olması nedeniyle yoksulluk ortadan kaldırılmaktadır.

Beşinci Bölüm, yoksulluk problemine üçüncü çözüm olarak sunulan çocuk yardımı politikasının etkinliğini göstermektedir. Çocuk yardımı, yoksulluk sınırı altındaki

çocuklu ailelere verilen nakdi gelir yardımını ifade etmektedir. TÜİK tarafından 2018 yılında derlenen ve 2020 yılında yayınlanan Gelir ve Yaşam Koşulları anketinde seçilen birey ve hane verileri birleştirilerek mikrosimülasyon analizi yapılmaktadır. Yoksulluk sınırının altında eşdeğer geliri olan çocuklu hanelere yoksulluk sınırı ile hanelerin eşdeğer geliri farkı kadar çocuk yardımı yapılmaktadır. Bütçe denkliğini sağlayabilmek için, başlangıçtaki vergi geliri ve çocuk yardımı ödemesi toplamı kadar nihai vergi toplanmakta, vergilendirme sabit oranlı ve artan oranlı vergilendirme şeklinde iki farklı vergilendirme şeması ile yapılmaktadır. Hane bazlı analiz sonuçlarına göre, çocuk yardımının sabit oranlı vergi ile finanse edilmesi sonucunda Atkinson endeksi 0.122'den 0.093'e, Gini endeksi 0.379'dan 0.326'ya, Theil endeksi ise 0.282'den 0.193'e gerilemektedir. Çocuk yardımının artan oranlı vergi ile finanse edilmesi sonucunda ise Atkinson endeksi 0.122'ten 0.083'e, Gini endeksi 0.379'den 0.311'e, Theil endeksi ise 0.282'den 0.123'e düşmektedir. Bu durum, çocuk yardımı politikasının gelir dağılımı eşitsizliğini azalttığını ve artan oranlı vergilendirme stratejisinin daha etkin olduğunu ortaya koymaktadır. Denk bütçe kapsamında nihai durumda hanehalklarından %25.28 sabit oranlı vergi veya başlangıçtaki vergi yükünün 1.12 katı vergi alınması gerektiği gösterilmektedir. Çocuk yardımı yalnızca yoksulluk sınırı altında geliri olan çocuklu hanelere yapıldığı için yoksulluk sınırının altında çocuğu olmayan haneler yoksul kalmaya devam etmektedir. Çocuk yardımının sabit oranlı vergi ile finanse edilmesi sonucunda, yoksul nüfus oranı 0.140'tan 0.024'e, yoksulluk açığı 0.040'tan 0.006'ya gerilemektedir. Çocuk yardımının artan oranlı vergi ile finanse edilmesi sonucunda ise, yoksul nüfus oranı 0.140'tan 0.026'ya, yoksulluk açığı ise 0.040'tan 0.007'ye gerilemektedir. Temel gelir ve negatif gelir vergisinden farklı olarak, çocuk yardımı politikası yoksulluğu ortadan kaldırmaya yönelik değil, yoksulluğu azaltmaya yöneliktir.

Altıncı Bölüm önemli bulguları ve politika önerilerini sunmakta, çalışmanın kısıtları ve gelecekteki çalışmalara nasıl yol göstereceğini belirtmektedir.

Anahtar kelimeler: Yoksulluk, Gelir Eşitsizliği, Mikrosimülasyon, Temel Gelir, Negatif Gelir Vergisi, Çocuk Yardımı.

ABSTRACT

THREE ESSAYS ON POVERTY ALLEVIATION PROGRAMMES: BASIC INCOME, NEGATIVE INCOME TAX AND CHILD BENEFIT

ZEYNEP GIZEM CAN

Ph.D. Thesis, Department of Economics
Supervisor: Prof. Dr. Harun BAL
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Poverty alleviation, which has gained prominence along with socio-political economics, has been the focus of studies in the development economics literature. In this thesis, basic income, negative income tax, and child benefit policies that are among the prominent issues in poverty alleviation are examined using an extensive individual and household basis data set and microsimulation analysis.

Chapter One reveals the background, objective and organization of the study. Chapter Two introduces the concept of poverty, describes key metrics related to income distribution and poverty, and outlines the social policies, social assistances and poverty in Turkey.

Chapter Three examines the effectiveness of the basic income policy, which is presented as the first solution to the poverty problem. Basic income refers to the cash payment by the state to all citizens, regardless of the level of income of individuals and their working conditions. Microsimulation analysis is carried out by combining individual and household data in the Income and Living Conditions survey compiled by Turkstat in 2018 and published in 2020. 50% of the median income, also called the poverty line, is considered basic income per capita and is given to all households according to the equivalence scale. In order to ensure neutral budget, the final tax collected is equal to sum of the initial tax and the basic income payment, and taxation is carried out using two different taxation schemes, i.e., flat rate tax and progressive rate tax. The household-based scenario shows that the Atkinson index drops from 0.123 to 0.040, the Gini index falls from 0.381 to 0.202, and the Theil index decreases from 0.284 to 0.095 after basic income with flat tax financing scheme. On the other hand, the Atkinson index drops from 0.123 to 0.034, the Gini index decreases from 0.381 to 0.190, and the Theil index falls from

0.284 to 0.079 after basic income with progressive tax financing scheme. It shows that the basic income policy reduces income inequality, and the progressive tax funding scheme is more effective. In the final case, 62.01 % flat rate tax or 2.89 times the initial tax burden should be levied on households within the scope of the neutral budget. Since basic income is tax-free, it is also defined as the minimum guaranteed income. Poverty is eliminated due to the fact that all households' incomes are greater or equal than poverty line.

Chapter Four reveals the effectiveness of the negative income tax policy, which is presented as the second solution to the poverty problem. Negative income tax refers to the policy based on the fact that individuals whose incomes are below a certain threshold receive a tax refund, while individuals whose incomes are above the specified threshold fund tax payments to finance tax refund. Microsimulation analysis is carried out by combining individual and household data in the Income and Living Conditions survey compiled by Turkstat in 2018 and published in 2020. The median income is equal to the breakeven income level, the households whose gross income is below the breakeven income level receive half of the difference between breakeven income level and the household gross income. In order to ensure neutral budget, the final tax collected is equal to sum of the initial tax and the negative income tax payment, and taxation is carried out using two different taxation schemes, i.e., flat rate tax and progressive rate tax. The household-based scenario shows that the Atkinson index from 0.123 to 0.055, the Gini index decreases from 0.381 to 0.240, and the Theil index from 0.284 to 0.133 after negative income tax with flat tax financing scheme. On the other hand, the Atkinson index decreases from 0.123 to 0.044, the Gini index decreases from 0.381 to 0.216, and the Theil index decreases from 0.284 to 0.104 after negative income tax with progressive tax financing scheme. It shows that the negative income tax policy reduces income inequality, and the progressive tax funding scheme is more effective. In the final case, %41.94 flat rate tax or 1.85 times the initial tax burden should be levied on households within the scope of the neutral budget. Negative income tax is also defined as the minimum guaranteed income, since even a household with no income will receive as many tax refunds as the poverty line. Poverty is eliminated due to the fact that all households' incomes are greater or equal than poverty line.

Chapter Five shows the effectiveness of the child benefit policy, which is presented as the third solution to the poverty problem. Child benefit refers to cash payment provided to households with children whose income below the poverty line.

Microsimulation analysis is carried out by combining individual and household data in the Income and Living Conditions survey compiled by Turkstat in 2018 and published in 2020. The households with children whose equivalent income is below the poverty line receive child benefit, which is equal to the difference between the poverty line multiplied by equivalence scale and household gross income. In order to ensure neutral budget, the final tax collected is equal to sum of the initial tax and the child benefit payment, and taxation is carried out using two different taxation schemes, i.e., flat rate tax and progressive rate tax. The household-based scenario shows that the Atkinson index from 0.122 to 0.093, the Gini index decreases from 0.379 to 0.326, and the Theil index from 0.282 to 0.193 after child benefit with flat tax financing scheme. On the other hand, the Atkinson index from 0.122 to 0.083, the Gini index decreases from 0.379 to 0.311, and the Theil index from 0.282 to 0.123 after child benefit with progressive tax financing scheme. It shows that the child benefit policy declines income inequality, and the progressive tax funding scheme is more effective. In the final case, %25.28 flat rate tax or 1.12 times the initial tax burden should be levied on households within the scope of the neutral budget. Since child benefit is provided only to households with children whose income is below the poverty line, households without children whose income is below the poverty line continue to remain poor. When child benefit is financed with a flat-rate tax, the headcount ratio decreases from 0.140 to 0.024, and the poverty gap falls from 0.040 to 0.006. On the other hand, when child benefit is financed with a progressive tax, the headcount ratio drops from 0.140 to 0.026, and the poverty gap decreases from 0.040 to 0.007. Unlike the basic income and negative income tax policies, the child benefit policy is not aimed at eliminating poverty, but at alleviating poverty.

Chapter Six presents key findings and policy recommendations, outlines the limitations and directions for future research.

Keywords: Poverty, Income Inequality, Microsimulation, Basic Income, Negative Income Tax, Child Benefit.

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The results and their interpretation are the author's responsibility.

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ABBREVIATIONS

BI: Basic Income

BL: Breakeven Income Level

CB: Child Benefit

DHS: Demografic and Health Surveys

FGT: Foster-Greer-Thorbecke

FT: Flat Tax

GDP: Gross Domestic Product

MSMs: Microsimulation Models

NIT: Negative Income Tax

PL: Poverty Line

PG: Poverty Gap

PT: Progressive Tax

SST: Sen-Shorrocks-Thon

TURKSTAT: Turkish Statistical Institute

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CHAPTER I

INTRODUCTION

1.1. Background of the Study

Poverty is a widespread economic problem, but it is also a sociological and psychological problem for communities. Poverty can increase crime rates, cause the spread of disease through unhealthy diets, living in unsanitary environments can lead to health problems, and supporting the poor can strain on the economy and reduce economic output. Since poverty affects people's lives in different ways, it is very important to prevent it. Throughout the centuries, countries have tried and proposed to alleviate and combat poverty.

Overcoming poverty requires social policies supported by governments and all parts of society. The United Nations (2015) has set 17 Sustainable Development Goals, the first of which is to end poverty in all its forms everywhere in the world. The primary goal of development projects and poverty alleviation programs worldwide is the eradication of poverty among poor and vulnerable people using a range of participatory and community-based techniques. (Chakrabarti and Dhar 2013; Yalegama et al., 2016). Based on the goal of ending poverty, this thesis identifies three development goals for poverty reduction aimed at improving social policies, including social assistance. They include developing, planning and implementing poverty alleviation strategies, improving the income levels, and satisfying the essential needs for the poor.

In this respect, the social policies that states adopt to address this problem also differ. There are many profitable tools to fight poverty and inequality. These instruments are the following. Inclusive economic growth is promoted to lift the poor out of poverty through productive employment. Studies of economic growth in Africa, Brazil, China, Costa Rica, and Indonesia reveal that rapid economic growth between 1970 and 2000 lifted significant numbers of poor people out of financial poverty (e.g., Dollar and Kraay, 2002; Sachs, 2005; Page and Pande, 2018; Singh and Chudasama, 2020). Microfinance is another tool that aims to lift the poor out of poverty and is a widely used poverty reduction strategy (e.g., Lashley, 2004; Banerjee and Jackson, 2017). In addition, developing countries need to restructure their economic, institutional, and fiscal systems to make them more efficient and pro-poor in order to reduce poverty. (e.g., Arndt, Mckay and Tarp, 2016; Page and Pande, 2018; Ayoo, 2022).

There are cash/income transfer programs like other poverty alleviation tools that are also related to the themes of this thesis. Most governments seek to improve people's standard of living relative to their current status by developing social assistance systems that provide cash or in-kind transfers. These aids are thus provided to maintain a minimum level of well-being in society. The welfare state is the most important redistributive mechanism in public policy (O'Donoghue, 2002). The concept of welfare state is relevant to the study, which is about combating poverty with the help of social assistance provided by the state (Apaydın, 2011). Welfare and social policy are closely related because social policy is the instrument of the welfare state to implement welfare strategies in society.

There are important studies that precede and motivate our work. Barrientos and Dejong (2004), Immervoll et. al. (2005), Ahmed and O'Donoghue (2009), Yakut-Çakar et al. (2012), Monchuk (2013), Fiszbein et. al. (2014), Cury et al. (2016), Banerjee et al. (2017), Page and Pande (2018), Hanna and Olken (2018), and Şahin and Kılıç (2021) strongly advocate for cash transfer programs, claiming that these programs are an important tool for alleviating poverty, deprivation, and vulnerability among children and their households.

This thesis contributes to the literature in four dimensions. First, it compares the redistributive effect of taxes and social benefits in Turkey under three different poverty alleviation social policies as cash income transfer programmes: Basic Income, Negative Income Tax, and Child Benefit. Second, Income and Living Conditions Survey compiled by Turkstat in 2018 and published in 2020, which includes representative individual and household data with detailed information on taxes and social security contributions, public pensions, social benefits and expenditures, and personal and household characteristics, is used to analyse the impact of social programmes on income inequality and poverty. Third, microsimulation analysis is an empirical approach to economic analysis that involves modeling economic elements of interest at the micro level. Microsimulation models for tax and social policy use microdata collection to replicate the consequences of government actions at the individual, family, or household level (O'Donoghue, 2002). Finally, the redistributive effects of simulated tax and benefit policies are compared with the effects of taxes, social security payments, and social benefits to measure the success of each social policy relative to a baseline.

1.2. Objectives of the Research

There are a number of gaps in the literature on the redistributive effects of basic income, negative income tax, and child benefit policies. This thesis is important because it is the most comprehensive study of basic income and the first study on negative income and child benefits that use the microsimulation method in the Turkish context. To date, there has been no study that has used microsimulation data to examine three policy proposals for Turkey simultaneously. This also gives us the opportunity to compare the policies from a cost-benefit perspective. In this way, it is attempted to show how social policies that have not yet been implemented in Turkey would affect poverty reduction if they were implemented.

The aim of this study is to explain the basic income, negative income tax and child benefit as a cash benefit/income subsidy, how disposable income affects poverty in Turkey. In this thesis, a different methodological perspective is implemented to reveal the relationship between income inequality and poverty with basic income, negative income tax and child benefit. After the transfer, which includes non-means-tested basic income, means-tested income with negative income tax, and child benefit, disposable income is considered to determine income inequality and poverty metrics.

The purpose of this thesis is to fill in some of the gaps in the research agenda regarding the redistributive effects of government tax and benefit policies for Turkey. Thus, the purpose of this chapter is to understand the extent to which this social welfare system is effective in achieving a minimum level of welfare in Turkey and to evaluate how effective this social welfare system is in reducing poverty. Therefore, the situation in Turkey can be considered in other studies dealing with poverty and welfare issues.

1.3. Organization of the Study

This thesis consists of six chapters. Following the background, objective and organization of the research in the Chapter One, the rest of the paper is structured in the following manner.

Chapter Two presents the definitions of poverty in the history of economic thought, the basic concepts of poverty including the criteria of poverty and inequality with equations, social policy, social assistance and poverty in Turkey. After a brief introduction in Section 2.1, the key concepts are presented in Section 2.2. Section 2.3 explains the social policy and social assistance and poverty in Turkey.

Chapter Three sheds light on the effectiveness of basic income by focusing on a particular public policy that could provide a solution to the poverty problem. After a brief introduction in Section 3.1, Section 3.2 explains the theoretical considerations on basic income as a social welfare system. Section 3.3 discusses the data and empirical methodology in detail. Section 3.4 shows the empirical findings of basic income policy on income inequality and poverty, followed by concluding remarks in Section 3.5.

Chapter Four reveals the effectiveness of the negative income tax by combining it with the flat tax and the progressive tax scheme. After a brief introduction in Section 4.1, Section 4.2 reveals the difference and similarity between basic income and negative income tax by providing the graphical illustrations. Section 4.3 explains data and empirical methodology in detail. Section 4.4 shows the empirical findings of negative income tax policy on income inequality and poverty, followed by concluding remarks in Section 4.5.

Chapter Five describes the main features of child poverty in the context of child support. After a brief introduction in Section 5.1, Section 5.2 also attempts to present the main determinants of the child poverty by reviewing literature. Section 5.3 explains data and empirical methodology in detail. Section 5.4 shows the empirical findings of child benefit policy on income inequality and poverty, followed by concluding remarks in Section 5.5.

Chapter Six presents key findings and policy recommendations, identifies the limitations and directions for future research. Section 6.1 outlines the key findings and policy recommendations. Section 6.2 indicates the limitations and directions for future research of this thesis.

CHAPTER II

POVERTY

2.1. Definition

Poverty, in its broadest sense, relates not only to a lack of cultural, material, and social resources, but also to a lack of access to social services, opportunities, and skills (Alkire and Foster, 2011; Guo et al., 2018). Based on the concept of relative deprivation, relative poverty defines households as poor if they lack certain characteristics that are common in the society in which they live (Townsend, 1979; Ravallion, 2010). Absolute poverty defines the absolute minimum in terms of basic needs such as food, clothing, and housing (Orshansky, 1965). Sen is known for going beyond monetary indicators of poverty, while Townsend emphasizes the diversity of resources needed to overcome poverty (Sen, 1976; Davis and Sanchez-Martinez, 2014). Poverty is not a concept that describes itself. Therefore, scholars and economists have offered various classifications throughout history.

The classical economic tradition assumes that individuals themselves are responsible for poverty. According to this theory, poverty is seen as a consequence of wrong individual decisions. For example, the poor lack self-control, which negatively affects their productivity. Therefore, individuals' wrong choices can lead them into poverty or into the welfare trap. (Davis and Sanchez-Martinez, 2014). According to classical economics, government intervention to alleviate poverty only encourages the poor to behave badly and should therefore be discontinued (Jung and Smith, 2007).

In neoclassical economics, the economy is more diverse and has causes of poverty that are not beyond the control of individuals. Neoclassical theory builds on classical traditions by emphasizing the importance of differences in initial ability, capital and skill endowments that determine an individual's productivity and cause poverty in a competitive, market-based economic system. External factors, moral hazard, adverse selection, and insufficient knowledge are seen as causes of poverty. Both the classical and neoclassical traditions emphasize the importance of money and the individual's relationship with society, while assigning a limited role to the state. This view focuses on income and consumption, since they are at the same time the main variables of interest and the most important measures for the analysis of poverty, while the neoclassical approach holds that income is determined by marginal productivity (Davis and Sanchez-

Martinez, 2014). Neoclassical economists, i.e., orthodox economists, consider that markets give each participant in the economic process what he or she deserves (Scaperlanda, 1999; Jung and Smith, 2007).

According to Marshall and Keynes, poverty is caused by a lack of human capital and economic underdevelopment. Marshall is inspired by John Stewart Mill's and Jeremy Bentham's utilitarian beliefs (Jung and Smith, 2007). Jensen (1998) states the Marshall's idea as follows: "A one-quarter increase in the wage of the poorer class contributes more to the total sum of happiness than a one-quarter increase in the income of an equal number of members of another class.". He also views poverty as a consequence of the institutional neglect of education for the mass of the population. He argues that people who advance through education rise to a higher class, making unskilled labor scarcer and consequently increasing the wages of unskilled workers (Jung and Smith, 2007).

Within Keynesian or neoliberal theories, growth is often predicted for economic progress. As a result, unemployment is predicted to fall, which will help reduce poverty. Unlike classical and neoclassical thinkers, the causes of poverty are not associated with individual choices, but government is expected to intervene to improve human capital and expand public education to combat poverty. In a Keynesian or liberal view, poverty is explained mainly by the misfortune of certain minorities who become unemployed, cannot work, or should not work even though they would like to. It follows that the state must exhort, regulate, and supplement, but not impose (Townsend, 1979). This theory suggests that poverty may be an expression of market failure that justifies redistributive taxation in cash and kind under certain circumstances. The emphasis on public investment to accomplish the complementing objectives of economic development, employment, and poverty reduction is greatest in particular vital industries deemed crucial due to their significant multiplier effects.

Among the macroeconomic factors emphasized by Keynes and the New Keynesians, aggregate investment, with its positive impact on employment, emerges as a critical component in generating the kind of growth needed to eradicate poverty. Low business investment increases unemployment and poverty rates in the labor force. Therefore, it is suggested that government revenues raised through taxes or bond issuance be used for public investment. This was referred to by Keynes himself as "socialization of investment." (Jung and Smith, 2007).

The Marxist or radical views see class and group discrimination at the core of poverty and give the state a key role in intervening or regulating markets. Marxist class

proposals for poverty reduction include minimum wages and anti-discrimination (Davis and Sanchez-Martinez, 2014).

The new approaches that give greater weight to factors such as social capital and social exclusion. Social capital and social exclusion theories acknowledge the importance of both social and economic issues. (Davis and Sanchez-Martinez, 2014). There is no consensus in the literature on what social capital means, nor is there a unified understanding of the topic. Bourdieu (1986) describes social capital as the collection of actual potential resources associated with the possession of a long-term network of institutionalised mutual acquaintances or recognition relationships. Social capital operates at the macro and meso levels and there are institutions such as government (Ahmad and Sadaqat, 2016). When productive members are empowered, they contribute to the development of society (Gürdal, 2019).

The literature recognizes the social exclusion method as complicated and multifaceted (Townsend, 1979; Burchardt et al., 1999; Bohnke, 2001). Social exclusion is a process in which some groups are systematically disadvantaged due to discrimination on the basis of their age, ancestry, caste, disability ethnicity, gender, HIV status, location of residence, migrant status, race, religion or sexual orientation. Discrimination happens in both governmental and private organizations such as the legal system, education, and health care, as well as social institutions such as the family[1]. Poverty and social exclusion are associated with inequality, but cannot be reduced to income inequality alone (Sen, 1997).

2.2. Key Concepts

This subsection presents the key concepts of this thesis. As mentioned earlier, this thesis mainly focuses on the relationship between basic income, negative income tax and child benefit as social assistance programmes and income inequality and poverty. After implementing social assistance programmes, poverty and income inequality are determined using poverty and income distribution metrics.

[1] One of the three main concepts of the human rights agenda of the Department for International Development is social inclusion. Building a socially inclusive society based on the ideals of equality and non-discrimination is critical to ensuring that all people can enjoy their rights. Gender inequality as a result of discrimination is a particularly pernicious form of social exclusion that exists throughout the world and poses unique problems.

2.2.1. Measures of Income Distribution

This subsection explains the income distribution metrics used to measure the redistributive effects of the tax-benefit system. One of them, the Lorenz curve is the plot of the cumulative income shares versus the cumulative population shares. The Gini index is a quantity calculated using a Lorenz curve (Farris, 2010). The general representation of the Gini index is as follows.

$$G = \frac{\sum_{i=1}^{N}\sum_{j=1}^{N}|x_i - x_j|}{2N^2\bar{x}} \tag{1}$$

where G denotes the Gini coefficient, N is the number of households, x_i stands for individual income, x_j stands for income under perfect equality income, $|x_i - x_j|$ stands for the absolute income difference for each individual, $\bar{x}$ stands for mean income where $\bar{Y} = \frac{1}{N}\sum_{i=1}^{N} x_i$.

The generalized entropy index has been proposed as a measure of income inequality in a population (Shorrocks, 1990). A general representation of the generalized entropy (GE) index is as follows.

$$GE(a) = \begin{cases} \frac{1}{Na(a-\iota)}\sum_{i=1}^{N}\left[\left(\frac{y_i}{\bar{y}}\right)^a - 1\right] & for \quad a \neq 0,1 \\ \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\bar{y}} ln\frac{y_i}{\bar{y}} & for \quad a = 1 \\ -\frac{1}{N}\sum_{i=1}^{N} ln\frac{y_i}{\bar{y}} & for \quad a = 1 \end{cases} \tag{2}$$

where $GE(a)$ stands for the generalized entropy index, a is a parameter that determines the weighting of the distances between incomes in different parts of the income distribution, N is the number of households, y_i stands for the income for different household, $\bar{y}$ stands for the mean income where $\bar{Y} = \frac{1}{N}\sum_{i=1}^{N} y_i$.

Theil index, proposed by Theil (1967), belongs to a larger family of measures called the general entropy class. It has the advantage of being additive across different subgroups compared to the Gini index. However, it lacks a simple representation and does not offer an attractive explanation for the Gini coefficient. The general representation of the Theil index is as follows.

$$T_T = T_{a=1} = \frac{1}{N}\sum_{i=1}^{N}\frac{x_i}{\mu}\ln\left(\frac{\chi_i}{\mu}\right) \tag{3}$$

where T_t stands for Theil T index in case of $a = 1$, N is the number of households, x_i stands for the characteristic of each household, μ stands for the mean income where $\mu = \frac{1}{N}\sum_{i=1}^{N} x_i$.

