# Towards A Green Income Support Policy: Investigating Social and Fiscal Alternatives for Turkey

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## ABSTRACT

The limited success of employment-based social protection measures under the diverging patterns of post-covid recovery rekindled the interest in a social policy framework known as the Basic Income (BI) support. The goal of this study is to assess the macroeconomic feasibility of a BI policy for Turkey with a green design. We test the potential of the BI program using five alternative scenarios distinguished by coverage of the receivers and their respective fiscal costs. We then employ an applied general equilibrium model to analyze the economy-wide effects and welfare implications for Turkey in the long-run through 2030. The dynamic macro results of our modeling effort indicate that BI has the potential for a significant social welfare enhancing impact for Turkey; yet, pursuing the BI mandate without any compensating fiscal consolidation is not manageable in the medium to longer run.

To achieve the warranted policy space we evaluate the macroeconomic and welfare effects of an alternative fiscal program comprising of (i) *carbon tax* levied on the fossil fuel producing industry, (ii) corporate income taxation policy reform that aims at expanding the revenue base and consolidation of the fiscal space of the government, and (iii) re-structuring of public consumption expenditures by introducing rationality and efficiency in the structure of fiscal expenditures. Our model solutions reveal that a green BI scenario not only achieves a higher GDP and welfare in the medium to long run, but also helps Turkey to reduce its carbon emissions in line with the global policy challenges of a green recovery.



**Key words:** Basic Income Social Policy, Green Recovery, Policy Space, Turkey, Applied General Equilibrium, Carbon Tax.

## 1. Introduction

As the adverse effects of climate change are experienced more frequently all around the world, international policy debate has shifted towards promoting social safety nets integrated with livelihood enhancement programs to ensure effective response to disasters and build resilience to shocks at the household and community levels (UNDRR, 2015). Given the severe impacts of climate-related risks on poverty and inequality, social protection has become an integral part of national and international policy agendas such as the *2030 Agenda for Sustainable Development*. COVID-19 crisis further revealed the inadequacy of the social protection systems, which are modeled on employer-employee contracts in most parts of the world and which ignore both informal employment and out-of-labor force population. The existing social protection systems failed to provide protection to all in-need in rapidly evolving dire situations like COVID-19.[1] Both existing research on social protection against climate change (Aleksandrova, 2020) as well as recent COVID-19 experience point out the need for building social safety nets with broad coverage. To ensure that social protection is incorporated in climate change mitigation, social safety nets must be able to rapidly respond to shocks, be scalable and adaptable with broad coverage. Universal Basic Income is one such policy that meets all these criteria. However, as Enami et al. (2021) shows it is quite a challenge to design such programs in middle income countries while keeping the tax burden at moderate levels.

On the revenue side, the most common policy proposal towards mitigation of carbon emissions is carbon taxation (Nordhaus, 2018). Economically carbon tax is a solid idea. It provides both to people and firms a continuous, clear incentive to change their behavior to reduce their carbon intensive energy use. However, politically carbon taxes are regressive and, not surprisingly, prove unpopular, in particular when proposed as a stand-alone policy. An alternative policy that observes the climate change and social protection nexus is the "cap-and-dividend." In a cap-and-dividend framework carbon polluters pay the carbon tax proportionally to their emissions while tax revenues are redistributed equally (Boyce, 2019). In other words, while prices of the goods and services which use carbon inevitably increase, the net income of people in the lower socioeconomic strata is protected. Nevertheless, cap-and-dividend policy still posits carbon emitting economic activity as a bad thing that needs to be curbed. Moreover, even in developed countries carbon taxes on consumption is unpopular, whereas taxes on fossil fuel industry are preferred (Harring et al., 2019; United Nations, 2021).