The Atkinson index, proposed by Atkinson (1970), is a income inequality metric. It is useful for determining which end of the distribution contributes most to observed inequality. The Atkinson index is more sensitive to changes at the lower end of the income distribution as it approaches one, and vice versa. The general representation of the Atkinson index is as follows.

$$A(\varepsilon) = \begin{cases} 1 - \frac{1}{\mu}\left(\frac{1}{N}\sum_{i=1}^{N} {y_i}^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}} & \text{for} \quad 0 \leq \varepsilon \neq 1 \\ 1 - \frac{1}{\mu}\left(\prod_{i=1}^{N} y_i\right)^{\frac{1}{N}} & \text{for} \quad \varepsilon = 1 \end{cases} \tag{4}$$

where $A(\varepsilon)$ denotes the Atkinson index, ε is the inequality aversion parameter, N is the number of individuals, y_i stands for individual income, μ stands for mean income where $\mu = \frac{1}{N}\sum_{i=1}^{N} x_i$.

The coefficient of variation index measures the sensitivity of the standard deviation of the income distribution to its mean. More equal income distributions have smaller standard deviations; therefore, the coefficient of variation index is smaller. The general representation of the coefficient of variation index is as follows.

$$CV = \left[\frac{\sum_{i=1}^{N} w_i {y_i}^2 / \sum_{i=1}^{N} w_i - \mu^2}{\mu^2}\right]^{\frac{1}{2}} \tag{5}$$

where CV stands for coefficient of variation index, N is the number of individuals, w_i stands for the weight of the agent groups, y_i stands for the individual income and μ stands for mean income where $\mu = \frac{1}{N}\sum_{i=1}^{N} y_i$.

A decile or share ratio allows us to determine the gap between the rich and the poor. The general representation of the decile or share ratio is as follows.

$$QR(p1, p2) = \frac{Q(p_1)}{Q(p_2)} \tag{6}$$

where $QR(p1, p2)$ stands for the decile or share ratio calculated by dividing the share of income that received by p_1 of the population by the share of income that received by p_2 of the population, such as P90/P10 or S80/S20 ratios. For example, P90/P10 is the ratio of the upper limit of the ninth decile to that of the first income decile.

2.2.2. Measures of Poverty

This subsection explains the poverty metrics used in this thesis. The poverty rate is the proportion of people or groups whose income is below the poverty line. According to the OECD, the poverty line is equal to half the median household income of the total population. The most commonly used poverty indicator is the poverty rate, sometimes called the headcount ratio. The general representation of the headcount ratio is as follows.

$$HR(y_i, z) = \frac{\sum_{i=1}^{N} I(y_i, z) n_i}{\sum_{i=1}^{N} n_i} \tag{7}$$

where $HR(y_i, z)$ stands for headcount ratio, y_i stands for income for each household n_i, z stands for the poverty line, $\sum_{i=1}^{N} I(y_i, z) n_i$ stands for the number of poor people, $\sum_{i=1}^{N} n_i$ is number of households[2]. A household is called as poor or non-poor in the following way.

$$I(y_i, z) = \begin{cases} 1 & \text{if} \quad y_i \leq z \\ 0 & \text{if} \quad y_i > z \end{cases} \tag{8}$$

Another poverty metric, Foster-Greer-Thorbecke (FGT) index, developed by Foster et al. (1984), includes headcount ratio (FGT0), poverty gap ratio (FGT1), and poverty severity index (FGT2). These indices derive from the Gini index. FGT0 measures how widespread poverty is; however, FGT1 measures how poor the poor are. On the other hand, FGT2 gives an indication of how severe poverty is.

The calculation of the headcount ratio (FGT0) is presented in the equations 7 and

[2] Note that the total household size, n_i, is used even when the income and poverty thresholds are expressed in adult equivalents.

8. The poverty gap ratio (FGT1) measures the amount of money by which each individual fall below the poverty line. FGT1 index, i.e., The poverty gap ratio (FGT1) is calculated as follows.

$$PG = \frac{1}{N}\sum_{j=i}^{q}\left(\frac{z-y_i}{z}\right) \tag{9}$$

where PG stands for poverty gap ratio, N is the number of households, q is the number of poor whose income is below the poverty line, z stands for the poverty line, y_i stands for the household income. To clarify, the poverty gap of 10% means that the income of the poor is on average 10% below the poverty line.

The poverty severity index (FGT2) describes the distribution of income among poor people. This index, also known as at-risk-of-poverty index or the squared poverty gap index, is related to the poverty gap ratio. It is calculated by averaging the square of the poverty gap ratios. By squaring poverty gap data, the further a poor's income falls below the poverty line, the more weight is given to the measure. The poverty severity index (FGT2) is calculated as follows.

$$PS = \frac{1}{N}\sum_{j=i}^{q}\left(\frac{z-y_i}{z}\right)^2 \tag{10}$$

where PS stands for poverty severity index (FGT2), N is the number of households, q is the number of poor whose income is below the poverty line, z stands for the poverty line, y_i stands for the household income. The poverty severity index (FGT2) is used as the FGT index in the following chapters.

Another important poverty metrics, the Watts index, proposed by Watts (1968) is formulated in its discrete form by Zheng (1993).

$$P_w = \frac{1}{N}\sum_{i=1}^{q}[\ln(z) - \ln(y_i)] \tag{11}$$

where P_w stands for Watts index, N is the number of households, q is the number of poor whose income is below the poverty line, z stands for the poverty line, y_i stands for the household income. Watts index is less sensitive to income distribution than poverty gap ratio.

The Sen-Shorrocks-Thon (SST) index, proposed by Shorrocks (1995), is an extended version of modified poverty intensity index developed by Sen (1976). According to Zheng (1997), the determined index coincides with the limit of another index given by Thon (1979). Xu (1998) calls this index the Sen-Shorrocks-Thon (SST) index because of its interesting intellectual background. The SST index is calculated is as follows.

$$P_{SST} = P_0 P_1^P \left(1 + \hat{G}^P\right) \tag{12}$$

where P_{SST} denotes Sen-Shorrocks-Thon index, P_0 is the headcount ratio, P_1^P represents the poverty gap ratio, and $\hat{G}^P$ stands for the Gini index. This metric enables us to divide poverty into three components.

Income gap ratio, also known as Sen I index, is calculated as follows.

$$I = \left(\frac{g}{qz}\right) \tag{13}$$

where I stands for the income gap ratio, g is the sum of the difference between poverty line and household income where $g = \sum_{i=1}^{N} g_i$ and $g_i = z - y$, z stands for the poverty line, y stands for the household income, q is the number of poor.

Clark, Hemming and Ulph index, developed by Clark et al. (1981) is defined as follows.

$$P_{CHU} = \frac{1}{N} \sum_{i=1}^{N} p(z, y_i) \tag{14}$$

where P_{CHU} stands for Clark, Hemming and Ulph index, N is the number of households, $p(z, y_i)$ is the individual poverty measure that takes the value zero for the non-poor ($y_i \geq z$) and for a positive number for the poor ($y_i < z$), whose value depends on both the poverty line and the individual standard of living.

Sen (1976) proposes a poverty metric that combines the effects of the number of poor individuals, their degree of poverty, and the distribution of poverty within the group. The Sen index is calculated as follows.

$$P_s = P_0\left(1 - (1 - G^p)\frac{\mu^p}{z}\right) \quad (15)$$

where P_s denotes Sen index, P_0 is the headcount ratio, G^p represents the Gini coefficient among the poor, μ^p is the mean income of the poor, z stands for the poverty line.

Let us now consider two measures that look at the relative deprivation of the poor, not just within the poor, but relative to the community as a whole. First, the Thon index, proposed by Thon (1979), may reflect changes in the number of non-poor individuals, but it does not reflect the effect when their income increases overall, either in terms of increased relative deprivation for the poor or in terms of increased capacity and thus less poverty for society. Following by Srivastava (1987), the Thon index is calculated as follows.

$$P_{Th} = \frac{2}{(n+1)nz}\sum_{i=1}^{m}(n+1-i)\,(z - y_i) \quad (16)$$

where P_{Th} stands for Thon index, n is number of the households, z stands for the poverty line, m stands for the number of poor, y_i stands for the household income, and i is the order of the household when the household income is sorted from top to bottom.

Other poverty metrics, Takayama index, proposed by Takayama (1979), has the added advantage of being a very accurate translation of the Gini coefficient of income inequality into a measure of poverty. Following by Srivastava (1987), the Takayama index is calculated as follows.

$$P_{Ta} = \frac{2}{\mu^* n^2}\sum_{i=1}^{n}(n+1-i)\,(\mu^* - y_i^*) \quad (17)$$

where P_{Ta} stands for Takayama index, n is number of the households, y_i^* stands for the censored income distribution where $y_i^* = y_i$ for $i = 1, \ldots\ldots, m$ and $y_i^* = z$ for $i = m+1, \ldots\ldots, n$, μ^* stands for the mean income for the censored distribution where $\mu^* = \frac{[m\mu_p + (n-m)]}{n}$, m stands for the number of poor, and i is the order of the household when the household income is sorted from top to bottom.

2.3. Social Policy, Social Assistances and Poverty in Turkey

Social policy is a part of public policy, although public policy includes economic

and industrial policy in addition to social policy. It is possible to divide the types of public policy into three categories: distributive public policy, regulatory public policy and redistributive public policy. Social policy belongs to the redistributive public policy group, which is divided into these three types of public policy. Redistributive public policy, on the other hand, is a policy that provides for the distribution of resources and values such as wealth and assets, property and rights among social classes and ethnic groups. Thanks to this policy, the disadvantaged groups in society enjoy benefits and interest, while other groups are imposed significant costs. Public redistribution policy, which describes the initiative to redistribute wealth, rights, and assets among certain social classes and strata within the country from those who do not have them, with the aim of providing social justice, is also a type of public policy that includes social policy practices (Arslan and Gürses, 2019). Consequently, social policy is the part of public policy that deals with social concerns.

Social policy is an instrument of the welfare state to implement welfare strategies in society (Apaydın, 2011). Social policy is concerned with how societies around the world meet human needs for education, health, security, well-being, and work. Social policy is concerned with how states and societies respond to the global challenges of demographic, economic, and social change, as well as globalization, migration and poverty. Social policy analyses the various roles of civil society, international organisations, national governments, the family, and the market, in providing services and supports throughout the life course, from childhood to old age. These services and supports include support for children and families, education, health, housing, income security pensions, social assistance and poverty reduction. Social policy aims to identify and reduce inequalities in access to services and support between social groups defined by age, ethnicity, disability, gender, migration status, race, sexual orientation, and socioeconomic status. Moreover, some scholars such as Buğra (2006) claim that social policy is crucial for the welfare state in the sense that it achieves de-commodification. As with all other theoretical concepts of social policy, a variety of instruments are required to apply them. Social planning, especially social security, social policy can also be implemented through alternative instruments such as social services and support and social insurance (Tezgel, 2013). It is worth mentioning that this is also done within the framework of collective self-help. Social assistance, social insurance, and social services, on the other hand, are today largely integrated into social security systems.

The current social security system in Turkey is administered by the Social Security

Institution (SGK), which is the result of the merger of three different organisations, namely the Pension Fund for State Employees for civil servants, the Social Security Institution for Contractual Employees, and the Self-Employed Fund (Bağ-Kur) for the self-employed. The Ministry of Labour and Social Security exercises general supervision in all related areas. Social protection in Turkey consists of two components: the contributory component (social insurance) and the non-contributory component (social assistance and social services). The social security system in Turkey is composed of two main areas. Long-term insurance, which covers old age, disability, and death/survival, and short-term insurance, which covers occupational accidents and diseases, health, and maternity. The social insurance system is compulsory and operated on a pay-as-you-go basis. It is financed by contributions from employers, employees and the state (the state covers the deficit as a third participant, except for unemployment insurance). Social insurance contributions are based on total income up to a certain ceiling. The branches of long-term insurance and short-term insurance are included in the contributory component. Recipients of the noncontributory component include the poor, the disabled, vulnerable children, the needy elderly, people who cannot pay their medical expenses, and needy widows and orphans. The vast majority of noncontributory payments are made under a green card system. Poor and uninsured citizens receive a green card that allows them to receive free health services. The state directly covers the cost of medical care for the poorest families.

Benefits, government social expenditures include payments and in-kind services to families and individuals who live in poverty and have low incomes. These expenditures include education benefits, child care for preschool children, minimum income, family benefits, unemployment benefits, employment-related benefits and payments of social security contributions and payroll taxes, social assistance. According to the OECD Social Expenditure Database, Turkish social expenditures amount to 12% of GDP, which is below the OECD average (20%). Looking at benefits in kind, these amount to about 4% of GDP in Turkey, still below the OECD average (8%) (Erol, 2022).

The ILO defines social assistance (SA) as tax-financed payments to poor and needy populations. It has two main objectives: to prevent severe poverty and to promote social inclusion. Social assistance schemes that promote social inclusion include conditional cash transfers, integrated social assistance, employment-guaranteed public work programmes, integrated income generation and health services, local/municipal programmes associated with local development initiatives, minimum guarantees income,

social insurance benefits, unconditional cash or in-kind benefits.

In Turkey, there are 40 social assistance programs or schemes that prioritize access to the following five basic needs, i.e., basic income, education, health, housing, and nutrition. Income support transfers to direct beneficiaries are the most common form of support for disadvantaged populations. These include food and coal in-kind transfers to families, conditional cash transfers to help children access school and health, and cash payments to widowed women, the elderly, cripples, and home-based caregivers for the elderly and disabled. The Turkish social assistance system is also characterized by a strong emphasis on socioeconomic vulnerability. In this way, Turkey differs from other nations. The proportion of social assistance expenditures devoted to targeted programs is much larger than in a typical high- or middle-income country. In middle- and high-income countries, targeted programs account for about 60% of the budget, but in Turkey they account for over 96% (Cuevas et al. 2020). In line with global trends, after the socio-political revolution in Turkey, cash transfers and other social aid instruments were introduced, supported by foreign institutions such as the United Nations and World Bank (Buğra, 2017).

CHAPTER III

BASIC INCOME

3.1. Introduction

This chapter represents the first step of the social policies proposed in this thesis to alleviate poverty. Basic income (BI), also known as citizen income, guaranteed income, or social dividend, is a periodic cash payment made by a political community to all its members on an individual basis, without being tied to resources or work requirements (Widerquist et al., 2013)[3]. This idea persists in discussions of social reform, which have recently resurfaced in the context of austerity policies. In the face of prevailing policies of welfare cuts, reductions in public spending, and tightening of eligibility requirements for welfare recipients, BI is usually presented as a radical alternative that can provide a solid social foundation for combating poverty and ensuring social inclusion in an emancipatory way by reviving the principle of universalism as the core of social citizenship (Van Parijs and Vanderborght, 2017).

The applicability of the BI policy and its funding are frequently discussed in the literature. Colombino (2015) summarises that the simplicity and transparency in implementation and the low transaction costs are the main advantages of the BI policy. On the other hand, the high financing costs and the crowding-out effect on the labour market, consisting of negative income effects due to the decline in the number of working hours, and negative substitution effects on account of the higher taxes to finance this scheme, are the main disadvantages. This scheme therefore leads to an important trade-off between equity and efficiency (e.g., Scutella, 2004; Paulus and Peichl, 2009; Horstschräer et al, 2010; Clavet et al, 2013; Yunker, 2013). To limit the negative effects of a higher tax rate to finance BI on labour supply and ensure budget balance, studies in

[3] Torry (2019) defines that BI has the following five characteristics: periodic, cash, individual, universal, and unconditional. Compared to other social benefits, basic income has some special characteristics. Unlike existing social benefits, the amount you receive is flat and does not depend on previous income. It is also not means-tested, so the amount does not depend on individual or family income or assets. BI is intended for the entire working-age population, not for specific groups of individuals or households. Individuals receive the BI, not household. The amount an adult or child receives is independent of the composition of the household or the circumstances of other household members. Although the BI is not means-tested, it is fully taxable, making it less valuable to higher-income individuals who must pay higher marginal tax rates.

the literature often couple BI with a flat tax. Clark (2005) anticipates the costs and financing of the BI policy for the U.S. based on 2002 data and sets BI at the poverty threshold for adults and 37% of that amount for children. Without creating a budget deficit, the additional cost of the BI policy is offset by a flat tax of 35.2%. This scheme has a positive effect on income distribution. While the bottom four quintiles experience an income gain through BI, the only exception is the top quintile, which experiences a loss in income share due to the gain of the bottom four quintiles. Using micro data from 2010, Arcarons et al. (2014) introduce the applicability of the BI policy for Catalonia by performing a static microsimulation analysis. The amount of BI is determined as 60% of the average income for adults and 20% of the amount granted to adults for children. Without creating a budget deficit, a flat tax of 49.57% funds the additional cost of BI. This provision has a positive impact on income distribution, i.e., the Gini index decreases from 0.366 to 0.246. Widerquist (2017) uses 2015 data to assess the feasibility of the BI policy for the United States. While adults receive $12,000, children receive half of that amount. With a flat tax of 37-50%, middle-income households do not have to pay much more than in the pre-policy situation. The BI scheme lowers the poverty rate from 13.5% to almost zero. Magnani and Piccoli (2020) use an input-output dataset to study the cost of BI combined with a flat tax for France by constructing a micro-macro model consisting of a static and sectoral CGE microsimulation analysis. Each French citizen receives an amount of €2,038, financed through seven income tax brackets ranging from 0% to 48.09%. The scheme not only leads to a considerable decrease in poverty and income inequality, but also to a slightly positive impact on macroeconomic variables, which means that the trade-off between efficiency and equity is not reached[4].

In addition to the aforementioned studies, the implementation of the BI policy worldwide can serve as a guide for a conceivable BI system in Turkey. The BI programme has not been fully implemented by any country; however, significant pilot projects have been conducted in Namibia and India, and partial BI programs in Alaska and Iran. The best known of these programmes, the Alaska Permanent Fund, was established in 1976 to allow Alaska to use a portion of its oil revenues for public purposes. It began with $734,000 and today totals over $40 billion. In 1980, this fund began paying each Alaskan

[4] For a more detailed literature review, see De Wispelaere and Stirton (2004, 2012), Harvey (2006), Standing (2008), Levy et al. (2013), Koistinen and Perkiö (2014), Browne and Immervoll (2017), Berman (2018), Banerjee et al. (2019), Gentilini et al. (2019), Gough (2019), and Rigolini et al. (2020).

resident an annual dividend that started at $1,000 and has ranged from $300 to $2,000 over the past 20 years. Widerquist and Sheahen (2012) emphasise the political popularity of this fund's dividend in Alaska, as no political party wants to change it. In another example, Iran introduced a monthly dividend of $45 per person to replace previous bread and energy subsidies; however, the impact of this programme on the Iranian economy was slowed by Western sanctions (Salehi-Isfahani et al. 2018). While neither example is a complete BI, unconditional cash transfers are certainly possible in different economies (Martin, 2016).

There are several descriptive and empirical studies on BI; however, this chapter is the most comprehensive study, i.e., on the costs, benefits, and possible financing strategies of a BI policy in the Turkish context. Moreover, this chapter fills the gap in the literature by using the microsimulation method to analyse income inequality and poverty through income redistribution after BI policy. Turkey, as a developing country with difficult characteristics for NIT, such as high income inequality, high poverty, high youth unemployment and large population, would be an instructive example for other economies, especially developing countries. In addition, a significant portion of the labour force earns the minimum wage, so the median income is close to the minimum wage. The costs, benefits, and financing options of a possible BI system for Turkey are the focus of this chapter.

The studies that have been conducted on BI or unconditional transfers in the Turkish context are quite limited. Buğra and Sınmazdemir (2002) calculate how much it would cost to give money to poor families in Turkey. The cost-GDP ratio is examined in 24 different situations, including four levels of minimum income and six levels of poverty. The cheapest scenario, covering a poor family's monthly food costs, costs 0.06% of GDP. The most expensive scenario, in which the monthly payment is equal to half the minimum wage, costs 2% of GDP. Using the data from the 2007 Statistics on Income and Living Conditions, Yakut-Çakar et al. (2012) examine a scenario in which all eligible households receive 40% of the median income. While eligibility varies depending on the alternative definition of the poor, the cost of implementing a minimum income system ranges from 0.33% to 2.69% of GDP. Households whose incomes are below 60% of median income receive an income subsidy that tops up their income to the threshold, at a cost of 2.69% of GDP. Consequently, the Gini coefficient falls from 0.411 to 0.360. Şahin and Kılınç (2021) provide a theoretical framework for the BI program, and analyze its applicability in Turkey by examining its costs and distributional effects using a tax-

benefit microsimulation model. The findings reveal that the introduction of an income tax financed BI would significantly burden the top half of the income distribution due to widespread income inequality and poverty, although it would improve income distribution. Each person age 15 and older receives a BI equal to the poverty threshold, while children under aged 15 receive 30% of that amount. Under the baseline scenario on a household basis, this plan costs 17.77% of GDP and is financed by multiplying the initial income tax rate by 3.54. This scheme reduces the Gini index from 0.388 to 0.181, and the poverty rate from 12.43% to zero.

The costs, benefits, and financing options of a possible BI system for Turkey are explained using the available data from TurkStat surveys. It allows performing a static tax-benefit microsimulation analysis showing household income without and with BI under the different financing options, i.e. flat and progressive taxes. The amount of BI for a household is calculated as 50% of the median income, i.e., the poverty line for the first adult, 50% of the poverty line for the second adult and 30% of the amount granted to the first adult for children[5]. These weights are referred to the equivalence scale, and are defined following the seminal paper by Hagenaars et al. (1994). When the cost of BI is financed with a flat tax scheme, the Atkinson index decreases from 0.123 to 0.040, the Gini index drops from 0.381 to 0.202, and the Theil index falls from 0.284 to 0.095. It can be covered with a flat tax of 62.01% of the household gross income. On the other hand, if the cost of BI is financed with a progressive tax scheme, the Atkinson index decreases from 0.123 to 0.034, the Gini index drops from 0.381 to 0.190, and the Theil index falls from 0.284 to 0.079. It can be covered with the progressive tax by multiplying the initial tax rate by 2.89. Note that the BI is tax free, these taxes are on market income. As for the poverty rate, poverty is eliminated because all households receive an equivalized income that is greater or equal to the poverty line.

The remainder of this chapter is organized as follows. Section 3.2 presents the theoretical considerations of the BI policy. Section 3.3 describes the specification of the data and the empirical methodology. Section 3.4 reveals the costs, benefits, and financing schemes of a possible BI policy, followed by concluding remarks in Section 3.5.

[5] Since the working age population includes 15 to 64 years, an individual older than 14 years is called an adult, while but an individual younger than 15 years is called a child.

3.2. Theoretical Consideration

This section provides a detailed theoretical framework for BI. Although studies on the BI policy have recently gained popularity, especially due to the rising tide of inequality and poverty following the Global Financial Crisis in 2008, the ideas of a citizen's income or unconditional income support have been voiced by various thinkers over time. Standing (2017) claims that the origins of BI can be traced back to Ephialtes of Trachis, who initiated certain democratic reforms in ancient Athens in 461 BC and is considered the actual inventor of the citizen's income. Following Ephialtes of Trachis, Pericles introduced a simple BI system that compensated citizens for their time in police service. While these initiatives are very primitive and do not meet the requirements of BI, they influenced later thinkers as the first ideas to BI.

There are traces of the BI in the Forest Charter, which supplements the Magna Carta. Until More, however, no one described a society in which there was a BI. More argued in his famous work Utopia that providing people with economic security was a better means of preventing theft than execution. After More, Vivès, in his famous work De Subsidye Pauperum, explained the first argument made in defense of the practice of public assistance. For this reason, some believe that Vivès was the first to create a system BI. But the people who fell under this model were only the poor who were to receive food aid. In this context, while one cannot argue that these names advocate a BI system, one can argue that they advance the ideas that give legitimacy to contemporary welfare states. Locke refers to public assistance in his work An Essay on the Poor Law. The Speenhamland Law, i.e., the Poor Law, was also a form of public assistance, as it guaranteed a minimum income to the poor. On the other hand, in some short passages from the writings of the Enlightenment philosophers, one can see, undoubtedly for the first time, the assertion that governments are obliged to provide for the subsistence of all citizens, regardless of the Christian duty of charity. Thus, in his famous work De l'Esprit des Lois, Montesquieu declares, "The state owes to all citizens a secure livelihood, food, adequate clothing, and a way of life not contrary to health." In the famous book Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain, Condorcet first formulates a concept of social insurance that contributes to the emergence of the modern welfare state. It should be emphasized, however, that these thinkers and ideas can only be considered a primitive form of BI.

It is often claimed by proponents of BI that Spence and Paine were the first authors to propose a true BI. Spence advocated a BI in 1796, which he saw as a natural means of law and justice. It is also worth noting that Spence had some sort of social dividend in mind. Paine had also advocated a BI for the elderly. It can be clearly said that Paine and Spence were close in their views. In the 19th century, Fourier, Charlier, and Huet, who were known as radical and socialist thinkers, argued for a payment to all young adults to be funded by certain taxes. Later, George argued that land is the common heritage of all and therefore a land tax is inevitable. In this perspective, he defended that this land tax should be shared by all.

The second wave of BI began after World War I. During this period Russell, Milner, Pickard, and Cole made important contributions to BI. The period of the third wave of BI began in the 1960s, when concern about the problem of structural and technological unemployment increased worldwide. At this time, the idea of a guaranteed income was defended by eminent economists, and some argued for a guaranteed minimum income subject to means testing. During this period, some thinkers developed important ideas: guaranteed income by Theobald, negative income tax by Friedman, income tax credit by Tobin, guaranteed minimum income by Galbraith and others such as Meade, Hayek, Tinbergen, Samuelson and Myrdal. Finally, Standing (2017) claims that the fourth wave of the basic income movement began in 1986 with the founding of the Basic Income European Network, known as BIEN. Buchanan, Simon, Deaton, Pissarides, Stiglitz, Atkinson, Skidelsky, Van Parijs, and Standing are some of the proponents of BI.

Given that the future of the capitalist market economy is vulnerable to financial and economic crises, scholars such as Piketty (2018) and Stiglitz (2019) point to income inequality and wealth, and recommend a global wealth tax. At the time, the idea of BI was also supported by Silicon Valley stars. Hughes, co-founder of Facebook, and Musk, founder of Solar City, Tesla and SpaceX, are among the supporters of BI. In summary, the first wave of the basic income movement consisted of reactions to the controversial rise of industrial capitalism. The second wave was based on a search for social justice aimed at correcting the destructive effects of World War I and improving the position of the working class, which was severely damaged at the time. The third wave was an expression of the fear of technological unemployment. Finally, the fourth wave was triggered by many factors that we are still discussing today. These include the rise of the precariat, increasing inequality in the world, and fears that the workforce would be

replaced by robotic technology, automation, and artificial intelligence. In this context, it is pointed out that many institutions have become dysfunctional and many social phenomena unsustainable. Today, BI occupies a central place as one of the solutions to many problems, including the problems of insecurity, precarity, and vulnerability and the growing inequalities in the world. With this growth, the discussion of BI in the context of social justice is also increasing in the literature. Remember that for a social policy to be considered socially just, it must help strengthen the freedoms and rights of those who benefit from it, and not increase the discretion or power of those who implement it. When one speaks of social justice, of course, it means social justice for all, not just social justice for one gender.

However, despite the fact that BI is supported by people from many different fields, the idea of BI is still considered utopian by most thinkers. This perception is reinforced by the fact that BI has not yet been implemented as a concrete social policy, because BI is an idea that countries are trying to test through pilot projects. It should be noted, however, that most pilot projects are not considered successful by the proponents of BI. In the literature on BI, the Alaskan dividend is considered the only BI achievement in the world, although it is far from sufficient to meet basic human needs.

3.3. Data and Methodology

In this section, the raw data set is firstly presented. Afterwards, the net income is converted to gross income, taking into consideration income tax brackets in 2018. As for the empirical methodology subsection, the static tax-benefit microsimulation analysis is detailed by giving some references. Finally, the calculations of the tax rates with BI is presented.

3.3.1. The Data

To carry out the empirical analysis, the data set is extracted from the Income and Living Conditions Survey which was conducted in 2018. Although the survey dates back to 2018, the relevant data set was released in 2020. The Microdata Set of TurkStat, in which 84,152 individuals (63,258 of working age) and 24,924 households are included, is the most recent data set to avail. This individual level microdata derived from surveys is not publicly available and access to it is subject to permission. This data set provides useful information about the income at individual and household levels. In addition, it

gives luxury of grouping the income by education level, health, employment, type and source. As a random sample of the population, it can be used unquestionably in income distribution analysis to get generalizable results. On the other hand, since the data set includes rich information on informal workers, it allows us to capture informal part of the employment.

In fact, the personal income distribution and poverty is generally analyzed by exploiting microdata. Therefore, the sample of the microdata set is borrowed as the sample of the analysis in this part. There is a coefficient in the data set that is assigned for each individual and household, which allows the analysis to be extended from sample to population. It is no more than a weight parameter that displays how powerful the sample is in terms of representing entire population. Nonetheless, these coefficients had better be examined with prudence due to their probable deceptiveness while working on the variables except household size, such as household incomes, pensions, social benefits, and tax estimations. For this reason, the calculations are limited to the size of the data set.

The microdata set of TurkStat provides us with a more extensive and granular data since it contains detailed information on disposable income and social benefits. Having the opportunity of using after-tax incomes at individual and household levels helps us to make more reliable comparisons and assess a non-means-tested policy and its implications without diverging from the definition of BI. This study presumes that income tax is the main financing tool for a BI policy. This assumption necessitates to recalculate gross incomes at household level. To that purpose, household level gross incomes are derived from net income by adding back the income taxes and then, required rate of the income tax that can finance the BI is calculated. For the net-to-gross conversion, income tax rate imposed in 2018 is used. Table 1 presents the income tax brackets in 2018.

Table 1
Income tax brackets in 2018

Tax rates	Descriptions
15%	Annual income less than ₺14,800
20%	Annual income between ₺14,800 and ₺34,000 (₺2,220 for ₺14,800)
27%	Annual income between ₺34,000 and ₺80,000 (₺6,060 for ₺34,000) Annual income between ₺34,000 and ₺120,000 (₺6,060 for ₺34,000) for wage income
35%	Annual income above ₺80,000 (₺18,480 for ₺80,000) Annual income above ₺120,000 (₺29,280 for ₺120,000) for wage income

Using Table 1, the gross incomes are derived from net income on the household basis. The equation (18) shows the net-to-gross convertion.

$$GI = \begin{cases} \overbrace{\frac{1}{0.85}NI}^{\text{A}} & \text{if} \quad \text{A} < ₺14{,}800 \\ \overbrace{\frac{1}{0.80} \times \left(NI - (₺14{,}800 - ₺2{,}220)\right) + ₺14{,}800}^{\text{B}} & \text{if} \quad ₺14{,}800 \leq \text{B} < ₺34{,}000 \\ \overbrace{\frac{1}{0.73} \times \left(NI - (₺34{,}000 - ₺6{,}060)\right) + ₺34{,}000}^{\text{C}} & \text{if} \quad ₺34{,}000 \leq \text{C} < ₺120{,}000 \\ \overbrace{\frac{1}{0.65} \times \left(NI - (₺120{,}000 - ₺29{,}280)\right) + ₺80{,}000}^{\text{D}} & \text{if} \quad \text{D} \geq ₺120{,}000 \end{cases} \tag{18}$$

where GI stands for the gross income, NI stands for the net income, and the unit is Turkish lira (₺). The equation (18) is available for the wage income. For the proprietors' income, the amounts ₺80,000 and 18,480 instead of 120,000 and 29,280, respectively are used for the highest income tax bracket.

3.3.2. Empirical Methodology

This chapter evaluates the distributional effects of a potential BI policy using a tax-benefit microsimulation model. Microsimulation models (MSMs) are tools that are able to simulate the effects of a policy on a sample of economic agents, i.e., individuals, households, and firms. Microsimulation models were introduced in the 1950s by Orcutt and his colleagues as a new approach in the social sciences to analyze the effects of social and economic policies by taking into account the micro-level characteristics and behavior of the units under study (Orcutt, 1957; Orcutt et al., 1961). This method of policy

evaluation is based on the description of the economic environment of individual actors, in particular their financial constraints, as well as their possible behaviour. The objective of a policy simulation is to assess the impact of a change in the economic environment caused by a policy reform on a vector of activity and/or welfare indicators for each actor in a sample of observations (Bourguignon and Spadaro, 2005).

Microsimulation analysis is important and valuable for public policy analysis for two reasons. First, it can fully account for the variability of economic agents found in micro-data sets. The first step in measuring the impact of social and tax policies is to work with some typical actors, such as typical firms or typical families. While this provides a basic picture of the effects of reforms, it may mask unexpected effects caused by specific combinations of individual characteristics that do not come into play in typical situations. And even when many typical situations are studied, it is rarely clear how representative they are. Working with thousands of real economic agents instead of a few hypothetical agents eliminates both of these problems. It is possible to predict who will be among the beneficiaries and losers of reform. Such data are critical for assessing the overall impact of the reform on the welfare of citizens and for considering the political economy variables that might impede its adoption. The second factor is the ability to adequately measure the total financial gains or costs of change. The MSM results can be summarised at the macro level, which allows the analyst to examine the impact of the policy on the government's budget constraint. Clearly, the standard approach does not provide such an accurate estimate of the budgetary cost of a policy change under typical circumstances (Li and O'Donoghue, 2013; Figari et al., 2015).

The most basic application of simulation models for benefits and taxes is to show the individual or household impacts of proposed policies without changing the characteristics of the budget. In this study, the objective is to determine the impact of a possible universal BI policy on disposable income, income inequality and poverty when flat and progressive taxes are applied. The fact that BI should be financed through taxes shows the importance of the tax-benefit simulation model. It should be made available to all working-age individuals, regardless of the income test.

The gist of the methodology is that income tax paid by the households compensate the incremental cost of BI. First of all, to conduct a household-level analysis, the amount of BI is determined. Full amount of BI multiplied by an eligibility score is disbursed to each household. This eligibility score is a kind of equivalence scale and a useful tool to compare the households of different sizes. It is basically equal to the weighted sum of the

number of individuals within the household. Following the seminal paper by Hagenaars et al. (1994), known as OECD scale, the weight for the reference person is 1, that of other adults and children are 0.5, and 0.3 respectively. The equivalence scale is formulated as follows.

$$e = \left(1 + 0.5\ (n_a - 1) + 0.3 \times (n_c)\right) \tag{19}$$

where e stands for the equivalence scale, n_a specifies the number of adults, and n_c represents the number of children. Then, equivalent or equivalence scale-adjusted income for the household, y_d, is calculated by dividing the disposable income of household, Y_d, by the equivalence scale coefficient, e:

$$y_d = \frac{Y_d}{e} \tag{20}$$

In the case where BI is paid at the household level rather than the individual level, each household receives $BI \times e$ Turkish lira amounts, i.e., the equivalent income of household members increases by exactly the amount of BI.

To keep it simple, consider a rudimentary economy in which there exists I households and each household i has a gross income of GI_i, a net income of NI_i, an initial tax payment of $T_i = GI_i - NI_i$, and an initial tax rate of $t_i = T_i/GI_i$. Irrespective of the number of tax brackets, there is a tax rate for each taxpayer as their both gross and net incomes can differ. The marginal cost of BI to the overall economy is financed by imposing more income tax on households once BI is disbursed to every household, hence income is redistributed.

There are two funding options. First, the cost of BI is financed with a flat income tax, i.e., an equal income tax rate for each household. Considering the additional cost of BI payments and the gross equivalent income of the household, the appropriate flat tax rate to ensure a balanced budget is calculated as follows.

$$t_{f,BI} = \frac{\sum_i^I T_i + \sum_i^I BI_i}{\sum_i^I GI_i} \tag{21}$$

where $t_{f,BI}$ is the flat tax rate for the BI scheme, $\sum_i^I T_i$ is the initial tax receipts, $\sum_i^I BI_i$ is the additional cost of the BI payments and $\sum_i^I GI_i$ is total gross income.

Secondly, the cost of BI is financed with progressive income tax, i.e., average tax burden positively depends on the income. Thus, the incremental cost of the BI payments is equal to the difference between the new tax payments, $T'_{i,BI}$, and the initial tax payments, T_i:

$$\sum_i^I BI_i = \sum_i^I T'_{i,BI} - \sum_i^I T_i \tag{22}$$

Suppose that the initial tax rate of each household is multiplied by a factor $f_{BI} = T'_{i,BI}/T_i$. Rearranging the equation (22) yields,

$$\sum_i^I BI_i = \sum_i^I (f_{BI} \times T_i) - \sum_i^I T_i \tag{23}$$

Rearranging the equation (23) becomes,

$$\sum_i^I BI_i = (f_{BI} - 1) \sum_i^I T_i \tag{24}$$

The left side of the equation (24) represents the overall cost of BI policy, while the right side denotes the total initial tax collection multiplied by $(f_{BI} - 1)$. The factor f_{BI} is equal to the total cost of BI policy divided by total initial tax collection. The required increase in the income tax rate can be calculated, namely the factor f_{BI}, given the fact that the recipients, the amount of BI and initial taxes are known. The progressive tax rate can be calculated by multiplying the factor by initial tax rate for each household.

$$t_{p,BI} = (f_{BI} \times t_i) \tag{25}$$

However, since BI is tax-free transfer payment, the effective tax rate, $t_{e,BI}$, is calculated as the amount of incremental tax payments, $T'_{i,BI}$, divided by the amount of gross income, GI_i, plus the BI_i payment.

$$t_{e,BI} = \frac{T'_{i,BI}}{GI_i + BI_i} \tag{26}$$

In the equation (26), $T'_{i,BI}$ and GI_i have a high level of correlation; however, there is no correlation between BI and them since BI is designed as a fixed and tax-free payment. It points out that the effective tax rate of the households that earn a comparatively higher BI will be lower. The effective tax rate turns out to be a more progressive compared to the after-policy tax rate. Thus, the poorest have a very similar effective tax rate to the initial (before-policy) tax rate, the middle-income earners pay an effective tax rate somewhere in the middle of before and after-tax rate. As the highest BI cost bearers, the richest pay an effective tax rate close to the after- policy tax rate.

Based on the information on BI payments, BI_i, and the new tax rates, $t_{f,BI}$, $t_{p,BI}$, and $t_{e,BI}$, the net income of each household under the policy can be calculated. Atkinson, Gini, Theil indices and other income distribution statistics such as P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 can be derived. P90/P10 is the ratio of the upper limit of the ninth decile to that of the first income decile. P90/P50 is the ratio of the upper limit of the ninth decile to that of the fifth income decile. P10/P50 is the ratio of the upper limit of the first decile to that of the median income. Similarly, P25/P75 is the ratio of the upper limit of the first quartile to that of the third income quartile. S80/S20 represents the ratio of the average income of the richest quintile to that of the poorest quintile of the population. The change in income distribution can be observed with high sensitivity thanks to these indicators. The Gini coefficient provides information about the middle part of the income distribution, while the Theil index focuses on the ends. Therefore, the Theil index is able to analyze the welfare of the poor more thoroughly and capture sensitive results. On the other hand, the Atkinson index is more sensitive to changes at the bottom of the income distribution. However, the Gini coefficient is still a useful indicator because the entire population is affected by policy changes. As for poverty metrics, all measures are described in terms of shortfalls of income. The headcount ratio is the simplest and most familiar measure of poverty; however, it is a poor guide for allocating resources. Similar to the headcount ratio, the poverty gap ratio is very useful for description, but it too is a poor guide for resource allocation. The Watts index is a simple poverty metric that satisfies the transfer axiom. Clark et al., FGT, Sen, SST, Takayama, Thon, and Watts indices are the extended versions of the above simple poverty metrics.

The poverty line and median income can be easily calculated using micro data. The poverty line is determined as half of the median income, and is calculated as

₺11,376.27. Social benefits paid to households can be calculated. In addition to reporting the impact of policies on income distribution, the change in income of the sample is also analyzed and the impact of policies on income distribution is reported while the poverty rate is calculated. Ten income groups are defined among households based on income calculated considering the impact of BI and the new income tax. In this way, the post-policy income distribution is revealed and it is determined who made gains or losses after the introduction of the policy. The poverty line before the BI policy is used because otherwise it would not be possible to properly compare the pre-policy and post-policy situation. Similarly, the pre-policy income groups are retained to analyze the impact of the policy on their incomes. Two different cases based on financing decisions are presented. In all cases, income distribution and poverty are analyzed at the household level using equivalized income.

3.4. Empirical Findings

This chapter consists of three subsections: income inequality, poverty, and finance. These subsections highlight the implications of a BI policy for income redistribution and poverty eradication, as well as the financing options for a possible BI system.

3.4.1. Income Inequality

As explained earlier, the costs of BI are financed with a flat tax (FT) or a progressive tax (PT). Under these two financing options, the rich are taxed more heavily so that the income distribution is more equal. Table 2 reveals the results for two different cases. The current value of the indicators is also given for comparison.

As clearly shown in Table 2, all indicators point to a more equal distribution of income with the BI policy. One of them, the Gini index, decreases from 0.381 to 0.202 after BI with FT and to 0.190 with PT. Another indicator, the Theil index, decreases from 0.284 to 0.095 after BI with FT and to 0.079 with PT. The effectiveness of the BI policy can also be seen in the P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 ratios. This is as expected, since paying BI increases the income of the poorest part of the population by eliminating poverty, while the high-income tax rate reduces the income of the richest. In terms of financing options, the effect of the PT on income distribution is clearly better than that of the FT. Therefore, middle-income households pay more taxes in case of FT,

as Table 3 also shows. They thus become net payers and their income fall below the initial income level.

Table 2
Income inequality metrics before and after BI policy

	Before BI	After BI with FT	After BI with PT
Mean	29237.42	23064.98	22526.93
Atkinson index	0.123	0.040	0.034
CoV index	1.024	0.623	0.538
Gini index	0.381	0.202	0.190
Theil index	0.284	0.095	0.079
P90/P10	5.378	2.164	2.091
P90/P50	2.293	1.640	1.555
P10/P50	0.426	0.758	0.744
P25/P75	0.691	1.474	1.434
S80/S20	7.040	2.571	2.486

Table 3 shows the change in income for each decile. Financing BI with PT is feasible because the number of gainers is greater than the number of losers. Moreover, funding BI with FT is not feasible because there are more losers. Looking at the net contributors and recipients in detail, the bottom 40% of the population with FT and 50% of the population with FT increase their income, while the income of the rest of the population decreases.

Table 3
Change in income before and after BI policy

	After BI with FT	After BI with PT
Poorest 10%	114.36%	125.95%
Second 10%	43.97%	55.40%
Third 10%	19.74%	30.12%
Fourth 10%	6.61%	15.59%
Fifth 10%	-2.77%	5.13%
Sixth 10%	-10.82%	-3.90%
Seventh 10%	-20.48%	-14.72%
Eighth 10%	-28.68%	-24.60%
Ninth 10%	-38.89%	-37.48%
Richest 10%	-55.28%	-63.35%
Number of gainers	10,501	12,599
Number of losers	14,420	12,322

Figure 1 illustrates the Lorenz curves before and after BI policy. The Lorenz curve shifts upward, implying that the income distribution is more equal. While households in the lowest quintile have 6.39% of income before the BI policy, they have 13.00% of income after BI with FT and 12.91% of income after BI with PT. At the same time, households in the highest quintile have 44.96% of income before BI policy, they have 33.41% of income after BI with FT and %32.08 of income after BI with PT. Figure 2 shows the difference in Lorenz curves between FT and PT financing options. While the lowest quartile has a higher income share according to FT, the second, third and fourth quartiles have a higher income share according to PT. The cumulative income shares for the 4^{th} quartile is 66.59% for BI with FT and 67.92% for BI with PT. The difference between these two funding options is at most 1.33% at the end of the 4^{th} quartile.

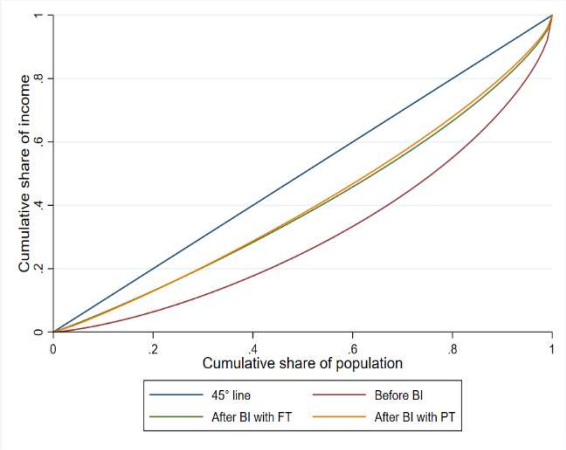

Figure 1. Lorenz curves before and after BI policy

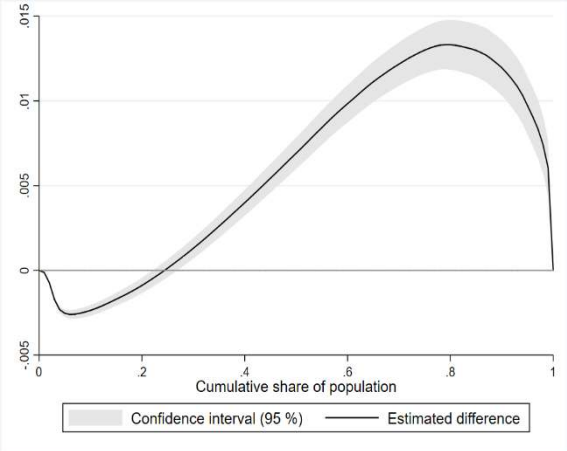

Figure 2. Difference in Lorenz curves of the FT and PT financing scheme

Figure 3 depicts the distribution of income before and after the BI policy. After the BI policy, there is a cutoff at the poverty line because equivalized income for households is more equal than the poverty line thanks to tax-free BI payments. The new distributions have a spike due to the increase in poorer households. The new distributions are narrower than the initial distribution, suggesting that households' incomes are converging. Moreover, the FT financing is more right-skewed than PT financing. Therefore, an equal tax rate to finance BI leads to a higher tax burden for households in the lowest group, making the income distribution very narrow for these households. It is consistent with the results in Table 3.

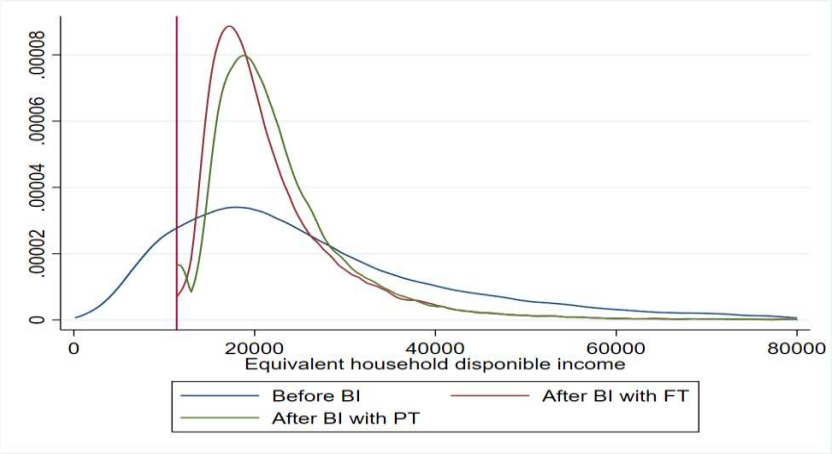

Figure 3. Income distribution density before and after BI policy

3.4.2. Poverty

The policy of BI is mainly aimed at the elimination of poverty. Therefore, the

payment of BI corresponds to the poverty line. As revealed in Table 4, the poverty decreases to zero with the implementation of the BI policy.

Table 4
Poverty metrics before and after BI policy

	Before BI	After BI with FT	After BI with PT
Headcount ratio	0.142	-	-
Income gap ratio	0.287	-	-
Poverty gap ratio	0.041	-	-
Clark et al. index	0.048	-	-
FGT index	0.143	-	-
Sen index	0.057	-	-
SST index	0.078	-	-
Takayama index	0.039	-	-
Thon index	0.078	-	-
Watts index	0.056	-	-

Figures 4 and 5 illustrate the difference in the poverty gap curves (PG) before and after the BI policy with FT and PT financing scheme. PG falls sharply from 0.041 to zero after the implementation of BI programme. 14.28% of the sample earns less than the poverty line before the BI policy; however, households' equivalized disposable income is greater or equal to the poverty line after BI policy.