In this study, we build on this vivid literature and propose an alternative policy mix where the emphasis is on social dividends to ensure social justice. We argue that for political feasibility, social protection should not be a sidekick of climate change policies, but must be incorporated as a pivotal point. We propose to reverse the policy framing: Instead of regressive carbon taxes compensated by a dividend, we offer a basic income framework with a broad coverage partly financed by taxes on fossil fuel industry, partly by taxes on corporate profits and reductions in wasteful public spending. This approach has many advantages. Firstly, framing economic

[1] The existing social protection systems which do not solely rely on employer-employee contracts also performed badly in response to COVID-19 because these means-tested programs rely on administrative data which are backward looking and do not reflect the current incomes of households in rapidly changing situations (Sahm, 2021).

activities like electricity generation as a public bad that needs to be curbed is politically dead-end especially in a developing country context, and has to be avoided. Secondly, a predictable basic income as a right goes a long way to satisfy the need for a safety net with broad coverage. Thirdly, our alternative policy mix is intrinsically more progressive, as it is partly financed by potentially regressive carbon taxes and partly by progressive corporate taxes.

The specific goal of this study is to assess the macroeconomic feasibility of alternative basic income (BI) policies in a developing country context (Turkey). We evaluate the potential of the BI policy using five alternative scenarios distinguished by coverage of the receivers such as all adults, or broad targeting groups including youth, women with children, elderly and the disabled, and means-tested programs. We first evaluate the potential social welfare enhancing impact of the BI. Based on the number of receivers derived in this first stage, we then calculate the fiscal costs of each scenario. In the third, and final, stage of the empirical analysis, we employ an applied general equilibrium methodology to analyze the economy-wide effects over the dynamic run covering through 2030. Our analysis suggests that Turkey *can* adopt a BI scheme *only if* coupled with sustained fiscal sources, and carbon taxation is revealed as one of the viable options.

The next section provides a brief overview of recent debates on Basic Income and alternative financing sources. Third section presents a detailed description of the methodology we follow. Fourth and fifth sections present social impact and macroeconomic findings, respectively. Finally, concluding remarks and policy discussion are offered in the last section.

## 2. Literature Review

### 2.1 Theoretical Background of Basic Income

Over the past decades, variations of the Basic Income policy have been discussed and tested by various interest groups including international and national NGOs. Unlike the earlier periods, the most recent BI debate[2] has supporters from a broad ideological spectrum, from radical politicians to libertarian think tanks. van Parijs and Vanderborght (2017) argue that basic income is necessary to radically restructure the way economic security is pursued in contemporary societies. van Parijs (2015) made the case that the main contribution of a BI policy is not merely to increase the purchasing power of people, but to increase their bargaining power by offering them an *exit option* from wage-labor. Particularly in the face of increasingly precarious employment relations, this option has become more desirable to empower the working-class to demand change in the structure of work relations (Standing, 2011; Birnbaum & de Wispelaere 2020).

Other supporters of BI do not necessarily share this radical view. Some rather see BI as a social policy instrument as it can provide an efficient means of poverty alleviation without significant structural change in economic relations. This can take the form of a Keynesian mechanism to boost

[2] Widerquist (2017a) calls this new interest as the third wave of BI. He argues that the first wave was experienced between 1910s and 1940s. A second, and larger, wave of support was revived in 1960s and 70s. The third, and the largest, wave, he suggests, started in 2000s. All three periods are characterized by rising inequality and/or economic instabilities.

aggregate demand, hence increased rate of employment, by injecting effective purchasing power into the economy (Rodríguez Enríquez, 2007; Bugra & Keyder, 2007). Moreover, an unconditional cash transfer based on citizenship is expected to ensure social inclusiveness, particularly for the socially excluded groups such as unemployed youth, long-term unemployed, single parents, disabled, ethnic minorities, and women (Handler & Babcock, 2006; Bugra & Keyder, 2007). From a gender perspective, BI is suggested to promote women's empowerment by helping tackle the structural inequalities due to the sexual divide in the social, economic, and public sphere (Elgarte, 2008; Schulz, 2017; Lombardozzi, 2020). A more recent debate in favor of BI as a social policy instrument argues that it can provide financial security to those who are at the risk of unemployment or reduced income due to automation (Cholbi & Weber, 2019; Dermont & Weisstanner, 2020; Allegri & Foschi, 2021).