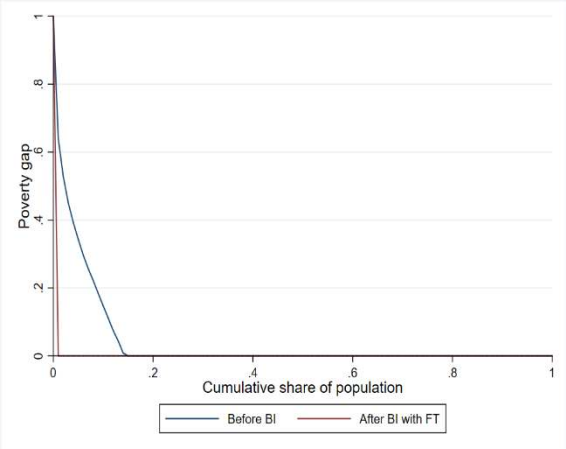

Figure 4. Difference in PG curves before and after BI with FT

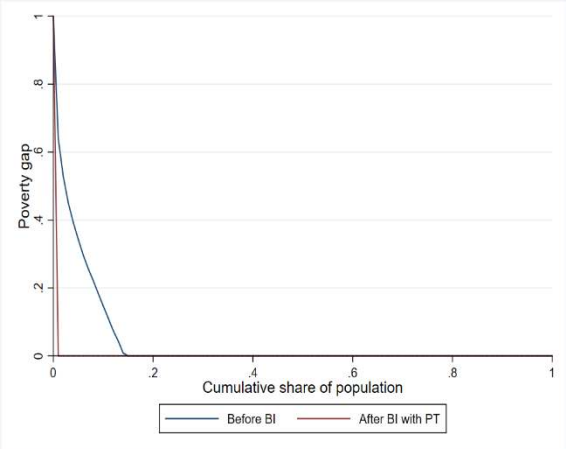

Figure 5. Difference in PG curves before and after BI with PT

Figures 6 and 7 show the difference between the Foster-Greer-Thorbecke (FGT)

curves before and after the BI policy funding with FT and PT. The FGT index follows a declining trend, falling from 0.143 to zero in two cases.

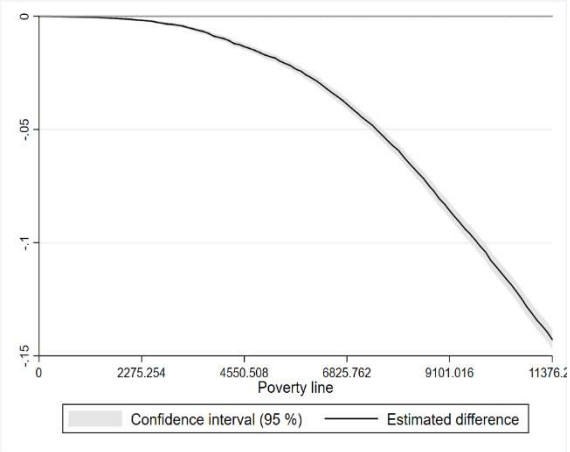

Figure 6. Difference in FGT curves before and after BI with FT

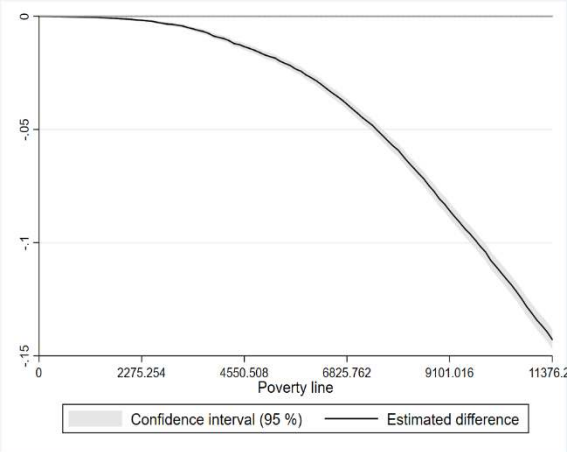

Figure 7. Difference in FGT curves before and after BI with PT

3.4.3. Financing

The additional cost of the BI policy is covered by household income tax payments. For this reason, the gross and net (effective) tax rates are calculated for two different financing options, FT and PT. The steps involved in determining the tax rates are described in detail in the subsection on empirical methodology. Figure 8 clarifies the tax rates before and after the BI policy. When the cost of the BI policy is financed with FT, the tax rate is 62.01% for all households. In contrast, when the cost of the BI policy is financed with PT, the tax factor is 2.89, meaning that each household's initial tax burden is multiplied by 2.89. Households in the lowest decile have an average tax burden of 13.69% of equivalized disposable income before the BI policy; however, the effective tax burden is 17.94% after the BI policy with FT and 14.14% after the BI policy with PT. On the other hand, households in the highest decile have an average tax burden of 23.36% of equivalized disposable income before the BI policy; however, the average net tax burden is 52.82% after the BI policy with FT and 59.08% after the BI policy with PT. As also shown in Table 3, the PT financing scheme favours the poorer households and the FT financing scheme favours only the richest decile.

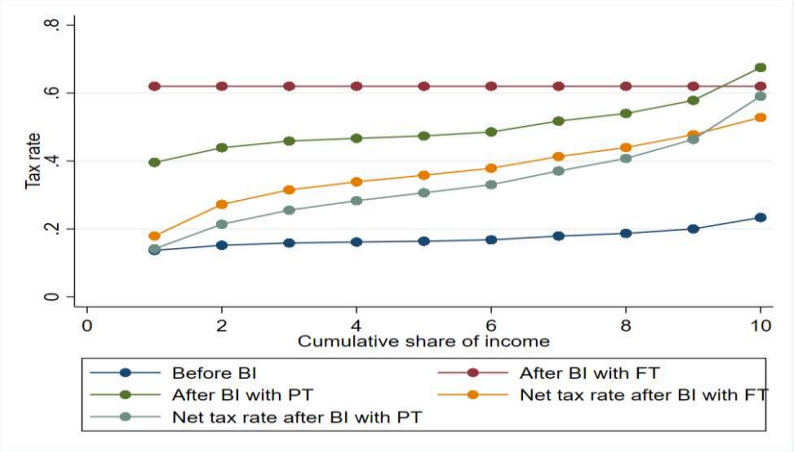

Figure 8. Tax rates before and after BI

Up until now, the results of static microsimulation analysis are based on a sample determined by TurkStat. Undoubtedly, this sample is sufficient to show the distribution and sources of income in the Turkish economy, but a macro perspective is necessary to study the applicability of the BI system in Turkey. Due to the large population with significant poverty, the tax-free BI policy is quite expensive. Table 5 provides some information on the BI scheme for the population and Turkey[6]. In 2018, the GDP is 3,758.77 billion, but the total gross taxable income is ₺2,795.91 million. Total gross taxable income is composed of total employee salary and net operating surplus. Initial taxes on capital gains, income, and profits amount to ₺221.97 million. While the total tax revenue is equal to 17.3% of the GDP, the taxes on capital gains, income, and profits is equal to 34.3% of the total tax revenue. This is due to the large share of the population receiving the minimum income, as well as the shadow economy. Sivis (2021) reveals that the average rate of unregistered locals in the labour market is 33%. Moreover, the labour force participation rate is equal to 53.2% of the working age population. Therefore, the cost of the BI policy in Turkey is quite high. It should be noted that the cost of the BI policy is fully financed by household income tax payments. Various financing options can offset these costs, such as carbon taxes, property taxes, or the elimination of other supports.

[6] The empirical analysis in this chapter is conducted on a household basis; however, it is assumed that each adult receives BI and each child receives 30% from BI since the exact number of households and dependent population in Turkey is not known. In 2018, there are approximately 62.08 million adults and 20.26 million children in Turkey.

Table 5
Descriptive statistics on BI scheme

Sample	Total gross taxable income	₺1,413.07 million
	Total tax revenue	₺876.18 million
	Total initial taxes	₺303.14 million
	Total BI payment	₺573.05 million
	Median income	₺22752.54
	Poverty line (BI per capita)	₺11376.27
	Flat tax	62.01%
	Tax factor	2.89
Turkey	GDP (2018)	₺3,758.77 million
	Total gross taxable income	₺2,795.91 million
	Total tax revenue	₺1,005.07 million
	Total initial taxes	₺221.97 million
	Total BI payment	₺783.10 million
	Flat tax	35.95%
	Tax factor	4.53
	BI cost to GDP	20.83%

3.5. Concluding Remarks

This chapter further develops the problem-oriented approach by offering a solution to the poverty problem. The basic income (BI) is a regular cash payment made by a political community to all its members, without requiring them to have specific resources or to work. The applicability of BI and how it should be financed are frequently debated in the literature. Given the inadequacies of existing policies to address unequal income distribution and high poverty rates, BI is discussed as an alternative social policy, and its costs, impacts, and financing options are analyzed.

As for the empirical methodology, a tax-benefit microsimulation model is developed to estimate incomes before and after the redistribution of BI and the introduction of an additional income tax. Two alternative financing options, i.e., a flat tax and a progressive tax system, are defined. Then, the impact of the BI policy on various determinants of income distribution and poverty is presented. In addition, the applicability of the BI policy in Turkey is discussed.

The household-based scenario shows that the Atkinson index drops from 0.123 to 0.040, the Gini index falls from 0.381 to 0.202, and the Theil index decreases from 0.284 to 0.095 after BI with FT financing scheme. It can be covered with a flat tax of 62.01%. On the other hand, the Atkinson index drops from 0.123 to 0.034, the Gini index decreases from 0.381 to 0.190, and the Theil index falls from 0.284 to 0.079 after BI with PT financing scheme. It can be covered by the progressive tax by multiplying the initial tax rate by 2.89. The effective tax rate is lower than the aforementioned tax rates because BI is tax-free. In addition, poverty is eliminated since all households receive an equivalized income that is greater or equal to the poverty line.

For the empirical analysis, the sample collected by TurkStat is used. However, a macro perspective is necessary to show the applicability of the BI system in Turkey. With a large population with significant poverty, the tax-free BI policy is quite expensive. A large part of the population earns the minimum income and is engaged in the shadow economy. In addition, the labor force participation rate is quite low. These costs can be offset by various financing options, such as carbon taxes, property taxes, or elimination of other supports.

This chapter reports the results of a static microsimulation study. A dynamic analysis can account for individual labor supply and household consumption patterns in response to additional BI payments. Thus, the future implementation of the BI policy can be evaluated in a broader context, taking into account possible alternative sources of funding and individual and household behavior. For example, the elasticity of labor supply to social transfers could be calculated. This topic can be further explored in future studies using new data or other methods.

CHAPTER IV

NEGATIVE INCOME TAX

4.1. Introduction

This chapter presents the first step of the social policy measures proposed in this thesis to alleviate poverty. The negative income tax (NIT) is one of the fundamental ideas of modern welfare program analysis. Its name derives from its contrast with a positive income tax, in which the government withholds a portion of income and the amount payable increases as income increases[7]. In contrast, with a NIT, the taxpayer receives money back, similar to a refundable tax credit, with the payment decreasing as income increases. The government pays a fixed amount of benefits or a reverse tax payment even if the recipient's income is zero, but gradually withdraws those benefits as the recipient's income increases. Withdrawing benefits or a NIT policy reduces marginal net income from work in the same way as a positive income tax.

The concept of a NIT was originally mentioned in the works of the French economist Cournot (1838). Friedman (1962) briefly introduced it as a method of limiting the welfare state, while Tobin (1965) and his colleagues further developed it as a strategy to combat poverty while maintaining incentives to work. Under an explicit tax rate, where no income is taxed at 100 percent and which can be linear but by definition need not be, NIT consists of reducing each household's income tax liability by the same fixed amount and paying out the difference between that amount and the tax liability if it is positive. Suppose that the fixed amount of the tax credit is set at the same level as the BI scheme. A person with no income and therefore no income tax liability receives an amount equal to the scheme BI. As income rises, however, the benefit shrinks more slowly, as in

[7] Friedman (1962) listed five advantages of the NIT policy. First, the NIT policy has the advantage that it supports poor families based solely on their income rather than on some other characteristic equated with neediness, such as age or the fact that the person is a farmer. Second, a NIT policy provides cash, which is the best form of assistance from the recipient's perspective. Third, a NIT policy could replace the existing patchwork of different programs that affect income distribution. Fourth, a NIT policy could be less expensive than the current system because it lowers administrative costs and makes it easier to target payments to those in need. Fifth, Friedman saw an additional advantage in that the NIT would not distort market prices, as is the case with minimum wages, tariffs, and agricultural subsidies, which are often advocated on distributional grounds.

traditional means-tested schemes, so that income after the transfer remains at exactly the same level as in the corresponding BI scheme. Under the NIT variant, taxes and benefits are simply offset. Under BI, the revenue needed to fund the universal tax credit from NIT is actually collected and returned to everyone. Under NIT, all transfers are unilateral: positive transfers (or negative taxes) to households whose incomes are below the breakeven income level, negative transfers (or positive taxes) to households whose income are above the breakeven income level.

Friedman (1962) recommended that all welfare programs be redesigned in light of the NIT policy so that government assistance to low-income individuals is withdrawn only at a low marginal rate. Tobin (1965), Lampman (1965, 1968), and Tobin et al. (1967) are among the scholars who supported this concept of a consistent and explicit NIT with a low marginal rate. The proposal had great influence in both political and academic circles. In policy circles, the idea of a negative income tax triggered multi-million-dollar field experiments in the United States in the 1960s and 1970s to see how it might affect labor supply. President Nixon championed NIT, which was subsequently tried by other presidents. A pure NIT was never passed by Congress, but tax rates in current social programs were sometimes changed to encourage employment. A substantial literature has accumulated in academia on the NIT and its effects on work incentives, and the idea has found its way into textbooks for aspiring economists. Indeed, the NIT has become the benchmark for modern analysis of all means-tested transfer programs. In the literature, NIT establishes a benchmark to analyze the impacts of welfare programs, according to Moffitt (2003), as most research in this area assumes NIT as the ideal scenario and attempts to either quantify the impact or develop alternatives. Moreover, the concept of the NIT has helped refocus policymakers' thinking on the basic message that incentives matter. Lopez-Daneri (2016) examines a revenue-neutral reform of the United States income tax and welfare system that includes the introduction of a NIT. The reform is implemented in a life-cycle economy with individual heterogeneity and uninsurable idiosyncratic labor risk. A tax rate of 22% and a transfer of 11% of GDP per capita represent the ideal NIT. A 2.1% annual increase in individual consumption is the average ex-ante welfare gain. The NIT policy far outperforms the housing tax change. The main effect of the reform is to increase the relative importance of high-productivity agents in labor supply at the expense of low-productivity agents. Wolf et al. (2021) analyze the impact of a public policy based on NIT as an alternative to current social programs for income transfers in Brazil. A multiregional applied CGE model of the Brazilian economy

is used to analyze the impact on household welfare, divided into 10 income classes and two factors, i.e., capital and labor, for each of the five major regions. The analysis of two scenarios for the proposed policy shows that NIT could be more effective than current social programs and lead to longer lasting results[8].

There are a number of descriptive and empirical studies on NIT, but none of them assess the benefits, costs, and potential funding schemes of a NIT program in the Turkish context. This chapter fills the gap in the literature by using the microsimulation method to analyse income inequality and poverty through income redistribution after NIT policy. Turkey, as a developing country with difficult characteristics for NIT, such as high income inequality, high poverty, high youth unemployment and large population, would be an instructive example for other economies, especially developing countries. In addition, a significant portion of the labour force earns the minimum wage, so the median income is close to the minimum wage. The costs, benefits, and financing options of a possible NIT system for Turkey are the main focus of this chapter.

The studies that have been conducted on NIT or unconditional transfers in the Turkish context are quite limited. Aktan and Vural (2002) provide a theoretical framework for NIT. Kargı (2007) points out the only empirical study on NIT for Turkey. Based on the 2005 TurkStat dataset, the cost of securing an average annual income of 8,736 YTL for each family of four is calculated to be about 5.5 billion TL, which is equivalent to 1.28% of gross household income. It is obvious that NIT payments to households entail less costs for the social security system compared to other social transfers. It makes sense to use NIT not as an alternative to the social security system, but as an integral part or instrument of it. Uzunali and Altun (2020) found that applying a NIT in place of the current social assistance system for poor welfare recipients in Turkey who are able to work has a positive impact on the state budget.

The costs, benefits, and financing options of a possible NIT system for Turkey are explained using the available individual and household data from TurkStat surveys. It allows performing a static tax-benefit microsimulation analysis showing household income without and with NIT under the different financing options, i.e. flat and progressive taxes. The amount of NIT for a household whose income is below the breakeven income level is calculated as the half of the difference between the breakeven

[8] For more detailed literature review, see Burtless and Hausman (1978), Robins (1985), Tondani (2009), Friedman (2013), Wiederspan et al. (2015), Widerquist (2019), Simpson (2021).

income level, i.e., the median income multiplied by the equivalence scale, and the household gross income. Following the seminal paper by Hagenaars et al. (1994), the equivalence scale is set at 1 for the first adult, 0.5 for the other adults, and 0.3 for the children[9]. When the cost of NIT is financed with a flat tax scheme, the Atkinson index decreases from 0.123 to 0.055, the Gini index drops from 0.381 to 0.240, and the Theil index falls from 0.284 to 0.133. The NIT payments can be covered with a flat tax of 41.94% for households whose gross income is above the breakeven income level. On the other hand, if the cost of NIT is financed with a progressive tax scheme, the Atkinson index decreases from 0.123 to 0.044, the Gini index drops from 0.381 to 0.216, and the Theil index falls from 0.284 to 0.104. The NIT payments can be covered with the progressive tax by multiplying the current tax rate by 1.85 for households whose gross income is above the breakeven income level. Note that the NIT is paid by households whose income are above breakeven income level, these taxes are based on the market income of this group. As for the poverty rate, poverty is eliminated because all households receive an equivalized income that is greater or equal to the poverty line.

The remainder of the chapter is organized as follows. Section 4.2 theoretically presents the similarities and differences between the various BI and NIT policies. Section 4.3 describes the specification of the data and the empirical methodology. Section 4.4 reveals the costs, benefits, and financing schemes of a possible NIT policy, followed by concluding remarks in Section 4.5.

4.2. BI vs NIT: A Stylized Presentation

This section highlights the similarities and differences between the various BI and NIT schemes in a theoretical framework through some illustrations. While Atkinson (1995) calls the NIT programme associated with the BI with a flat tax scheme, Rossi (1998) calls the same programme as a guaranteed minimum income, implying that it is a special case of NIT with a marginal tax rate of 100% for all recipients. These definitions are correct, but it is necessary to go further to understand the difference between NIT and BI in order to analyse it more deeply.

Figure 9 shows the conventional guaranteed minimum income. This scheme guarantees a certain level of income (G) for each household. If gross household income

[9] Since the working age population includes 15 to 64 years, an individual older than 14 years is called an adult, while but an individual younger than 15 years is called a child.

is below the threshold income level, they receive the payment equal to the difference between the threshold income and their gross income. Figure 10 clarifies the BI with trap introduced by Salverda (1984). Unlike the traditional scheme, BI is paid to all households regardless of their gross income level. A BI, paid to all at level G, raises the initial 45° curve by a distance equal to G, resulting in the higher dashed 45° line.

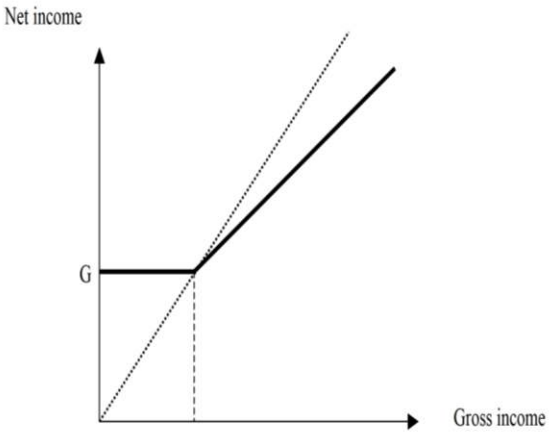

Figure 9. Minimum guaranteed income

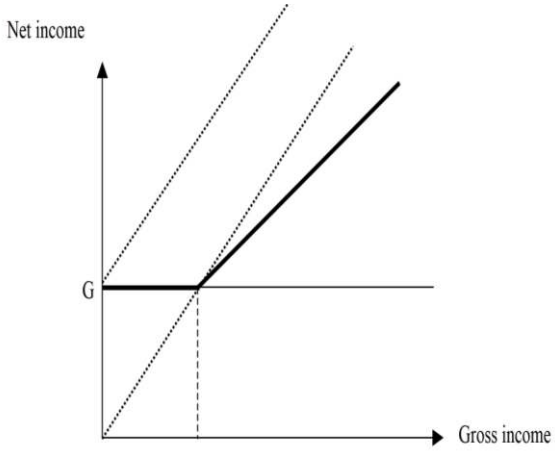

Figure 10. BI with trap

Figure 11 illustrates the combination of BI and FT proposed by Atkinson (1995). A BI, which all households receive at the level G, can be financed by a straight-line tax on total gross household income. After households receive the BI, their gross income, represented by the 45° dashed line, shifts upward parallel to itself. Figure 12 depicts the BI offered by Meade (1989) with an additional burden on low-income earners. As can also be seen in Figure 5, some proponents of NIT offer higher negative tax rates than positive tax rates. On the other hand, some proponents of BI recommend regressive taxation as a form of overburdening low-income earners beyond the standard tax rate. The unemployment trap is eliminated to a lesser extent than in the linear scenario, but the material incentives for competent workers to make their labor available, to exert themselves, and to improve their skills are reduced to a lesser extent.

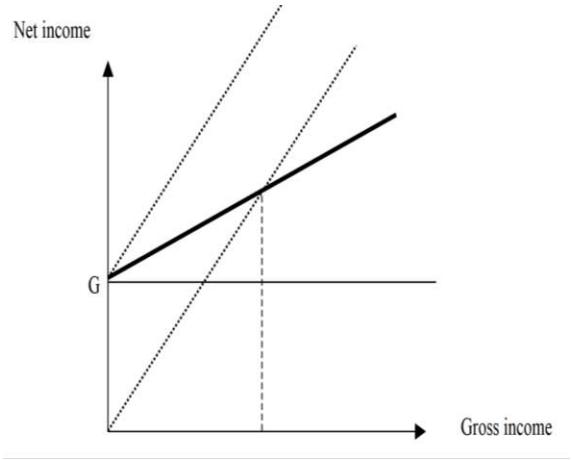

Figure 11. BI with FT

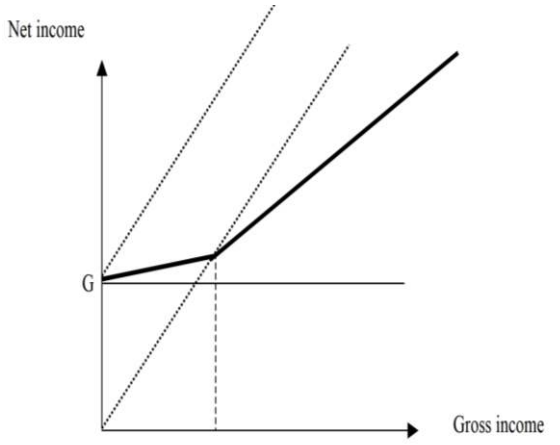

Figure 12. BI with low earners' overcharge

Figure 13 shows the linear NIT scheme developed by Friedman (1962). This scheme is based on a means-tested guaranteed minimum income that can prevent unemployment traps by linking the amount of the benefit to an individual's gross income. In this case, the bold line representing net income as a function of gross income no longer has a flat left part at level G, while the level of gross income which people stop receiving benefits, called as the breakeven point, rises. Figure 14 illustrates the nonlinear NIT scheme asserted by Mitschke (1985) and Godino et al. (1999). As a result, the benefit-receipt ratio exceeds the positive tax ratio, and the NIT policy can be said to be regressive because the effective marginal tax rate is higher for the poor than for the wealthy. Nevertheless, this system is also less regressive and more redistributive than the guaranteed minimum income system, as shown in Figure 9.

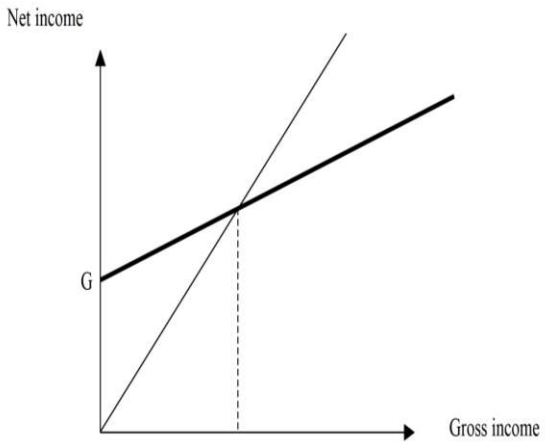

Figure 13. Linear NIT

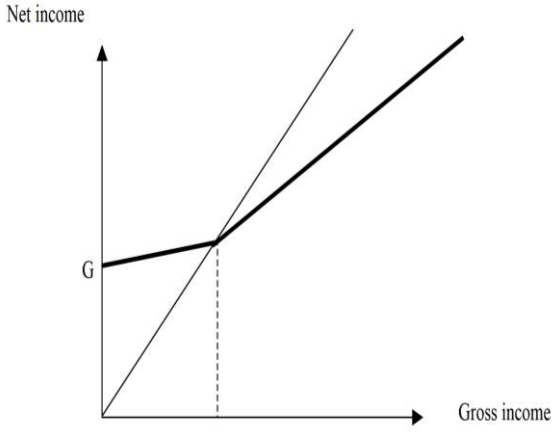

Figure 14. Nonlinear NIT

Figure 15 shows a BI scheme. Each household receives a universal and unconditional payment, g. The total BI payments (OQPg) shifts the 45° line upwards and is financed by tax receipts (gEMN).

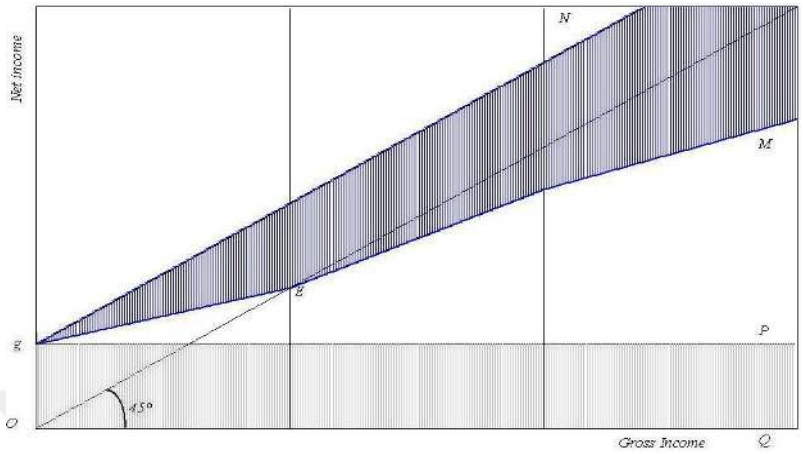

Figure 15. BI Scheme

Figure 16 shows a NIT scheme. The NIT payments (OGE) are financed by tax revenues (EMN). Households whose income are below the breakeven income level, E, receive a tax refund; however, the households whose incomes are above the breakeven income level pay this amount.

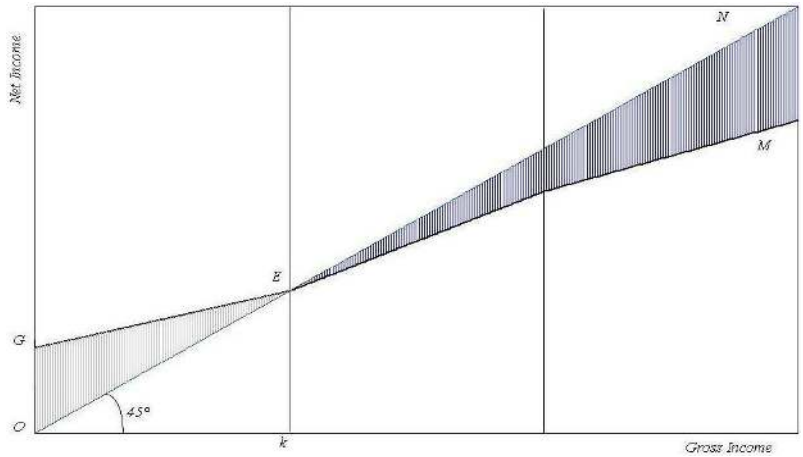

Figure 16. NIT Scheme

4.3. Data and Methodology

In this section, the raw data set is firstly presented. Afterwards, the net income is converted to gross income, taking into consideration income tax brackets in 2018. As for

the empirical methodology subsection, the static tax-benefit microsimulation analysis is detailed by giving some references. Finally, the calculations of the tax rates with NIT is presented.

4.3.1. The Data

To carry out the empirical analysis, the data set is extracted from the Income and Living Conditions Survey which was conducted in 2018. Although the survey dates back to 2018, the relevant data set was released in 2020. The Microdata Set of TurkStat, in which 84,152 individuals (63,258 of working age) and 24,924 households are included, is the most recent data set to avail. This individual level microdata derived from surveys is not publicly available and access to it is subject to permission. This data set provides useful information about the income at individual and household levels. In addition, it gives luxury of grouping the income by education level, health, employment, type and source. As a random sample of the population, it can be used unquestionably in income distribution analysis to get generalizable results. On the other hand, since the data set includes rich information on informal workers, it allows us to capture informal part of the employment.

In fact, the personal income distribution and poverty is generally analyzed by exploiting microdata. Therefore, the sample of the microdata set is borrowed as the sample of the analysis in this part. There is a coefficient in the data set that is assigned for each individual and household, which allows the analysis to be extended from sample to population. It is no more than a weight parameter that displays how powerful the sample is in terms of representing entire population. Nonetheless, these coefficients had better be examined with prudence due to their probable deceptiveness while working on the variables except household size, such as household incomes, pensions, social benefits, and tax estimations. For this reason, the calculations are limited to the size of the data set.

The microdata set of TurkStat provides us with a more extensive and granular data since it contains detailed information on disposable income and social benefits. Having the opportunity of using after-tax incomes at individual and household levels helps us to make more reliable comparisons and assess a means-tested policy and its implications without diverging from the definition of NIT. This study presumes that income tax is the main financing tool for a NIT policy. This assumption necessitates to recalculate gross incomes at household level. To that purpose, household level gross incomes are derived

from net income by adding back the income taxes and then, required rate of the income tax that can finance the NIT is calculated. For the net-to-gross conversion, income tax rate imposed in 2018 is used. Table 1 presents the income tax brackets in 2018.

Table 6
Income tax brackets in 2018

Tax rates	Descriptions
15%	Annual income less than ₺14,800
20%	Annual income between ₺14,800 and ₺34,000 (₺2,220 for ₺14,800)
27%	Annual income between ₺34,000 and ₺80,000 (₺6,060 for ₺34,000) Annual income between ₺34,000 and ₺120,000 (₺6,060 for ₺34,000) for wage income
35%	Annual income above ₺80,000 (₺18,480 for ₺80,000) Annual income above ₺120,000 (₺29,280 for ₺120,000) for wage income

Using Table 6, the gross incomes are derived from net income on the household basis. The equation (27) shows the net-to-gross convertion.

$$GI = \begin{cases} \overbrace{\frac{1}{0.85}NI}^{\text{A}} & \text{if} \quad \text{A} < ₺14{,}800 \\ \overbrace{\frac{1}{0.80} \times \left(NI - (₺14{,}800 - ₺2{,}220)\right) + ₺14{,}800}^{\text{B}} & \text{if} \quad ₺14{,}800 \leq \text{B} < ₺34{,}000 \\ \overbrace{\frac{1}{0.73} \times \left(NI - (₺34{,}000 - ₺6{,}060)\right) + ₺34{,}000}^{\text{C}} & \text{if} \quad ₺34{,}000 \leq \text{C} < ₺120{,}000 \\ \overbrace{\frac{1}{0.65} \times \left(NI - (₺120{,}000 - ₺29{,}280)\right) + ₺80{,}000}^{\text{D}} & \text{if} \quad \text{D} \geq ₺120{,}000 \end{cases} \tag{27}$$

where GI stands for the gross income, NI stands for the net income, and the unit is Turkish lira (₺). The equation (27) is available for the wage income. For the proprietors' income, the amounts ₺80,000 and 18,480 instead of 120,000 and 29,280, respectively are used for the highest income tax bracket.

4.3.2. Empirical Methodology

This chapter evaluates the distributional effects of a potential NIT policy using a tax-benefit microsimulation model. Microsimulation models (MSMs) are tools that are able to simulate the effects of a policy on a sample of economic agents, i.e., individuals,

households, and firms. Microsimulation models were introduced in the 1950s by Orcutt and his colleagues as a new approach in the social sciences to analyze the effects of social and economic policies by taking into account the micro-level characteristics and behavior of the units under study (Orcutt, 1957; Orcutt et al., 1961). This method of policy evaluation is based on the description of the economic environment of individual actors, in particular their financial constraints, as well as their possible behaviour. The objective of a policy simulation is to assess the impact of a change in the economic environment caused by a policy reform on a vector of activity and/or welfare indicators for each actor in a sample of observations (Bourguignon and Spadaro, 2005).

Microsimulation analysis is important and valuable for public policy analysis for two reasons. First, it can fully account for the variability of economic agents found in micro-data sets. The first step in measuring the impact of social and tax policies is to work with some typical actors, such as typical firms or typical families. While this provides a basic picture of the effects of reforms, it may mask unexpected effects caused by specific combinations of individual characteristics that do not come into play in typical situations. And even when many typical situations are studied, it is rarely clear how representative they are. Working with thousands of real economic agents instead of a few hypothetical agents eliminates both of these problems. It is possible to predict who will be among the beneficiaries and losers of reform. Such data are critical for assessing the overall impact of the reform on the welfare of citizens and for considering the political economy variables that might impede its adoption. The second factor is the ability to adequately measure the total financial gains or costs of change. The MSM results can be summarised at the macro level, which allows the analyst to examine the impact of the policy on the government's budget constraint. Clearly, the standard approach does not provide such an accurate estimate of the budgetary cost of a policy change under typical circumstances (Li and O'Donoghue, 2013; Figari et al., 2015).

The most basic use of tax-benefit simulation models is to show the change of the proposed policy on the household without changing the characteristics of the household. In this study, it is aimed to determine the effect of a possible NIT policy on disposable income and poverty with the application of flat and progressive taxes. The fact that NIT is financed through taxes reveals the importance of the tax-benefit simulation model. It is planned to be given to the households whose incomes are below the breakeven income level with income mean-tested.

The gist of the methodology is that income tax paid by the households compensate the incremental cost of NIT. First of all, to conduct a household-level analysis, the amount of NIT is determined. Each household whose income is below the breakeven income level receives the 50% of the difference between breakeven income level, multiplied by its eligibility score, and equivalised gross household income[10]. This eligibility score is a kind of equivalence scale and a useful tool to compare the households of different sizes. It is basically equal to the weighted sum of the number of individuals within the household. Following the seminal paper by Hagenaars et al. (1994), known as OECD scale, the weight for the reference person is 1, that of other adults and children are 0.5, and 0.3 respectively. The equivalence scale is formulated as follows.

$$e = \left(1 + 0.5\,(n_a - 1) + 0.3 \times (n_c)\right) \tag{28}$$

where e stands for the equivalence scale, n_a specifies the number of adults, and n_c represents the number of children. Then, equivalent or equivalence scale-adjusted income for the household, y_d, is calculated by dividing the disposable income of household, Y_d, by the equivalence scale coefficient, e:

$$y_d = \frac{Y_d}{e} \tag{29}$$

In the case where NIT is paid at the household level rather than the individual level, each household whose income is below the breakeven income level receives $\frac{1}{2} \times (BL \times e - GI_i)$ amounts of Turkish lira where BL denotes the breakeven income level.

To keep it simple, consider a rudimentary economy in which there exists I households and each household i has a gross income of GI_i, a net income of NI_i, an initial tax payment of $T_i = GI_i - NI_i$, and an initial tax rate of $t_i = T_i/GI_i$. Irrespective of the number of tax brackets, there is a tax rate for each taxpayer as their both gross and net incomes can differ. The marginal cost of NIT to the overall economy is financed by imposing more income tax on households once NIT is disbursed from every household whose income is above the breakeven income level, hence income is redistributed.

[10] Friedman (1962) did not give an exact figure for NIT. However, Friedman later offered that NIT is equal to 50%. On the other hand, Tobin (1967) states that NIT is 33.3% based on cost considerations.

There are two funding options. First, the cost of NIT is financed with a flat income tax, i.e., an equal income tax rate for each household. Taking into account the additional cost of NIT payments and the gross equivalent income of the household, the appropriate flat tax rate to ensure a balanced budget is calculated as follows.

$$t_{f,NIT} = \frac{\sum_i^I T_i + \sum_i^I NIT_i}{\sum_i^I GI_i} \tag{30}$$

where $t_{f,NIT}$ is flat tax rate for NIT policy, $\sum_i^I T_i$ is the initial tax receipts, $\sum_i^I NIT_i$ is the additional cost of NIT payments paid to households whose incomes are below the breakeven income level and $\sum_i^I GI_i$ is the sum of the gross household income above the breakeven income level.

Secondly, the cost of NIT is financed with progressive income tax, i.e., average tax burden positively depends on the income. Therefore, the incremental cost of the NIT payments is equal to the difference between the new tax payments, $T'_{i,NIT}$, and the initial tax payments, T_i:

$$\sum_i^I NIT_i = \sum_i^I T'_{i,NIT} - \sum_i^I T_i \tag{31}$$

Suppose that the initial tax rate of each household is multiplied by a factor $f_{NIT} = T'_{i,NIT}/T_i$. Rearranging the equation (31) yields,

$$\sum_i^I NIT_i = \sum_i^I (f_{NIT} \times T_i) - \sum_i^I T_i \tag{32}$$

Rearranging the equation (32) becomes,

$$\sum_i^I NIT_i = (f_{NIT} - 1) \sum_i^I T_i \tag{33}$$

The left side of the equation (33) is the NIT's total cost, and the right side is the total initial tax collection multiplied by $(f_{NIT} - 1)$. The factor f_{NIT} is also equal to the ratio of the NIT's total cost to the total initial tax collection. The required increase in the income tax rate can be calculated, namely the factor f_{NIT}, given the fact that the recipients and the amount of NIT and initial taxes are known. The progressive tax can be calculated by

multiplying the factor by initial tax rates for each household whose income is above the breakeven income level.

$$t_{p,NIT} = (f_{NIT} \times t_i) \tag{34}$$

Unlike the BI policy, the effective tax rate is equal to the tax rates after NIT policy. The effective tax rate, $t_{e,NIT}$, can be denoted as, $t_{e,NIT} = \frac{T'_{i,NIT}}{GI_i}$ for the households whose incomes are above the breakeven income level and $t_{e,NIT} = \frac{T'_{i,NIT}}{GI_i + NIT_i}$ for the households whose incomes are below the breakeven income level. Because $T'_{i,NIT} = \sum_i^I T_i + \sum_i^I NIT_i$, the effective tax rate is equal to the tax rates calculated after NIT policy for the households whose incomes are above the breakeven income level. On the other hand, the households whose income are below the breakeven income level receive tax refund, therefore, their effective tax rate is equal to zero.

Based on the information on NIT payments, NIT_i, and the new tax rates, $t_{f,NIT}$ and $t_{p,NIT}$, the net income of each household under the policy can be calculated. Atkinson, Gini, and Theil indices and other income distribution statistics such as P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 can be derived. P90/P10 is the ratio of the upper limit of the ninth decile to that of the first income decile. P90/P50 is the ratio of the upper limit of the ninth decile to that of the fifth income decile. P10/P50 is the ratio of the upper limit of the first decile to that of the median income. Similarly, P25/P75 is the ratio of the upper limit of the first quartile to that of the third income quartile. S80/S20 represents the ratio of the average income of the richest quintile to that of the poorest quintile of the population. The change in income distribution can be observed with high sensitivity thanks to these indicators. The Gini coefficient provides information about the middle part of the income distribution, while the Theil index focuses on the ends. Therefore, the Theil index is able to analyze the welfare of the poor more thoroughly and capture sensitive results. On the other hand, the Atkinson index is more sensitive to changes at the bottom of the income distribution. However, the Gini coefficient is still a useful indicator because the entire population is affected by policy changes. As for poverty metrics, all measures are described in terms of shortfalls of income. The headcount ratio is the simplest and most familiar measure of poverty; however, it is a poor guide for allocating resources. Similar to the headcount ratio, the poverty gap ratio is very useful

for description, but it too is a poor guide for resource allocation. The Watts index is a simple poverty metric that satisfies the transfer axiom. Clark et al., FGT, Sen, SST, Takayama, Thon, and Watts indices are the extended versions of the above simple poverty metrics.

The poverty line and median income can be easily calculated using micro data. The poverty line is determined as half of the median income, and is calculated as ₺11,376.27. Households whose annual equivalized income is below the poverty line are classified as poor. Social benefits paid to households can be calculated. In addition to reporting the impact of policies on income distribution, the change in income slices of the population is also analyzed and the impact of policies on income distribution is reported while the poverty rate is calculated. Ten income groups are defined among households based on income calculated considering the impact of NIT and the new income tax. In this way, the post-policy income distribution is revealed and it is determined who made gains or losses after the introduction of the policy. Note that the pre-policy poverty line is used because otherwise it would not be possible to properly compare the pre-policy and post-policy situation. Similarly, the pre-policy income groups are retained to analyze the impact of the policy on their incomes. Two different cases based on financing decisions are presented. In all cases, income distribution and poverty are analyzed at the household level using equivalized income.

4.4. Empirical Findings

This chapter consists of three subsections: income inequality, poverty, and finance. These subsections highlight the implications of a NIT policy for income redistribution and poverty eradication, as well as the financing options for a possible NIT system.

4.4.1. Income Inequality

As explained earlier, the cost of NIT is financed by a flat tax (FT) or a progressive tax (PT). Under these two financing options, the rich are taxed more heavily so that the income distribution is more equal. Table 7 shows the results for two different cases. The current value of the indicators is also shown for comparison.

As can be seen from Table 7, all indicators point to a more equal income distribution with the NIT policy. One of them, the Gini index, decreases from 0.381 to

0.240 after BI with FT and to 0.216 with PT. Another indicator, the Theil index, decreases from 0.284 to 0.133 after NIT with FT and to 0.104 with PT. The effectiveness of the NIT policy can also be seen in the P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 ratios. This is as expected, since paying NIT increases the income of the poorest part of the population by eliminating poverty, while the high-income tax rate reduces the income of the richest. In terms of financing options, the effect of the PT on income distribution is clearly better than that of the FT. Therefore, middle-income households pay more taxes FT, as Table 8 also shows. They thus become net payers and their income fall below the initial income level.

Table 7
Income inequality metrics before and after NIT policy

	Before NIT	After NIT with FT	After NIT with PT
Mean	29237.42	22565.00	22595.16
Atkinson index	0.123	0.055	0.044
CoV index	1.024	0.742	0.639
Gini index	0.381	0.240	0.216
Theil index	0.284	0.133	0.104
P90/P10	5.378	2.569	2.341
P90/P50	2.293	1.767	1.706
P10/P50	0.426	0.688	0.729
P25/P75	0.691	1.537	1.511
S80/S20	7.040	3.120	2.791

Table 8 shows the change in income for each decile. The number of gainers and losers is the same for NIT with FT and PT because households whose incomes are below the breakeven income level receive the NIT payments and the rest of the sample finances that amount. In terms of poverty reduction, funding NIT with PT is feasible because middle-income households pay less in taxes than if they were funded with FT. Looking at net payers and recipients in detail, the bottom 40% of the population with FT and PT financing options increase their average income, while the income of the rest of the population decreases.

Table 8
Change in income before and after NIT policy

	After NIT with FT	After NIT with PT
Poorest 10%	123.20%	123.20%
Second 10%	54.32%	54.32%
Third 10%	30.34%	30.34%
Fourth 10%	14.84%	14.87%
Fifth 10%	-7.33%	-5.24%
Sixth 10%	-24.30%	-19.55%
Seventh 10%	-33.32%	-28.28%
Eighth 10%	-37.68%	-33.23%
Ninth 10%	-42.14%	-39.17%
Richest 10%	-46.05%	-52.53%
Number of gainers	13,169	13,169
Number of losers	11,752	11,752

Figure 17 shows the Lorenz curves before and after the NIT policy. The Lorenz curve shifts upward, implying that the income distribution is more equal. While households in the lowest quintile have 6.39% of income before the NIT policy, they have 11.61% of income after NIT with FT and 12.30% of income after NIT with PT. On the other hand, households in the highest quintile have 44.96% of income before NIT policy, they have 36.22% of income after NIT with FT and %34.32 of income after NIT with PT. Figure 18 shows the difference in Lorenz curves between FT and PT financing options. While the highest quartile has a higher share of income with FT financing, the other quartiles have a higher share of income with PT financing. The cumulative share of income for the first four quartiles is 63.77% with FT financing and 65.68% with PT financing. The difference between these two financing options at the end of the 4^{th} quartile is at most 1.91%.

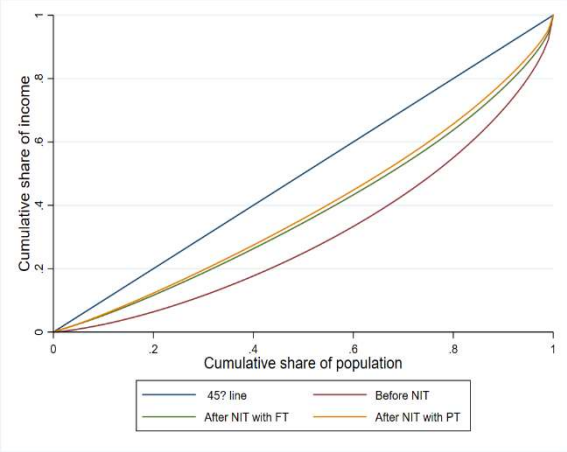

Figure 17. Lorenz curves before and after NIT policy

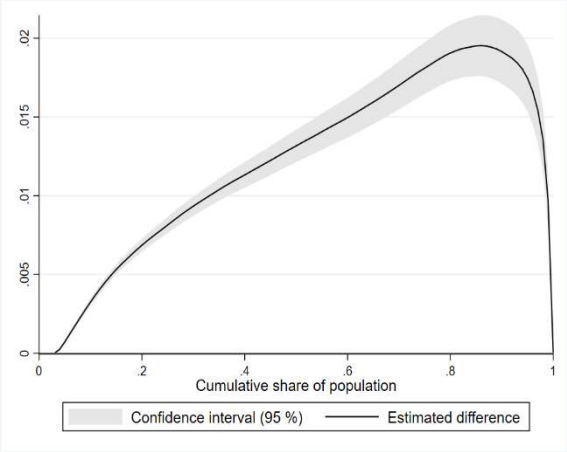

Figure 18. Difference in Lorenz curves of the FT and PT financing scheme

Figure 19 shows the income distribution before and after the NIT policy. After the NIT policy, income distribution is truncated at the poverty line because the equivalized income for households is more equal than the poverty line. The new distributions have a spike resulting from the increase in poorer households. The new distributions are narrower than the original distribution, suggesting that households' incomes are converging. Moreover, the FT financing is more right-skewed than PT financing. Therefore, an equal tax rate to finance NIT leads to a higher tax burden for households in the lowest group, making the income distribution very narrow for these households. It is consistent with the results in Table 8.

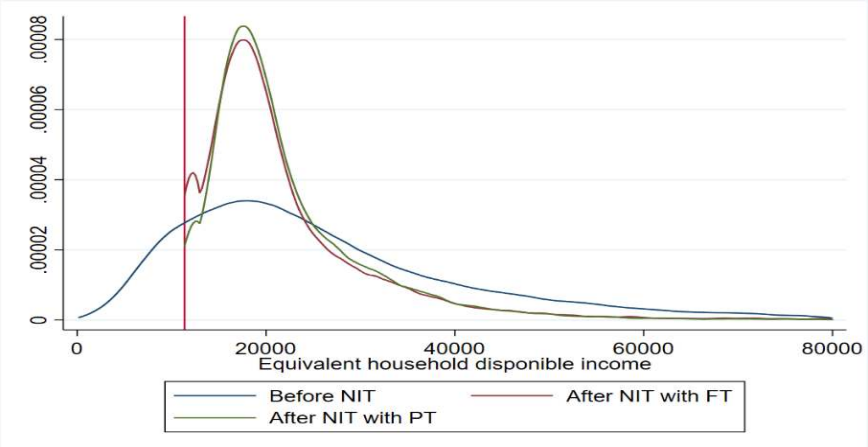

Figure 19. Income distribution density before and after NIT policy

4.4.2. Poverty

The policy of NIT is mainly aimed at the elimination of poverty. Therefore, the payment of NIT corresponds to the poverty line, i.e., 50% of the median income of the sample. As can be seen in Table 9, poverty decreases to zero with the implementation of the NIT policy.