Although the idea of a BI has been broadly discussed, major concerns persist. The most common counterarguments of basic income are that it decouples income from productivity, creates a disincentive to work, lowers wages, raises inflation, and reduces the pressure on governments to create jobs (Flassbeck, 2017; Kay, 2017). The fiscal burden it will impose on the budget is a particularly voiced concern (Greenstein, 2017; Schneider, 2017; Acemoglu, 2019).

### 2.2. Financing of Basic Income

Both proponents and opponents of the BI policy agree that a broad income support is a major step in states' transfer policy and yet it comes with costs. Some researchers suggest that BI will be a replacement to all existing social transfers, so it will not create an extra cost (Browne & Immervoll, 2017; Ensor et al., 2017). However, this is unlikely to be the case in practice. Most of the losers in such a replacement scenario are likely to resist and some of these groups such as the disabled or veterans (i.e., deserving poor) can easily find powerful allies to resist such a replacement.

There are a sizeable number of studies proposing various ways to fund a BI scheme without replacing the existing social transfers. Progressive taxation, flat tax, or a broadly defined income tax are the most commonly considered alternatives (Bishop et al., 2000; Widerquist, 2017b; Gan, 2019). It is generally suggested to be funded in a specific, ear-marked way. Taxes on consumption are the largest base of taxation, particularly in developing countries. They can serve as an administratively efficient source of a broad-based transfer policy (Harris et al., 2018). Other potential funding sources of BI policy include reallocation of funds from other social welfare programs, corporate income tax, wealth tax, tax on natural resources and environmental taxes (Ortiz et al., 2018; Ter-Minassian, 2020).

There is a growing literature on the potential use of environmental taxes as revenue to finance a BI scheme (Boyce, 2019; Mathur, 2019; Riedl, 2020; United Nations, 2021). Cap and dividend literature investigates the economic effects of carbon fee (or cap) and dividend policies. Boyce (2019) suggests that carbon dividends could be a type of universal basic income (UBI) where the source of the income is a universal basic asset. He adds that even though a carbon dividend would not be sufficient to support a UBI at subsistence level, it can be a possible opening toward a full UBI by raising its revenue sources over longer time horizon.

A handful of empirical studies have investigated the impact of redistribution of carbon revenues to households either in the form of direct transfers or as financing of tax cuts. Despite the inconclusive evidence in the literature on whether the impact of the carbon tax is regressive or progressive, it is almost anonymous that *redistribution of carbon revenues* has progressive impact (Timilsina & Shrestha, 2002; Brenner et al., 2007; Gonzalez, 2012; Wang et al., 2019; Chepeliev et al., 2021; Soergel et al., 2021). To assess the short-run distributional impacts, Fermstad and Paul (2019), for instance, modeled a \$50 tax per ton of $CO_2$ ($tCO_2$) in US using an input-output model. Once they model the cases where carbon tax revenues are used to reduce all labor taxes, or fund a carbon dividend, they find that a \$50/$tCO_2$ tax increases the income of 98% of people in the poorest decile when used to pay for carbon dividends. Carbon dividends benefit 56% of Americans, including 84% of those in the bottom half of the income distribution. Landis et al. (2021) similarly found that the impact of carbon pricing policies is progressively distributed across income deciles in most EU countries when countries adopt per-capita based schemes for within-country revenue distribution.

In addition to the studies that investigate the distributional impacts of carbon pricing on households, some studies analyze the economy-wide impacts. Grottera (2017) use a Social Accounting Matrix to assess the impact of a R\$25 and R\$50 carbon tax on GDP, employment, emissions and Gini coefficient in the case of Brazil. Their results indicate that a redistribution of revenues from the carbon tax in the form of direct transfers to households reduces income inequality at both tax levels. Garaffa et al. (2021) compares six alternative scenarios with the aid of a Computable General Equilibrium (CGE) model and finds that carbon pricing in Brazil leads to welfare losses in the absence of revenue recycling or when carbon revenues are used to finance rebates on labor and on sales taxes.

Our contribution to this literature is to combine the Basic Income framework with distributional effects of carbon taxation. Unlike the latter, we do not see income transfers as a secondary target ameliorating the regressive effects of carbon taxes. The main focus of this study is an income transfer policy that prioritizes poverty and inequality alleviation. We use carbon tax as one of the sources to fund this transfer program. Following United Nations (2021) suggestions and Harring et al. (2019) findings, we model carbon tax as a tax on fossil fuel industry and model it as a part of broader tax and public spending reform. Another way we contribute to the literature is that we combine a household level analysis with a general equilibrium framework. By doing this, we investigate the impact of the Basic Income scheme both at the household level and its broader long-term effects through government's fiscal budget.

## 3. Methodology

We advocate for reversing the framing of carbon tax and income support policies in the context of climate policy. Parallel to this framing, we also reverse the order of analysis. In a standard analysis, carbon taxes are introduced at the first stage and then macroeconomic effects (i.e. generally slower growth) and social impacts (such as poverty and inequality) are estimated. Such a framework inevitably portrays climate change policies necessary but painful. Instead, we introduce and analyze alternative BI policies at the first stage; then we pick one alternative BI considering both positive welfare effects and overall fiscal cost; and finally we search for fiscal policy alternatives that are most compatible with economic growth and enhanced welfare. This alternative framework has the added benefit of permitting us to consider many alternative scenarios at the first stage.

Specifically, this study employs two distinct, yet complementary, techniques of quantitative analysis. More formally, we first focus on the sectional categories of the Income and Living Conditions, and carry on a social-impact analysis of a possible Basic Income implementation across various alternative targeted groups. This exercise is carried out over the 2018 data (the most recent data set for Turkey) and partitions the targeted groups based on age, gender, and income characteristics. We choose five alternative BI instrumentalization packages and calculate the fiscal costs of each separately. Then, we compute the potential fiscal cost of these policies both in real terms and as a ratio to the GDP in a given fiscal year. At a second level of analysis we utilize this fiscal policy information within a macroeconomic general equilibrium setting and study the overall impact of the BI intervention over the whole micro and macro balances of the Turkish economy. We construct a CGE model to this end and simulate the workings of the domestic economy within an open macroeconomic environment. The model is based on 2018 social accounting data and is carried out in a dynamic fashion spanning 2018 to 2030.

### 3.1. Data and Methods of Social Impact Analysis

The Social Impact Analysis utilizes two main indicators in the pursuit of social welfare analysis: (i) poverty rate and the (ii) poverty gap.[3] Following Foster et al. (1984), poverty measures are calculated using the following formula:

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

where $z$ is the poverty threshold, $y_i$ is per capita household income, H represents the poor, and N represents the population. $P_\alpha$ is defined as the poverty rate when $\alpha = 0$; and the poverty gap when $\alpha = 1$. We perform all poverty analysis with respect to 50% of median of the original distribution.[4]

For inequality, we provide data on Gini coefficients, income ratios at p90/p10, and at p90/p50. We also provide the histograms of per capita income distribution for each scenario vis-à-vis the original distribution.

Data for the social impact analysis is drawn from Survey of Income and Living Conditions (SILC) 2018. As of February 2021, when this study was initiated, that version of the survey was the latest

[3] The poverty rate and poverty gap we computed are different than that the official statistics by TURKSTAT due to a slightly different method of computation. While TURKSTAT reports per capita income by OECD adult equivalized levels, we use crude household size for the ease of communication with non-expert audiences. We also repeated our computations using OECD adult equivalized per capita income levels to ensure our results are parallel to official statistics. These results are available from authors upon request.