Table 9
Poverty metrics before and after NIT policy

	Before NIT	After NIT with FT	After NIT with PT
Headcount ratio	0.142	-	-
Income gap ratio	0.287	-	-
Poverty gap ratio	0.041	-	-
Clark et al. index	0.0475	-	-
FGT index	0.143	-	-
Sen index	0.057	-	-
SST index	0.078	-	-
Takayama index	0.039	-	-
Thon index	0.078	-	-
Watts index	0.056	-	-

Figures 20 and 21 show the difference between the poverty gap curves (PG) before and after the NIT policy with FT and PT. PG falls sharply from 0.041 to zero after the implementation of NIT programme. 14.28% of the sample earns less than the poverty line before the NIT policy; however, households' equivalized disposable income is greater or equal to the poverty line after NIT policy.

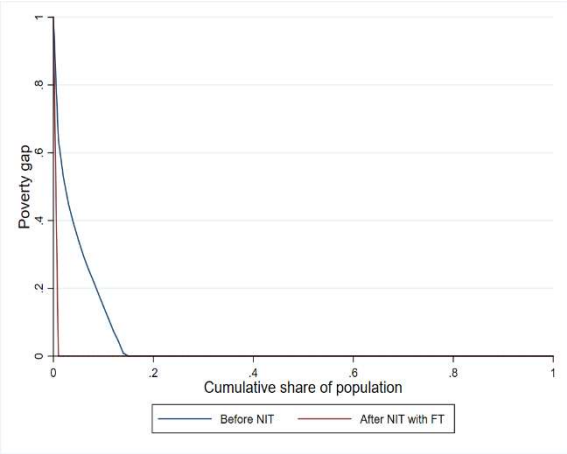

Figure 20. Difference in PG curves before and after NIT with FT

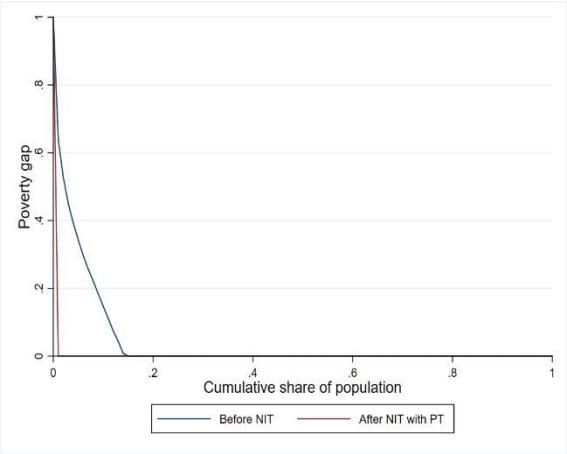

Figure 21. Difference in PG curves before and after NIT with PT

Figures 22 and 23 show the difference between the Foster-Greer-Thorbecke (FGT) curves before and after the NIT policy funding with FT and PT. The FGT index follows a declining trend, falling from 0.143 to zero in two cases.

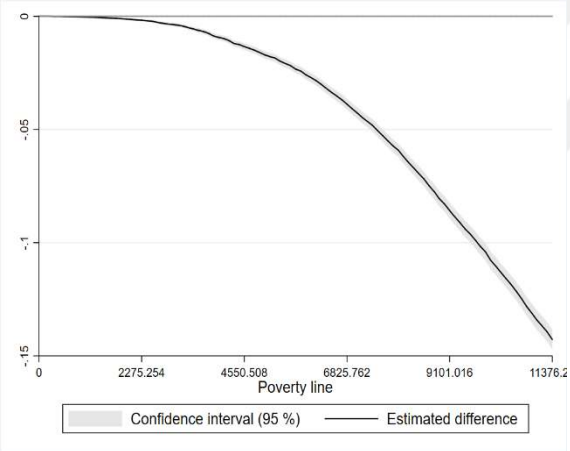

Figure 22. Difference in FGT curves before and after NIT with FT

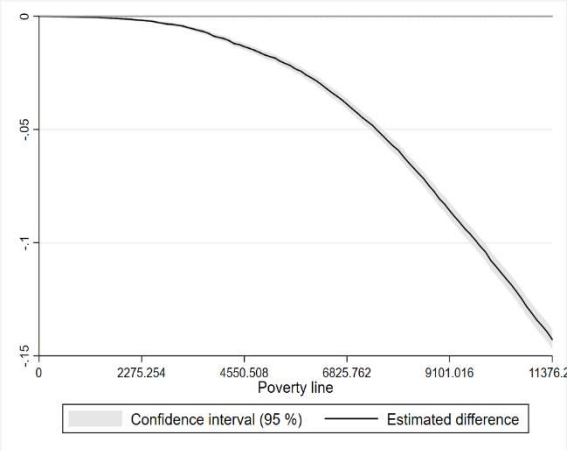

Figure 23. Difference in FGT curves before and after NIT with PT

4.4.3. Financing

The additional cost of NIT is covered by household income tax payments. For this reason, the initial and effective tax rates are determined for two different financing options, FT and PT. The steps for determining the tax rates are described in detail in the subsection on empirical methodology. Figure 24 shows the tax rates before and after the NIT policy. When the cost of the NIT policy is financed with FT, the tax rate is 41.94% for all households whose incomes are above the breakeven income level. On the other hand, if the cost of the NIT policy is financed with PT, the tax factor is 1.85, which means

that the tax burden of each household is multiplied by 1.85. Households in the lowest decile have an average tax burden of 13.69% of equivalized disposable income before the NIT policy; however, the effective tax burden is almost zero after the NIT policy. On the other hand, households in the highest decile have an average tax burden of 23.36% of equivalent disposable income before the NIT policy; however, the average net tax burden is 40.67% of that after the NIT policy with FT and 42.88% of that after the NIT policy with PT. As also shown in Table 8, the PT financing scheme favours the poorer households and the FT financing scheme favours only the richest decile.

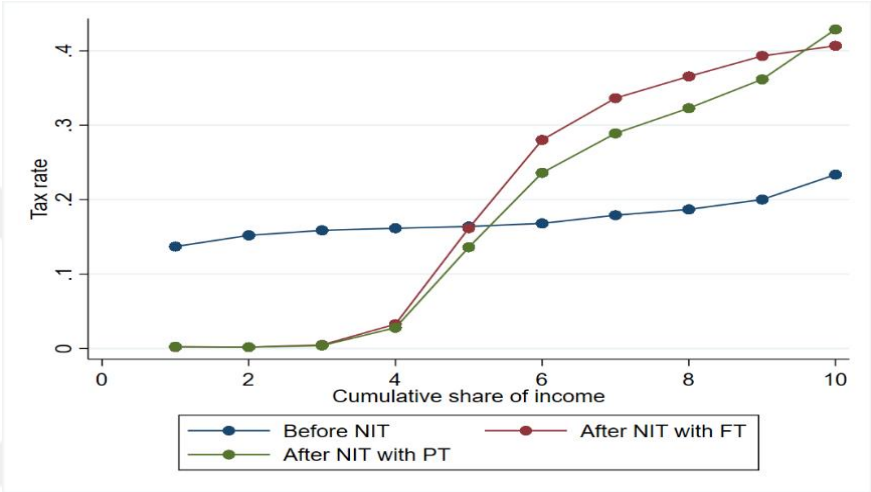

Figure 24. Tax rates before and after NIT policy

So far, the results of static microsimulation analysis are based on a sample determined by TurkStat. Undoubtedly, this sample is sufficient to show the distribution and sources of income in the Turkish economy, but a macro perspective is necessary to study the applicability of the NIT system in Turkey. However, there is no information on gross household income and equivalence scale, i.e., the number and age of family members. Therefore, the cost of the NIT policy cannot be accurately estimated. Compared to BI, the cost of the policy NIT is lower and more affordable. Table 10 provides general information on the NIT scheme.

Table 10
Descriptive statistics on NIT scheme

Total gross taxable income	₺1077.30 million
Total tax revenue	₺452.92 million
Total initial taxes	₺303.14 million
Total negative income tax payment	₺149.78 million
Median income	₺22752.54
Poverty line	₺11376.27
Flat tax	41.94%
Factor of tax	1.85

4.5. Concluding Remarks

This chapter further develops the problem-oriented approach by offering a solution to the poverty problem. The negative income tax (NIT) provides a certain level of benefits or a reverse tax payment, but then gradually withdraws those benefits when labor income falls below the breakeven income level of household income. The applicability of NIT and its financing are frequently debated in the literature. Given the inadequacies of existing policies to address income inequality and high poverty rates, NIT is discussed as an alternative social policy, and its costs, financing options, and impacts are analyzed.

Regarding the empirical methodology, a tax and benefit microsimulation model was developed to estimate incomes before and after redistribution NIT and the introduction of an additional income tax. Two alternative financing options, i.e., a flat tax and a progressive tax system, are defined. Then, the impact of the NIT policy on various determinants of income distribution and poverty is presented. In addition, the applicability of NIT to Turkey is briefly discussed.

The household-based scenario shows that the Atkinson index from 0.123 to 0.055, the Gini index decreases from 0.381 to 0.240, and the Theil index from 0.284 to 0.133 after NIT with FT financing scheme. It can be covered with the flat tax of 41.94% of the income. On the other hand, the Atkinson index decreases from 0.123 to 0.044, the Gini index decreases from 0.381 to 0.216, and the Theil index decreases from 0.284 to 0.104 after NIT with PT financing scheme. It can be covered by the progressive tax by multiplying the current income tax by 1.85. It should be noted that the cost of NIT is

lower and more affordable than BI. It also eliminates poverty by providing all households with an equivalent income greater or equal to the poverty line.

The sample collected by TurkStat is used to conduct empirical analyses. However, there is no information on equivalised gross household income below or above the breakeven income level in a macro perspective for Turkey. Therefore, the cost of the NIT policy cannot be accurately estimated for Turkey.

This chapter reports the results of a static microsimulation study. A dynamic analysis can account for individual labor supply and household consumption patterns in response to additional NIT payments. Thus, the future implementation of the NIT policy can be evaluated in a broader context, taking into account possible alternative sources of funding and individual and household behavior. For example, the elasticity of labor supply to social transfers could be calculated. This topic can be further explored in future studies using new data or other methods.

CHAPTER V

CHILD BENEFIT

5.1. Introduction

This chapter presents the first step of the social policy measures proposed in this thesis to alleviate poverty. Child poverty is defined as the percentage of children, persons under aged 18, living in households with an equivalized disposable income below the national poverty line. Since children are the most important element in securing and sustaining the economic and social development of nations, child poverty has lasting and far-reaching effects, as it also affects the development process of society and the speed of its development process. A person who has not overcome child poverty in his or her later years may pass on poverty to other generations.

Since the adoption of the United Nations Convention on the Rights of the Child, the impact of social assistance policies on child poverty, injustice, and social change has also moved higher on the policy agenda (Spencer, 2000; Fiedler and Kuester, 2010). A number of researchers have conducted extensive research with Euromod for European countries to compare the effects of cash benefits in their tax and benefit systems on child poverty (e.g., Immervoll et al., 2000; Sutherland, 2001; Makovec et al., 2006). Moreover, these studies have often emphasized the critical role of social transfers in alleviating child poverty (e.g., Matsaganis et al., 2006; Wagle, 2013; Barrientos et al., 2014; Marx et al., 2015; Bárcena-Martínet et al., 2021). Gibbons and Blanden (2006) show for the United Kingdom that poor youth in the 1970s were twice as likely to be poor in adulthood as their nonpoor peers. Because the adverse effects of deprivation on human development tend to be magnified, it is likely that people who were more affected by poverty in childhood will have greater difficulty escaping poverty as adults (Wagmiller and Adelman, 2009).

There are four types of child support studies: benefit incidence, actual reform, policy import, and freestyle reform. Freestyle reform studies are hypothetical studies that are not based on a specific policy from other countries. Researchers in these studies design their own policies, which may be based on existing policies or theoretical policy ideas. Freestyle scenarios are similar to what-if scenarios. Researchers experiment with different policies to study how they affect the distribution of benefits and other welfare

indices. These exercises help us evaluate the efficiency and equity of the current system. (e.g., Sutherland, 2001; Levy et al., 2007, 2013; Urban and Pezer, 2018)[11].

There are several descriptive and empirical studies on CB; however, this chapter is the most comprehensive study, i.e., on the costs, benefits, and possible financing strategies of a CB policy in the Turkish context. Moreover, this chapter fills the gap in the literature by using the microsimulation method to analyse income inequality and poverty through income redistribution after CB policy. Turkey, as a developing country with difficult characteristics for CB, such as high income inequality, high poverty, high youth unemployment and large population, would be an instructive example for other economies, especially developing countries. In addition, a significant portion of the labour force earns the minimum wage, so the median income is close to the minimum wage. The costs, benefits, and financing options of a possible CB system for Turkey are the main focus of this chapter.

The studies that have been conducted on CB in the Turkish context are quite limited. Dayıoğlu (2007) examines the main determinants of child poverty in Turkey using data from the 2003 household budget survey, and it is expected that different monetary measures would yield different results. Therefore, five poverty measures are examined to determine the sensitivity of poverty rates depending on the measure chosen. The child poverty rate in this paradigm is calculated using monthly consumption expenditures, including imputed rent, and annual consumption expenditures, excluding the income of working children. The study highlights the discrepancies between income- and consumption-based measures. Income- and consumption-based multivariate analyzes are conducted to examine the causes of child poverty. Results show that the determinants of child poverty vary by the measurement technique used and between urban and rural areas. According to the data, consumption poverty was lower than income poverty, and the work efforts of children and mothers contributed to reducing child poverty. In addition, the work status of the household head and the employment sector were identified as determinants of child poverty. In particular, non-working household heads were identified as a risk factor for child poverty. It is also said that the likelihood of child poverty increases when there are more family members in the household. Dayıoğlu and

[11] For a more detailed literature review, see Bradshaw (2002), Heckman (2006), Brady et al. (2009), Vidyattama et al. (2013), Navicke et al. (2014), Popova (2016), McLaughlin and Rank (2018), Popova ad Navicke (2019), and Parolin (2021).

Demir-Şeker (2016) uses a nationally representative four-year panel to examine the dynamics of child poverty in Turkey. Over a four-year period, 51.4% of 0-6-year olds are affected by poverty, which is significantly higher than the cross-sectional average of 32.2%. During the entire observation period, 30% of poor children, or 15.4% of the child population, are affected by poverty. In addition, about half of the population suffers from acute material deprivation. Due to the low level of social support available to children in Turkey, their well-being depends mainly on their parents' success in the labor market. Children living in households headed by unemployed or insecure workers who are younger and less educated are more likely to be permanently impoverished and suffer severe material deprivation. Gurdal (2019) adds to the body of knowledge by focusing on the decade of change in child poverty in Turkey. In this context, several studies are conducted to analyze child poverty in Turkey between 2007 and 2017 using micro-data sets from the Income and Living Conditions Surveys of the Turkish Institute of Statistics. At the beginning of the study, the changes in the composition of the determinants of child poverty are examined. Then, the predictors of child poverty in 2007 and 2017 are examined using the relative and absolute income levels identified in this study. In each study, a decade of changes in the determinants of child poverty is considered. Finally, to better understand child poverty in Turkey, the sources of children's household income are examined in depth. Aran et al. (2021) predict that Covid-19 will have an impact on child poverty in Turkey. The microsimulation model analyzes the impact of labor income losses on household expenditures based on the 2018 Household Budget Survey, taking into account that certain jobs/sectors might be more sensitive to the Covid-19 shock than others. Using an income elasticity model, the loss of labor income leads to a decline in monthly family spending. In Turkey, expenditure-based child poverty increases by 4.9-9.3% from a baseline of 15.4%. Of the hypothetical cash transfer scenarios examined, universal child benefits for children ages 0-17 had the largest impact on reducing child poverty, but programs targeting the lowest 20-30% of families are more cost-effective in reducing poverty.

The costs, benefits, and financing options of a possible CB system for Turkey are explained using the available individual and household data from TurkStat surveys. It allows performing a static tax-benefit microsimulation analysis showing household income without and with CB under the different financing options, i.e. flat and progressive taxes. The amount of CB for a household with children whose income is below the poverty line is the difference between the poverty line, 50% of the median

income multiplied by the equivalence scale, and its gross income. Following the seminal paper by Hagenaars et al. (1994), the equivalence scale is set at 1 for the first adult, 0.5 for the other adults, and 0.3 for the children[12]. When the cost of CB is financed with a flat tax scheme, the Atkinson index decrases from 0.122 to 0.093, the Gini index drops from 0.379 to 0.326, and the Theil index falls from 0.282 to 0.223. It can be covered with a flat tax of 25.28% for households whose gross income is above the poverty line. On the other hand, if the cost of CB is financed with a progressive tax scheme, the Atkinson index decrases from 0.123 to 0.083, the Gini index drops from 0.379 to 0.311, and the Theil index falls from 0.284 to 0.193. It can be covered with the progressive tax by multiplying the current tax by 1.12 for households whose gross income is above the poverty line. Note that the CB is paid by households whose incomes are above the poverty line, these taxes are based on the market income of this group. Regarding poverty rates, unlike BI and NIT, poverty is alleviated because households with children whose income is below the poverty line receive the benefit, not all households below the poverty line.

The remainder of the paper is organized as follows. Section 5.2 presents the theoretical framework on the child poverty. Section 5.3 describes the specification of the data and the empirical methodology. Section 5.4 reveals the costs, benefits, and financing schemes of a possible CB policy, followed by concluding remarks in Section 5.5.

5.2. Theoretical Framework

Child poverty has been the center of interest among academics, researchers, and policymakers since the early 1990s. Studies on the poverty situation of children in different countries have gained importance. Since children are economically dependent on their families, income is the starting point. It is also assumed that the characteristics of household members are related to the factors of child poverty. Therefore, adult characteristics such as age, education level, marital status, and work status have been studied to understand the causes of child poverty.

It is almost impossible to change the poverty status of children without improving the economic level of their families. Family structures and parental characteristics that affect family income are critical to children's well-being. Adults should be helped to

[12] By following the exemplary papers by Bradbury and Jäntti (1999), Mejer and Siermann (2000), Oxley et al. (2001), an individual older than 17 years is called an adult, but an individual younger than 18 years is called a child.

integrate into the workforce, increase their productivity, and then achieve better positions in the labor market, as emphasized by the human capital theory of poverty. In this environment, education is critical to increase individuals' human capital to support their families. Harmon and Walker (1995) use cross-sectional data from the Family Expenditure Survey (FES) to assess the economic returns to education in the United Kingdom. They used minimum school-leaving age data to create a sample of males aged 18 to 64. Using a typical human capital model, they estimate that schooling represents a 15% economic gain for men. Their results support the notion that educated individuals support their families economically and minimize the likelihood of child poverty in such households. Heckman (2008) analyses the data on the importance of money and early attitudes on children's outcomes by organising the information given here and the results of related literature in psychology, education, and neuroscience using a basic economic model of skill development. It examines the effects of money and early life circumstances on children's outcomes by combining a basic economic model of skill development with literature in psychology, education, and neuroscience. The results show that (i) parental influences are important in child development, (ii) investments in early childhood must be distinguished from investments in late childhood, (iii) there is a trade-off between equity and efficiency in late investments but not in early investments, (iv) skills are created, not just inherited, and are diverse, (v) the traditional dichotomy between skills and abilities is misleading, and (vi) the distinction between nature and disposition is misleading.

Since family structure is another aspect that influences child poverty, one-person families are a threat to children. In this context, Jaentti and Danziger (1994) examine the incidence and causes of child poverty in Sweden and the United States. Data from the Luxembourg Income Survey for 1981 and 1987 for Sweden and for 1979 and 1986 for the United States are used in the analysis. Children living in single-parent families and children living in two-parent households were examined using two different models. In the United States and Sweden, weighted least squares regressions were used to assess child poverty by parental work status. The results show that working parents have a direct impact on reducing child poverty in both the United States and Sweden. The study highlights the importance of changes in welfare benefits for single parents and the introduction of active labor market policies. Christopher et al. (2002) conducted a study of parental marital status. They analyzed women and men separately by marital status and by whether they lived with their children under age 18, using data from the Luxembourg

Income Study. They ran a logistic regression and found that single women and their children were more likely to be poor. This conclusion can be explained by women's unequal work opportunities. For example, it is more difficult for women to enter the labor force. Women are also more likely than men to choose lower-paying jobs and move up later in their careers. They may also leave the labor force for longer periods of time due to family responsibilities such as child care. In this environment, labor market laws can help protect women from these harmful situations. Kickham and Ford (2009) use Current Population Survey data from the 50 United States to analyze the relationship between government policies to help couples maintain good marriages, divorce rates, and child poverty from a new perspective. Cross-sectional and time-series analyzes are conducted to predict the dependent variables divorce incidence and child poverty, and two logistic regressions are used. They conclude that there is a consistent relationship between divorce frequency and child poverty.

Income is considered the most important factor, and much work on child poverty uses money-related methods to identify poor children. However, there is a growing body of research that uses a multidimensional approach to identify disadvantaged children. For example, Roelen et al. (2010) examined child poverty in Vietnam using a multidimensional measure as an alternative and complement to monetary poverty measures. They use data from the 2006 Multiple Indicator Cluster Survey, which covers housing, education, and health. To construct aggregate poverty rates for children, they construct sub-indices for education, health, housing, water and sanitation, child labor, leisure, and social inclusion and protection, using a two-stage approach. Poverty quantiles are constructed for children based on the depth and severity of their poverty. According to the study's comprehensive methodology, one-third of children are classified as impoverished. Trani et al. (2013) conduct a study for children in Afghanistan and focus on different aspects of child poverty. Their study uses data from the National Disability Survey of Afghanistan, which covers children ages 5 to 14. The study defines child poverty as a lack of essential skills, as poverty is seen as complex. Child poverty is measured by 10 different variables, including health, care, and food security. According to the findings, rural residents, women, and children with disabilities are more vulnerable to poverty than other groups in Afghanistan. The study also highlights the importance of characteristics such as education and health. Roche (2013) uses data from four rounds of the Demographic and Health Surveys in Bangladesh between 1997 and 2007 to illustrate multidimensional ways of measuring child poverty. This approach examines child

poverty using Alkire, Foster, and other measures. Nutrition, water, sanitation, health, housing, and access to radio or television are the characteristics used in the study to analyze child poverty. Using the composite multidimensional poverty measure, the researchers found that child poverty in Bangladesh declined significantly between 1997 and 2000. The results also suggest that improvements in health, nutrition, and sanitation had a significant impact on reducing poverty among the poor.

The wealth index has also been presented as an alternative index for measuring poverty using the DHS (Demografic and Health Surveys). To calculate the index, families are asked questions about their assets and services, such as sanitation, water supply, agricultural land ownership, and country-specific goods. Each family asset is assigned a weight. The data are normalized using the conventional normal distribution and five wealth quintiles are formed, from the lowest to the richest (Rutstein and Johnson, 2004). In using the wealth index to quantify child poverty, children in households with index values were sorted from lowest to highest. Children in poverty are represented by the lowest 10% or 20%. This approach is used to assess inequalities between children and other family members. In this context, Using the wealth index, Ainsworth and Filmer (2002) examine the likelihood that orphans are impoverished. They select 28 countries based on available data. The information comes from 39 surveys that collected information on orphan status, housing, school enrollment, etc. They categorize the orphans as maternal, paternal, or sibling. Each family is given an index score based on statistics about living conditions such as access to electricity, ownership of a refrigerator, and a television. As part of the index categorization, children are divided into the bottom 40%, the middle 40%, and the top 20%. Comparing the bottom 40% and top 20% of households with orphans, we find that impoverished households in South Africa and Senegal are more likely to have an orphan, while the opposite is true for poor households in Mozambique and Uganda. Given the variability in country-specific data on orphans, the study suggests that it is best to focus on impoverished children in general, including orphans, rather than on specific metrics for orphans.

In light of increasing debates about the choice between monetary and multidimensional measures of child poverty, Stewart and Roberts (2019) examine the propensity of national professionals from UK institutions such as local government and children's charities to estimate child poverty. They examine 251 responses from academics, researchers, and citizens to a 2012 UK government consultation paper on child poverty assessment. One of the questions asked whether experts preferred

multidimensional poverty metrics over monetary poverty measures. It also asked whether they would prefer a multidimensional poverty measure that used income as a variable. Another question related to the use of absolute rather than relative thresholds in the monetary measure. After analyzing the responses, it turns out that the vast majority of people consider money to be the most important component of poverty. In addition, the majority of respondents favored a relative concept of poverty, and only a few expressed problems with measuring 60% of median equivalized income.

5.3. Data and Methodology

In this section, the raw data set is firstly presented. Afterwards, the net income is converted to gross income, taking into consideration income tax brackets in 2018. As for the empirical methodology subsection, the static tax-benefit microsimulation analysis is detailed by giving some references. Finally, the calculations of the tax rates with CB is presented.

5.3.1. The Data

To carry out the empirical analysis, the data set is extracted from the Income and Living Conditions Survey which was conducted in 2018. Although the survey dates back to 2018, the relevant data set was released in 2020. The Microdata Set of TurkStat, in which 84,152 individuals (63,258 of working age) and 24,924 households are included, is the most recent data set to avail. This individual level microdata derived from surveys is not publicly available and access to it is subject to permission. This data set provides useful information about the income at individual and household levels. In addition, it gives luxury of grouping the income by education level, health, employment, type and source. As a random sample of the population, it can be used unquestionably in income distribution analysis to get generalizable results. On the other hand, since the data set includes rich information on informal workers, it allows us to capture informal part of the employment.

In fact, the personal income distribution and poverty is generally analyzed by exploiting microdata. Therefore, the sample of the microdata set is borrowed as the sample of the analysis in this part. There is a coefficient in the data set that is assigned for each individual and household, which allows the analysis to be extended from sample to population. It is no more than a weight parameter that displays how powerful the sample

is in terms of representing entire population. Nonetheless, these coefficients had better be examined with prudence due to their probable deceptiveness while working on the variables except household size, such as household incomes, pensions, social benefits, and tax estimations. For this reason, the calculations are limited to the size of the data set.

The microdata set of TurkStat provides us with a more extensive and granular data since it contains detailed information on disposable income and social benefits. Having the opportunity of using after-tax incomes at individual and household level helps us to make more reliable comparisons and assess a means-tested policy and its implications without diverging from the definition of CB. This study presumes that income tax is the main financing tool for a CB policy. This assumption necessitates to recalculate gross incomes at household level. To that purpose, household level gross incomes are derived from net income by adding back the income taxes and then, required rate of the income tax that can finance the CB is calculated. For the net-to-gross conversion, income tax rate imposed in 2018 is used. Table 11 presents the income tax brackets in 2018.

Table 11
Income tax brackets in 2018

Tax rate	Description
15%	Annual income less than ₺14,800
20%	Annual income between ₺14,800 and ₺34,000 (₺2,220 for ₺14,800)
27%	Annual income between ₺34,000 and ₺80,000 (₺6,060 for ₺34,000) Annual income between ₺34,000 and ₺120,000 (₺6,060 for ₺34,000) for wage income
35%	Annual income above ₺80,000 (₺18,480 for ₺80,000) Annual income above ₺120,000 (₺29,280 for ₺120,000) for wage income

Using Table 11, the gross incomes are derived from net income on the household basis. The equation (35) shows the net-to-gross convertion.

$$GI = \begin{cases} \overbrace{\frac{1}{0.85} NI}^{\text{A}} & \text{if} \quad \text{A} < ₺14{,}800 \\ \overbrace{\frac{1}{0.80} \times \left(NI - (₺14{,}800 - ₺2{,}220)\right) + ₺14{,}800}^{\text{B}} & \text{if} \quad ₺14{,}800 \leq \text{B} < ₺34{,}000 \\ \overbrace{\frac{1}{0.73} \times \left(NI - (₺34{,}000 - ₺6{,}060)\right) + ₺34{,}000}^{\text{C}} & \text{if} \quad ₺34{,}000 \leq \text{C} < ₺120{,}000 \\ \overbrace{\frac{1}{0.65} \times \left(NI - (₺120{,}000 - ₺29{,}280)\right) + ₺80{,}000}^{\text{D}} & \text{if} \quad \text{D} \geq ₺120{,}000 \end{cases} \tag{35}$$

where GI stands for the gross income, NI stands for the net income, and the unit is Turkish lira (₺). Note that the equation (35) is available for the wage income. For the proprietors' income, the amounts ₺80,000 and 18,480 instead of 120,000 and 29,280, respectively are used for the highest income tax bracket.

5.3.2. Empirical Methodology

This chapter evaluates the distributional effects of a potential CB policy using a tax-benefit microsimulation model. Microsimulation models (MSMs) are tools that are able to simulate the effects of a policy on a sample of economic agents, i.e., individuals, households, and firms. Microsimulation models were introduced in the 1950s by Orcutt and his colleagues as a new approach in the social sciences to analyze the effects of social and economic policies by taking into account the micro-level characteristics and behavior of the units under study (Orcutt, 1957; Orcutt et al., 1961). This method of policy evaluation is based on the description of the economic environment of individual actors, in particular their financial constraints, as well as their possible behaviour. The objective of a policy simulation is to assess the impact of a change in the economic environment caused by a policy reform on a vector of activity and/or welfare indicators for each actor in a sample of observations (Bourguignon and Spadaro, 2005).

Microsimulation analysis is important and valuable for public policy analysis for two reasons. First, it can fully account for the variability of economic agents found in micro-data sets. The first step in measuring the impact of social and tax policies is to work with some typical actors, such as typical firms or typical families. While this provides a basic picture of the effects of reforms, it may mask unexpected effects caused by specific combinations of individual characteristics that do not come into play in typical situations. And even when many typical situations are studied, it is rarely clear how representative they are. Working with thousands of real economic agents instead of a few hypothetical

agents eliminates both of these problems. It is possible to predict who will be among the beneficiaries and losers of reform. Such data are critical for assessing the overall impact of the reform on the welfare of citizens and for considering the political economy variables that might impede its adoption. The second factor is the ability to adequately measure the total financial gains or costs of change. The MSM results can be summarised at the macro level, which allows the analyst to examine the impact of the policy on the government's budget constraint. Clearly, the standard approach does not provide such an accurate estimate of the budgetary cost of a policy change under typical circumstances (Li and O'Donoghue, 2013; Figari et al., 2015).

The most basic use of tax-benefit simulation models is to show the change of the proposed policy on the household without changing the characteristics of the household. In this study, it is aimed to determine the effect of a possible CB policy on disposable income and poverty with the application of flat and progressive taxes. The fact that CB is financed through taxes reveals the importance of the tax-benefit simulation model. It is planned to be given to the households with children whose income is below the poverty line with income mean-tested.

The gist of the methodology is that income tax paid by the households compensate the incremental cost of CB. First of all, to conduct a household-level analysis, the amount of CB is determined. Each household with children whose income is below the poverty line is granted the the difference between poverty line multiplied by its eligibility score and gross household income. This eligibility score is a kind of equivalence scale is a useful tool to compare households of different sizes. It is basically equal to the weighted sum of the number of individuals within the household. Following the seminal paper by Hagenaars et al. (1994), known as OECD scale, the weight for the reference person is 1, that of other adults and children are 0.5, and 0.3 respectively. The equivalence scale is formulated as follows.

$$e = \left(1 + 0.5\ (n_a - 1) + 0.3 \times (n_c)\right) \tag{36}$$

where e stands for the equivalence scale, n_a specifies the number of adults, and n_c represents the number of children. Then, equivalent or equivalence scale-adjusted income for the household, y_d, is calculated by dividing the disposable income of household, Y_d, by the equivalence scale coefficient, e:

$$y_d = \frac{Y_d}{e} \tag{37}$$

In the case where CB is paid at the household level rather than the individual level, each household with children whose income is below the poverty line receives $(PL \times e - GI_i)$ amounts of Turkish lira where PL denotes the poverty line.

To keep it simple, consider a rudimentary economy in which there exists I households and each household i has a gross income of GI_i, a net income of NI_i, an initial tax payment of $T_i = GI_i - NI_i$, and an initial tax rate of $t_i = T_i/GI_i$. Irrespective of the number of tax brackets, there is a tax rate for each taxpayer as their both gross and net incomes can differ. The marginal cost of CB to the overall economy is financed by imposing more income tax on households once CB is disbursed to every household with children whose income is below the poverty line, hence income is redistributed.

There are two funding options. First, the cost of CB is financed with a flat income tax, i.e., an equal income tax rate for each household. Taking into account the additional cost of CB payments and the gross equivalent income of the household, the appropriate flat tax rate to ensure a balanced budget is calculated as follows.

$$t_{f,CB} = \frac{\sum_i^I T_i + \sum_i^I CB_i}{\sum_i^I GI_i} \tag{38}$$

where $t_{f,CB}$ is flat tax rate for CB policy, $\sum_i^I T_i$ is the initial tax receipts, $\sum_i^I CB_i$ is the additional cost of CB payments paid to households with children whose income is below the poverty line, and $\sum_i^I GI_i$ is the sum of the gross household income above the poverty line.

Secondly, the cost of CB is financed with progressive income tax, i.e., average tax burden positively depends on the income. Therefore, the incremental cost of the CB payments is equal to the difference between the new tax payments, $T'_{i,CB}$, and the initial tax payments, T_i:

$$\sum_i^I CB_i = \sum_i^I T'_{i,CB} - \sum_i^I T_i \tag{39}$$

Suppose that the initial tax rate of each household is multiplied by a factor $f_{CB} = T'_{i,CB}/T_i$. Rearranging the equation (39) yields,

$$\sum_i^I CB_i = \sum_i^I (f_{CB} \times T_i) - \sum_i^I T_i \quad (40)$$

Rearranging the equation (40) becomes,

$$\sum_i^I CB_i = (f_{CB} - 1) \sum_i^I T_i \quad (41)$$

The left side of the equation (41) is the CB's total cost, and the right side is the total initial tax collection multiplied by $(f_{CB} - 1)$. The factor f is also equal to the ratio of the CB's total cost to the total initial tax collection. We can calculate the required increase in the income tax rate, namely the factor f, given the fact that the recipients and the amount of CB and initial taxes are known. The progressive tax can be calculated by multiplying the factor by initial tax rates for each household whose income is above the poverty line.

$$t_{p,CB} = (f \times t_i) \quad (42)$$

Similar to NIT policy, the effective tax rate is equal to the tax rates after CB policy. The effective tax rate, $t_{e,CB}$, can be denoted, $t_{e,CB} = \frac{T'_{i,CB}}{GI_i}$ for the households whose incomes are above the poverty line, and $t_{e,CB} = \frac{T'_{i,CB}}{GI_i + CB}$ for the households with children whose income are below the poverty line. Because $T'_{i,CB} = \sum_i^I T_i + \sum_i^I CB_i$, the effective tax rate is equal to the tax rates calculated after CB policy for the households whose incomes are above the poverty line and for the households without children whose income is below the poverty line. On the other hand, the households with children whose income are below the poverty line receives tax benefit, therefore, their effective tax rate is equal to zero.

Based on the information on CB payments, CB_i, and the new tax rates, $t_{f,CB}$ and $t_{p,CB}$, the net income of each household under the policy can be calculated. Atkinson, Gini, and Theil indices and other income distribution statistics such as P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 can be derived. P90/P10 is the ratio of the upper limit of the ninth decile to that of the first income decile. P90/P50 is the ratio of the upper limit of the ninth decile to that of the fifth income decile. P10/P50 is the ratio of the upper limit of the first decile to that of the median income. Similarly, P25/P75 is the ratio of the upper limit of the first quartile to that of the third income quartile. S80/S20 represents the ratio

of the average income of the richest quintile to that of the poorest quintile of the population. The change in income distribution can be observed with high sensitivity thanks to these indicators. The Gini coefficient provides information about the middle part of the income distribution, while the Theil index focuses on the ends. Therefore, the Theil index is able to analyze the welfare of the poor more thoroughly and capture sensitive results. On the other hand, the Atkinson index is more sensitive to changes at the bottom of the income distribution. However, the Gini coefficient is still a useful indicator because the entire population is affected by policy changes. As for poverty metrics, all measures are described in terms of shortfalls of income. The headcount ratio is the simplest and most familiar measure of poverty; however, it is a poor guide for allocating resources. Similar to the headcount ratio, the poverty gap ratio is very useful for description, but it too is a poor guide for resource allocation. The Watts index is a simple poverty metric that satisfies the transfer axiom. Clark et al., FGT, Sen, SST, Takayama, Thon, and Watts indices are the extended versions of the above simple poverty metrics.

The poverty line and median income can be easily calculated using micro data. The poverty line is determined as half of the median income, and is calculated as ₺11523.86. The calculated poverty line for the CB policy differs from that for the BI and NIT policies because of the change in adult and child ages and the equivalence scale. Households whose annual equivalized income is below the poverty line are classified as poor. Social benefits paid to households can be calculated. In addition to reporting the impact of policies on income distribution, the change in income groups of the population is also analyzed and the impact of policies on income distribution is reported while the poverty rate is calculated. Ten income groups are defined among households based on income calculated considering the impact of CB and the new income tax. In this way, the post-policy income distribution is revealed and it is determined who made gains or losses after the introduction of the policy. Note that the pre-policy poverty line is used because otherwise it would not be possible to properly compare the pre-policy and post-policy situation. Similarly, the pre-policy income groups are retained to analyze the impact of the policy on their incomes. Two different cases based on financing decisions are presented. In all cases, income distribution and poverty are analyzed at the household level using equivalized income.

5.4. Empirical Findings

This chapter consists of three subsections: income inequality, poverty, and finance. These subsections highlight the implications of a CB policy for income redistribution and poverty eradication, as well as the financing options for a possible CB system.

5.4.1. Income Inequality

As explained earlier, the cost of CB is financed with a flat tax (FT) or a progressive tax (PT). Under these two financing options, the rich are taxed more heavily so that the income distribution is more equal. Table 12 shows the results for two different cases. The current value of the indicators is also given for comparison.

As clearly seen in Table 7, all indicators point to a more equal income distribution after CB policy. One of them, the Gini index, decreases from 0.379 to 0.326 after CB with FT and to 0.311 after CB with PT. Another indicator, the Theil index, decreases from 0.282 to 0.093 after CB with FT and to 0.083 after CB with PT. The effectiveness of the CB policy can also be seen in the P90/P10, P90/P50, P10/P50, P25/P75, and S80/S20 ratios. This is as expected, since paying CB increases the income of the poorest part of the population by eliminating child poverty, while the high-income tax rate reduces the income of the richest. In terms of financing options, the effect of the progressive tax on income distribution is clearly better than that of the flat tax. Therefore, middle-income households pay more taxes FT, as Table 13 also shows. They thus become net payers and their income fall below the initial income level.

Table 12
Income distribution before and after CB policy

	Before CB	After CB with FT	After CB with PT
Mean	29555.24	23170.08	23358.97
Gini index	0.379	0.326	0.311
Atkinson index	0.122	0.093	0.083
Theil index	0.282	0.223	0.193
CoV index	1.023	0.946	0.846
P90/P10	5.289	3.363	3.384
P90/P50	2.278	2.148	2.068
P10/P50	0.431	0.639	0.611
P25/P75	0.438	0.479	0.487
S80/S20	6.947	4.521	4.342

Table 13 shows the change in income for each decile. The number of gainers and losers is the same for CB with FT and PT because households whose incomes are below the breakeven income level receive the payments from CB and the rest of the sample pays that amount. In terms of poverty reduction, funding CB with PT is feasible because middle-income households pay less in taxes than funding CB with PT. Looking at net payers and recipients in detail, we see that the bottom 20% of the population increases their average income with FT and PT, while the income of the rest of the population decreases.

Table 13
Change in income before and after CB policy

	After CB with FT	After CB with PT
Poorest 10%	53.73%	53.73%
Second 10%	5.39%	5.39%
Third 10%	-15.47%	-12.87%
Fourth 10%	-21.05%	-16.70%
Fifth 10%	-21.71%	-17.68%
Sixth 10%	-22.73%	-19.00%
Seventh 10%	-24.00%	-20.67%
Eighth 10%	-24.78%	-22.08%
Ninth 10%	-26.13%	-24.48%
Richest 10%	-27.93%	-32.21%
Number of gainers	6,178	6,178
Number of losers	18,743	18,743

Figure 25 shows the Lorenz curves before and after the CB policy. The Lorenz curve shifts upward, implying that the income distribution is more equal. While households in the lowest quintile have 6.46% of income before the CB policy, they have 9.30% of income after CB with FT and 9.32% of income after CB with PT. On the other hand, households in the highest quintile have 44.84% of income before CB policy, they have 42.05% of income after CB with FT and %40.46 of income after CB with PT. Figure 26 shows the difference in Lorenz curves the difference in Lorenz curves between FT and PT financing options. While the highest quartile has a higher share of income with FT financing, the other quartiles have a higher share of income with PT financing. The cumulative share of income for the first four quartiles is 57.95% with FT financing and 59.54% with PT financing. The difference between these two financing options at the end of the 4^{th} quartile is at most 1.59%.

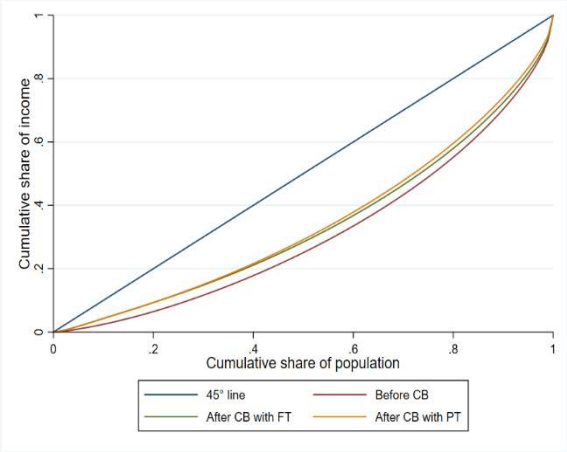

Figure 25. Lorenz curves before and after CB policy

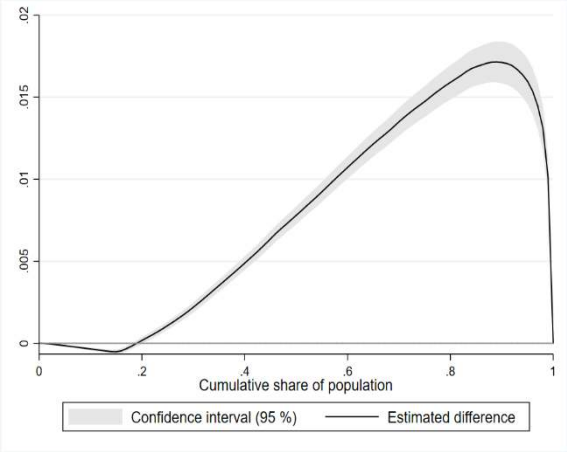

Figure 26. Difference in Lorenz curves of the FT and PT financing scheme

Figure 27 shows the income distribution before and after the CB policy. After the CB policy, income distribution is not truncated at the poverty line because households without children whose income is below the poverty line do not receive the any benefit. The new distributions have a spike due to the increase in income of poorer households with children. The new distributions are narrower than the original distribution, suggesting that households' incomes are converging. Moreover, the financing of FT is more right-skewed than that of PT. Therefore, an equal tax rate to finance CB leads to a higher tax burden for households in the lowest group, making the income distribution very narrow for these households. It is consistent with the results in Table 13.

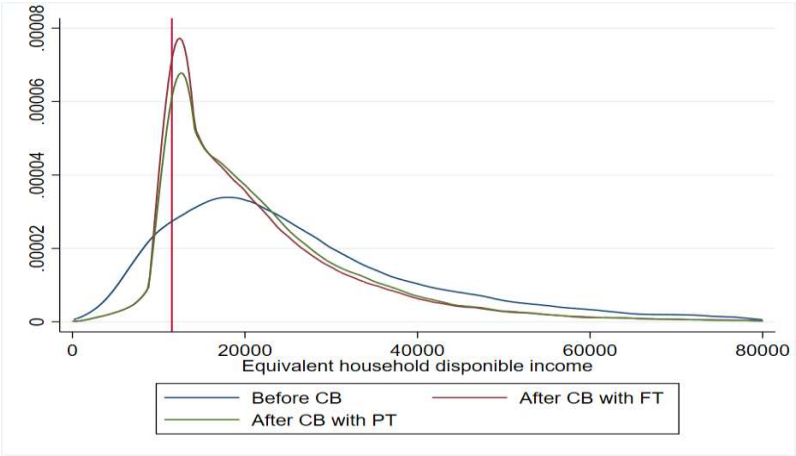

Figure 27. Income distribution density before and after CB policy

5.4.2. Poverty

This chapter is primarily concerned with alleviating poverty. Therefore, CB

payments are equal to the difference between the poverty line, multiplied by the equivalence scale, and the households with children whose gross income is above the poverty line. As shown in Table 3, poverty has declined due to the implementation of the CB policy. The headcount ratio decreases from 0.140 to 0.024 after CB with FT and 0.026 after CB with PT. Similarly, all poverty indices decrease relative to the baseline. As can be clearly seen in Table 14, the CB policy alleviates poverty.

Table 14
Poverty metrics before and after CB policy

	Before CB	After CB with FT	After CB with PT
Headcount ratio	0.140	0.024	0.026
Income gap ratio	0.285	0.272	0.274
Poverty gap ratio	0.040	0.006	0.007
FGT index	0.140	0.155	0.131
Watts index	0.055	0.019	0.019
SST index	0.077	0.027	0.027
Clark et al. index	0.046	0.008	0.008
Sen index	0.056	0.009	0.010
Thon index	0.077	0.013	0.014
Takayama index	0.038	0.006	0.007

Figures 28 and 29 show the difference between the poverty gap (PG) curves before and after the CB policy with FT and PT. PG decreases from 0.040 to 0.006 after CB with FT and to 0.007 after CB with PT, by decreasing sharply for the share of the population. The households with children whose income is below the poverty line is equal to 12% of the sample before the CB policy; however, the equivalized disposable income for households with children is more or equal to the poverty line after the implementation of CB programme.

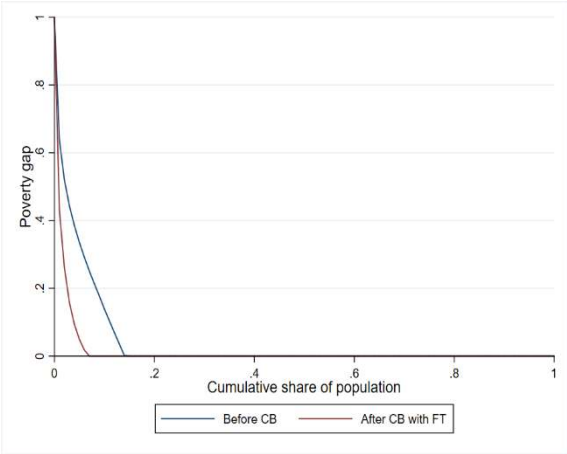

Figure 28. Difference in PG curves before and after CB with FT

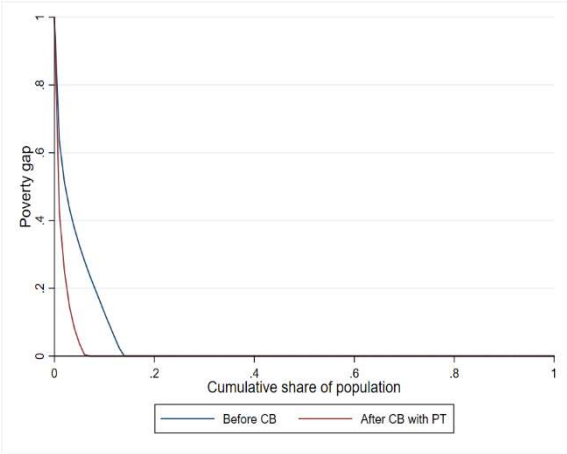

Figure 29. Difference in PG curves before and after CB with PT

Figures 30 and 31 show the difference between the Foster-Greer-Thorbecke (FGT) curves before and after CB policy funding with FT and PT. The FGT index rises from 0.140 to 0.155 after CB with FT, and decreases from 0.140 to 0.131 after CB with PT.

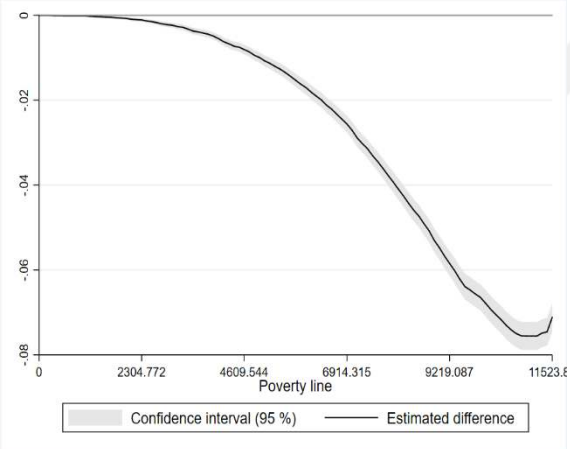

Figure 30. Difference in FGT curves before and after CB with FT

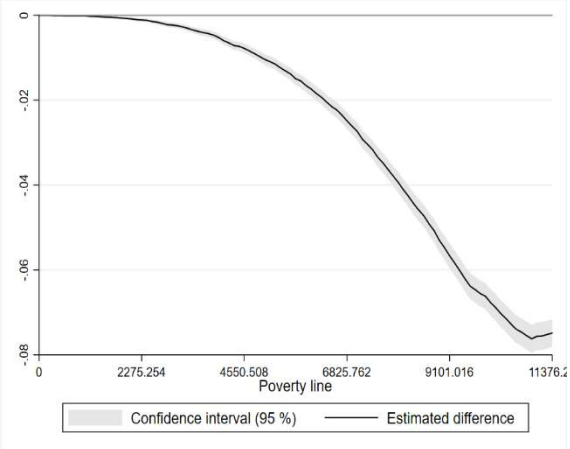

Figure 31. Difference in FGT curves before and after CB with PT

5.4.3. Financing

The additional cost of CB is covered by household income tax payments. For this reason, the gross and net (effective) tax rates are determined for two different financing options, FT and PT. The steps for determining the tax rates are described in detail in the subsection on empirical methodology. Figure 32 shows the tax rates before and after the CB policy. When the cost of the CB policy is financed with FT, the tax rate is 25.28% for all households whose incomes are above the poverty line. In contrast, if the cost of the

CB policy is financed with PT, the tax factor is 1.12, meaning that tax burden of each households whose incomes are above the poverty line is multiplied by 1.12. Households in the lowest decile have an average tax burden of 13.61% of equivalized disposable income before the CB policy; however, the effective tax burden is 0.65% after CB with FT and 0.93% after CB with PT. On the other hand, households in the highest decile have an average tax burden of 24.77% of equivalized disposable income before the CB policy; however, the average net tax burden is 26.27% after CB with FT and 59.08% after the CB with PT. As also shown in Table 13, the PT financing system favours the poorer households and the FT financing system favours only the richest decile.

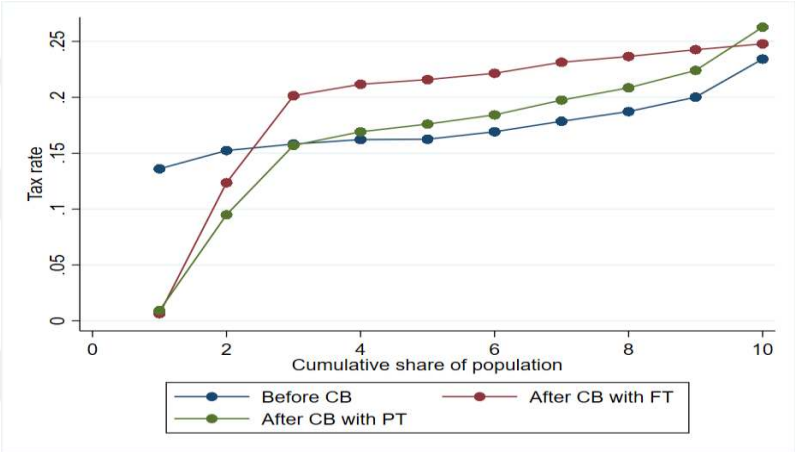

Figure 32. Tax rates before and after CB policy

So far, the results of static microsimulation analysis are based on a sample determined by TurkStat. Undoubtedly, this sample is sufficient to show the distribution and sources of income in the Turkish economy, but a macro perspective is necessary to study the applicability of the CB system in Turkey. However, there is no information on gross household income and equivalence scale, i.e., the number and age of family members. Therefore, the cost of the CB policy cannot be accurately estimated. Compared to BI and NIT, the cost of the CB policy is the lowest and most affordable. Table 15 provides some information on the CB scheme.

Table 15
Descriptive statistics on CB scheme

Total gross taxable income	1080.41 million TRY
Total tax revenue	398.68 million TRY
Total initial taxes	303.14 million TRY
Total CB payment	95.54 million TRY
Median income	23047.72 TRY
Poverty line	11523.86 TRY
Flat tax	36.90%
Factor of tax	1.12

5.5. Concluding Remarks

This chapter develops the problem-oriented approach by offering a solution to the poverty problem. The child benefit system (CB) is a regular cash payment made by a political community to households with children whose income is below the poverty line without being tied to resources or work. Given the inadequacies of existing policies to address unequal income distribution and high poverty rates, CB is discussed as an alternative social policy, and its costs, financing options, and impacts are analyzed.

Regarding the empirical methodology, a tax and benefit microsimulation model is developed to estimate income redistribution before and after CB and to introduce an additional income tax. Two alternative financing options, i.e., a flat tax and a progressive tax system, are defined. Then, the impact of the CB policy on various determinants of income distribution and poverty is presented. In addition, the applicability of CB to Turkey is briefly discussed.

The household-based scenario shows that the Atkinson index from 0.122 to 0.093, the Gini index decreases from 0.379 to 0.326, and the Theil index from 0.282 to 0.193 after CB with FT financing scheme. It can be covered with the flat tax of 25.28% of income. On the other hand, the Atkinson index from 0.122 to 0.083, the Gini index decreases from 0.379 to 0.311, and the Theil index from 0.282 to 0.123 after CB with PT financing scheme. It can be covered by the progressive tax by multiplying the current income tax by 1.12. In addition, poverty is alleviated because only the households with children whose income is below the poverty line receive child benefits equal to the difference between the poverty line, multiplied by equivalence scale, and their gross income.

The sample collected by TurkStat is used to conduct empirical analyses. However, there is no information on equivalised gross household income below or above the breakeven income level in a macro perspective for Turkey. Therefore, the cost of the CB policy cannot be accurately estimated for Turkey.

This chapter reports the results of a static microsimulation study. A dynamic analysis can account for individual labor supply and household consumption patterns in response to additional CB payments. Thus, the future implementation of the CB policy can be evaluated in a broader context, taking into account possible alternative sources of funding and individual and household behavior. For example, the elasticity of labor supply to social transfers could be calculated. This topic can be further explored in future studies using new data or other methods.

CHAPTER VI

CONCLUSION

6.1. Key Findings and Policy Recommandations

Poverty is a condition in which income is insufficient to meet all or most of the basic daily needs. The fight against poverty requires a multidimensional effort; therefore, economic and social policies must be reconciled. This thesis discusses basic income, negative income tax, and child benefit applications that are part of anti-poverty programs, both theoretically and empirically.

Basic income is the first problem-oriented approach that offers a solution to the problem of poverty. It is a regular cash payment made by a political community to all its members, without requiring them to have specific resources or to work. The applicability of BI and how it should be financed are frequently debated in the literature. Given the inadequacies of existing policies to address income inequality and high poverty rates, BI is discussed as an alternative social policy, and its costs, financing options, and impacts are analysed by implementing a tax-benefit microsimulation model. The household-based scenario shows that the Atkinson index drops from 0.123 to 0.040, the Gini index falls from 0.381 to 0.202, and the Theil index decreases from 0.284 to 0.095 after BI with FT financing scheme. It can be covered with a flat tax of 62.01%. On the other hand, the Atkinson index drops from 0.123 to 0.034, the Gini index decreases from 0.381 to 0.190, and the Theil index falls from 0.284 to 0.079 after BI with PT financing scheme. It can be covered by the progressive tax by multiplying the initial income tax rate by 2.89. It should be noted that the effective tax rate is lower than the aforementioned tax rates because BI is tax-free. In addition, it also eliminates poverty since all households receive an equivalized income that is greater or equal to the poverty line.

Negative income tax is the second problem-oriented approach that provides a solution to the problem of poverty. It provides a certain level of benefits or a reverse tax payment, but then gradually withdraws those benefits when labor income falls below the breakeven income level of household income. The applicability of NIT and its financing are frequently debated in the literature. Given the inadequacies of existing policies to address income inequality and high poverty rates, NIT is discussed as an alternative social policy, and its costs, financing options, and impacts are analyzed by implementing a tax-benefit microsimulation model. The household-based scenario shows that the Atkinson

index from 0.123 to 0.055, the Gini index decreases from 0.381 to 0.240, and the Theil index from 0.284 to 0.133 after NIT with FT financing scheme. It can be covered with the flat tax of 41.94% of the income. On the other hand, the Atkinson index decreases from 0.123 to 0.044, the Gini index decreases from 0.381 to 0.216, and the Theil index decreases from 0.284 to 0.104 after NIT with PT financing scheme. It can be covered by the progressive tax by multiplying the current income tax by 1.85. It should be noted that the cost of NIT is lower and more affordable than BI. It also eliminates poverty by providing all households with an equivalent income greater or equal to the poverty line.

Child benefit is the third problem-oriented approach that provides a solution to the problem of poverty. It is a regular cash payment made by a political community to households with children whose income is below the poverty line without being tied to resources or work. Given the inadequacies of existing policies to address unequal income distribution and high poverty rates, CB is discussed as an alternative social policy, and its costs, financing options, and impacts are analyzed by implementing a tax-benefit microsimulation model. The household-based scenario shows that the Atkinson index from 0.122 to 0.093, the Gini index decreases from 0.379 to 0.326, and the Theil index from 0.282 to 0.193 after CB with FT financing scheme. It can be covered with the flat tax of 25.28% of income. On the other hand, the Atkinson index from 0.122 to 0.083, the Gini index decreases from 0.379 to 0.311, and the Theil index from 0.282 to 0.123 after CB with PT financing scheme. It can be covered by the progressive tax by multiplying the current income tax by 1.12. In addition, poverty is alleviated because only the households with children whose income is below the poverty line receive child benefits equal to the difference between the poverty line, multiplied by equivalence scale, and their gross income.

Regarding the empirical methodology, a tax and benefit microsimulation model is developed to estimate income distribution before and after BI, NIT and CB policies and to introduce an additional income tax. Two alternative financing options, i.e., a flat tax and a progressive tax system, are defined for all policies. Then, the impact of the BI, NIT and CB policies on various determinants of income distribution and poverty are presented. In addition, the applicability of BI, NIT and CB policies for Turkey is discussed. To carry out the empirical analysis, the data set is extracted from the Income and Living Conditions Survey which was conducted in 2018. Although the survey dates back to 2018, the relevant data set was released in 2020.

For the empirical analysis, the sample collected by TurkStat is used. However, a macro perspective is necessary to show the applicability of the BI system in Turkey. With a large population with significant poverty, the tax-free BI policy is quite expensive. A large part of the population earns the minimum income and is engaged in the shadow economy. In addition, the labor force participation rate is quite low. These costs can be offset by various financing options, such as carbon taxes, property taxes, or elimination of other supports.

Basic income stands out to as the most effective policy, but the tax-free BI policy is quite expensive. In Turkey, a large part of the population receives the minimum income and engaged in the shadow economy. In addition, the labor force participation rate is quite low. These costs can be offset by various financing options, such as carbon taxes, property taxes, or the elimination of other supports. On the other hand, the cost of the negative income tax policy is lower and more affordable compared to basic income policy. However, the cost of the negative income tax policy for Turkey cannot be accurately estimated since there is no information on gross household income and equivalence scale, i.e., the number and age of family members. Finally, the cost of the child benefit policy is the lowest and most affordable, but the cost of the child benefit policy for Turkey cannot be accurately estimated, similar to the negative income tax policy. As for the financing scheme, the impact of the progressive tax financing scheme on income inequality and poverty is clearly better than that of the flat tax financing scheme, since high-income households pay more taxes in the progressive tax financing scheme, while middle-income households pay more taxes in the flat tax financing scheme.

6.2. Limitations and Directions for Future Research

This thesis is based on individual-level microdata from surveys, so there are some limitations due to the characteristics of the dataset. First, the dataset comes from the Income and Living Conditions Survey, conducted in 2018. Although the survey is from 2018, the relevant dataset was published in 2020. To provide a more consistent and up-to-date analysis, the analysis is updated each year with a newly published dataset. Second, there is no information on equivalised gross household income below or above the breakeven income level or poverty line in a macro perspective for Turkey. Therefore, the costs of the NIT and CB policies for Turkey cannot be accurately estimated.

In all chapters, the results of a static microsimulation study are reported. A

dynamic analysis, such as a computable general equilibrium (CGE) model with microsimulation, can account for individual labor supply and household consumption patterns in response to additional BI, NIT, and CB payments. Thus, the future implementation of the BI, NIT and CB policies can be evaluated in a broader context, taking into account possible alternative sources of funding and individual and household behavior. For example, the elasticity of labor supply to social transfers could be calculated. This topic can be further explored in future studies using new data or other methods.

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APPENDIX

Detailed Information on the Estimations

Table 16
Mean income

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	29237.42	189.67	154.15	0.00	28865.66	23218.95
After BI with FT	22526.93	88.83	253.59	0.00	22352.81	22701.05
After BI with PT	23064.98	78.55	293.62	0.00	22911.01	21474.03
After NIT with FT	22565.00	106.09	212.70	0.00	22357.06	22772.94
After NIT with PT	22595.16	91.47	247.03	0.00	22415.88	22774.44
For CB						
Current	29555.24	191.49	154.34	0.00	29179.91	29930.57
After CB with FT	23170.08	138.91	166.80	0.00	22897.80	23442.36
After CB with PT	23358.97	125.23	186.52	0.00	23113.50	23604.44

Table 17
Gini index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.381	0.003	122.627	0.000	0.375	0.387
After BI with FT	0.202	0.003	76.177	0.000	0.196	0.207
After BI with PT	0.190	0.002	84.228	0.000	0.185	0.194
After NIT with FT	0.240	0.003	80.419	0.000	0.234	0.246
After NIT with PT	0.216	0.003	82.749	0.000	0.211	0.221
For CB						
Current	0.379	0.003	121.525	0.000	0.373	0.385
After CB with FT	0.326	0.003	101.406	0.000	0.320	0.333
After CB with PT	0.311	0.003	108.500	0.000	0.305	0.316

Table 18
Atkinson index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.123	0.002	49.985	0.000	0.118	0.128
After BI with FT	0.040	0.002	21.933	0.000	0.036	0.043
After BI with PT	0.034	0.001	23.403	0.000	0.031	0.037
After NIT with FT	0.055	0.002	26.105	0.000	0.051	0.059
After NIT with PT	0.044	0.002	24.295	0.000	0.040	0.047
For CB						
Current	0.122	0.002	49.313	0.000	0.117	0.127
After CB with FT	0.093	0.002	37.229	0.000	0.088	0.098
After CB with PT	0.083	0.002	38.080	0.000	0.078	0.087

Table 19
General entropy index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.284	0.008	35.058	0.000	0.268	0.300
After BI with FT	0.095	0.006	15.501	0.000	0.083	0.107
After BI with PT	0.079	0.005	16.250	0.000	0.070	0.089
After NIT with FT	0.133	0.007	18.680	0.000	0.119	0.147
After NIT with PT	0.104	0.006	16.957	0.000	0.092	0.116
For CB						
Current	0.282	0.008	34.501	0.000	0.266	0.298
After CB with FT	0.223	0.008	26.277	0.000	0.206	0.239
After CB with PT	0.193	0.007	26.100	0.000	0.178	0.207

Table 20
Coefficient of variance index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	1.024	0.036	28.744	0.000	0.954	1.094
After BI with FT	0.623	0.051	12.309	0.000	0.523	0.722
After BI with PT	0.538	0.044	0.044	0.000	0.451	0.625
After NIT with FT	0.742	0.049	15.019	0.000	0.645	0.839
After NIT with PT	0.639	0.049	12.998	0.000	0.543	0.735
For CB						
Current	1.023	0.037	27.805	0.000	0.951	1.095
After CB with FT	0.946	0.047	20.224	0.000	0.855	1.038
After CB with PT	0.846	0.046	18.517	0.000	0.757	0.936

Table 21
P10/P90 ratio

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.186	0.002	96.735	0.000	0.182	0.190
After BI with FT	0.462	0.002	189.191	0.000	0.457	0.467
After BI with PT	0.478	0.002	203.437	0.000	0.474	0.483
After NIT with FT	0.389	0.002	157.392	0.000	0.384	0.394
After NIT with PT	0.427	0.002	178.432	0.000	0.422	0.432
For CB						
Current	0.189	0.002	96.550	0.000	0.185	0.193
After CB with FT	0.297	0.002	139.224	0.000	0.293	0.302
After CB with PT	0.295	0.002	146.640	0.000	0.292	0.299

Table 22
P20/P80 ratio

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.346	0.003	130.502	0.000	0.341	0.351
After BI with FT	0.612	0.002	259.362	0.000	0.607	0.617
After BI with PT	0.628	0.002	295.004	0.000	0.624	0.632
After NIT with FT	0.570	0.003	204.645	0.000	0.565	0.576
After NIT with PT	0.587	0.003	232.048	0.000	0.582	0.592
For CB						
Current	0.350	0.003	131.150	0.000	0.345	0.355
After CB with FT	0.407	0.002	179.045	0.000	0.403	0.412
After CB with PT	0.415	0.002	182.748	0.000	0.410	0.419

Table 23
P10/P50 ratio

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For UBI & NIT						
Current	0.426	0.003	125.155	0.000	0.420	0.433
After BI with FT	0.758	0.002	423.275	0.000	0.754	0.761
After BI with PT	0.744	0.002	391.631	0.000	0.740	0.747
After NIT with FT	0.688	0.003	269.874	0.000	0.683	0.693
After NIT with PT	0.729	0.002	332.181	0.000	0.724	0.733
For CB						
Current	0.431	0.003	126.677	0.000	0.424	0.437
After CB with FT	0.639	0.003	225.086	0.000	0.633	0.644
After CB with PT	0.611	0.003	227.767	0.000	0.606	0.616

Table 24
P25/P75 ratio

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For UBI & NIT						
Current	0.434	0.003	149.683	0.000	0.428	0.440
After BI with FT	0.679	0.002	301.530	0.000	0.674	0.683
After BI with PT	0.691	0.002	337.603	0.000	0.687	0.695
After NIT with FT	0.651	0.003	242.543	0.000	0.646	0.656
After NIT with PT	0.662	0.003	257.255	0.000	0.657	0.667
For CB						
Current	0.438	0.003	151.971	0.000	0.433	0.438
After CB with FT	0.479	0.002	198.432	0.000	0.475	0.479
After CB with PT	0.487	0.002	199.366	0.000	0.482	0.487

Table 25
FGT index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int.	
					LB	UB
For BI & NIT						
Current	0.143	0.002	64.425	0.000	0.138	0.147
After BI with FT	0.000	0.000	-	-	0.000	0.000
After BI with PT	0.000	0.000	-	-	0.000	0.000
After NIT with FT	0.000	0.000	-	-	0.000	0.000
After NIT with PT	0.000	0.000	-	-	0.000	0.000
For CB						
Current	0.140	0.002	63.809	0.000	0.136	0.145
After CB with FT	0.155	0.002	67.509	0.000	0.150	0.159
After CB with PT	0.131	0.002	61.360	0.000	0.127	0.135

Table 26
Watts index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int. LB	95% Conf. Int. UB
For BI & NIT						
Current	0.056	0.001	44.733	0.000	0.054	0.059
After BI with FT	0.000	0.000	-	-	0.000	0.000
After BI with PT	0.000	0.000	-	-	0.000	0.000
After NIT with FT	0.000	0.000	-	-	0.000	0.000
After NIT with PT	0.000	0.000	-	-	0.000	0.000
For CB						
Current	0.055	0.001	44.163	0.000	0.053	0.057
After CB with FT	0.019	0.001	25.137	0.000	0.017	0.020
After CB with PT	0.019	0.001	25.137	0.000	0.017	0.020

Table 27
SST index

	Coef.	S.E.	t-stat	Prob.	95% Conf. Int. LB	95% Conf. Int. UB
For BI & NIT						
Current	0.078	0.001	52.942	0.000	0.076	0.081
After BI with FT	0.000	0.000	-	-	0.000	0.000
After BI with PT	0.000	0.000	-	-	0.000	0.000
After NIT with FT	0.000	0.000	-	-	0.000	0.000
After NIT with PT	0.000	0.000	-	-	0.000	0.000
For CB						
Current	0.077	0.001	52.317	0.000	0.074	0.079
After CB with FT	0.027	0.001	29.953	0.000	0.025	0.029
After CB with PT	0.027	0.001	29.953	0.000	0.025	0.029

Table 28
Income distribution before and after BI policy

Quantile group	Quantile	% of median	Share, %	Cumulative Share, %	GL(p)
Before BI					
1	13381.667	58.814	6.386	6.386	1867.110
2	19565.252	85.991	11.317	17.703	5175.851
3	26462.666	116.306	15.633	33.336	9746.473
4	38666.668	169.944	21.707	55.043	16093.070
5			44.957	100.000	29237.423
After BI with FT					
1	16141.565	82.132	12.995	12.995	2927.340
2	18400.414	93.626	15.326	28.321	6379.842
3	21192.889	107.834	17.485	45.806	10318.654
4	26377.729	134.216	20.782	66.588	15000.285
5			33.412	100.000	22526.934
After BI with PT					
1	16950.094	81.492	12.906	12.906	2976.698
2	19490.031	93.704	15.815	28.720	6624.319
3	22298.262	107.205	18.069	46.790	10792.004
4	26995.461	129.788	21.130	67.920	15665.688
5			32.080	100.000	23064.984

Table 29
Income distribution before and after NIT policy

Quantile group	Quantile	% of median	Share, %	Cumulative Share, %	GL(p)
Before NIT					
1	13381.667	58.814	6.386	6.386	1867.110
2	19565.252	85.991	11.317	17.703	5175.851
3	26462.666	116.306	15.633	33.336	9746.473
4	38666.668	169.944	21.707	55.043	16093.070
5			44.957	100.000	29237.423
After NIT with FT					
1	15224.129	79.497	11.610	11.610	2619.782
2	17853.707	93.229	14.712	26.322	5939.608
3	20631.146	107.732	16.975	43.298	9770.087
4	26694.701	139.395	20.474	63.772	14390.138
5			36.228	100.000	22565.003
After NIT with FT					
1	15877.097	81.047	12.296	12.296	2778.242
2	18286.162	93.345	15.146	27.442	6200.496
3	21085.420	107.634	17.352	44.794	10121.213
4	27063.318	138.149	20.884	65.678	14840.021
5			34.322	100.000	22595.163

Table 30
Income distribution for CB scheme

Quantile group	Quantile	% of median	Share, %	Cumulative Share, %	GL(p)
Before CB					
1	13643.077	59.195	6.455	6.455	1907.882
2	19833.119	86.052	11.361	17.817	5265.782
3	26757	116.094	15.657	33.473	9893.162
4	38997.617	169.204	21.683	55.156	16301.532
5			44.844	100	29555.237
After CB with FT					
1	12501.805	66.301	9.318	9.318	2176.514
2	16468.857	87.339	12.297	21.615	5048.947
3	21662.648	114.883	16.218	37.832	8837.214
4	30155.242	159.922	21.712	59.544	13908.925
5			40.456	100	23358.974
After CB with PT					
1	11987.9	66.447	9.301	9.301	2154.962
2	15698.037	87.012	11.825	21.126	4894.868
3	20826.967	115.44	15.634	36.76	8517.373
4	29442.338	163.194	21.194	57.954	13427.94
5			42.046	100	23170.081

Table 31
Initial, policy and effective tax rates before and after BI

Decile group	Initial tax rate	Policy tax rate (with FT)	Effective rax rate (with FT)	Policy tax rate (with PT)	Effective rax rate (with PT)
1	0.137	0.620	0.179	0.396	0.141
2	0.152	0.620	0.272	0.439	0.214
3	0.159	0.620	0.315	0.459	0.255
4	0.162	0.620	0.339	0.467	0.283
5	0.164	0.620	0.358	0.474	0.306
6	0.168	0.620	0.379	0.486	0.330
7	0.179	0.620	0.413	0.518	0.371
8	0.187	0.620	0.440	0.540	0.408
9	0.200	0.620	0.477	0.578	0.463
10	0.234	0.620	0.528	0.675	0.591

Table 32
Initial and effective tax rates before and after NIT policy

Decile group	Initial tax rate	Effective tax rate (with FT)	Effective tax rate (with PT)
1	0.137	0.002	0.002
2	0.152	0.002	0.002
3	0.159	0.005	0.004
4	0.162	0.033	0.028
5	0.164	0.162	0.136
6	0.168	0.280	0.236
7	0.179	0.336	0.289
8	0.187	0.366	0.323
9	0.200	0.393	0.362
10	0.234	0.407	0.429

Table 33
Initial, policy and effective tax rates before and after CB policy

Decile group	Initial tax rate	Effective tax rate (with FT)	Effective tax rate (with PT)
1	0.136	0.006	0.009
2	0.152	0.124	0.095
3	0.158	0.201	0.157
4	0.162	0.212	0.169
5	0.163	0.216	0.176
6	0.169	0.221	0.184
7	0.179	0.231	0.197
8	0.187	0.237	0.209
9	0.200	0.243	0.224
10	0.234	0.248	0.263