[4] We also present alternative headcount poverty estimates where threshold is each scenario's own 50% of median in Online Supplementary Materials.

dataset available to outside researchers. SILC is an annual household survey that is conducted by Turkish Statistical Institute (TURKSTAT) since 2006 to supply comparable data on income distribution, relative poverty, living conditions and social exclusion. The survey provides nationally representative data for Turkey as a whole, and is geographically disaggregated into 12 statistical regions. The 2018 survey comprises of approximately 81 thousand people (of which about 61 thousand are above 15 years of age) in 24 thousand households. SILC reports the incomes of the previous full year (in this case, 2017) and the employment of the survey year. Income information includes incomes obtained from activities (wage, salary, and entrepreneurial income -agricultural and non-agricultural-), property income, and social transfers (unemployment, retirement, old age, widow-orphan, disability, scholarships, and other transfers).

### 3.2. Data and Theoretical Structure of Macro CGE Model

The macroeconomic aspects of our study involve a general equilibrium model based on macroeconomic balances of Turkish economy in 2018. The analytical approach is based on the methodology of applied general equilibrium distinguished as computable general equilibrium (CGE) modeling. Embedded in the theoretical realm of –what is known as—the Walrasian / Structuralist equilibrium, the CGE framework provides a coherent system of data management and scenario analyses addressing issues of fiscal sustainability and income support simultaneously.

CGE modeling is an applied approach to the Walrasian economic system. It is Walrasian in the sense that it brings behavioral assumptions, production technologies and market institutions together within the discipline of general equilibrium (see, e.g., Derviş, et.al., 1982) Yet, our current application diverges from the orthodox Walrasian set up as we introduce many structuralist / heterodox features that represent the salient characteristics of Turkey's economy – such as demand driven output determination, investment-driven savings generation, open unemployment, and chronic balance of payments disequilibrium given deep import dependence of a debt-ridden economy (Orhangazi & Yeldan, 2021).

The proposed version of the CGE model utilized in this study addresses the characteristic features of peripheral development and the dual objectives of development and improved income distribution in various ways. First and foremost, a distinguishing feature of the current model is that it deliberately takes account of the rigidities in the labor and capital markets by introducing explicit gaps against the equalization of the wage and profit rates across sectors (see Taylor, 1990, 2004 for seminal work on heterodox CGE modeling; see Agénor et. al, 2007 for an application to Turkey). This feature underlines the structuralist tradition of the model. These structuralist "distortions" are set from the existing data on wage rates (and the rates of profit) across sectors and are maintained as rigid divergences from equalization of the "average" wage rate. Migration is a further behavioral rule, governing the movement of labor from the rural poor wage towards the high urban wage sectors.

The model is built on the augmented input-output (I/O) data structure provided by TURKSTAT. The most recent official I/O data is dated 2012. Starting from this data set we updated the I/O structure to the 2018 macroeconomic balance of the Turkish economy using the national income statistics as constraints of row and column sums of the original I/O matrix. Factor employment and remunerations are taken from the TURKSTAT Labor Force Statistics data utilizing the aggregation scheme of the model.

The model is updated over time with annual 'solutions' up to 2030. Economic growth is the end result of (i) exogenous growth of labor supplies; (ii) investments on physical capital stocks net of depreciation allowances; and (iii) total factor productivity (TFP) growth. Technical factor productivity rates are updated in a Hicks-neutral manner given historical rates of "base-run" growth.

The detailed characteristics and the algebraic structure of the model is laid down as supplementary material to this text and is available from the authors upon request.

## 4. Empirical Findings of the Social Impact Analysis

The goal of the social impact analysis is to estimate and evaluate the social and fiscal impacts of the Basic Income policy in the short run (upon impact). The empirical analysis comprises of three steps. In the first step we define five scenarios to analyze the social impacts. Experimenting with five alternative scenarios is informative to empirically analyze and document the poverty rates, poverty gaps, income distribution, and inequality. In later steps we establish the broad fiscal and economic impacts.

We start with a universal basic income (UBI) to establish a maximum budget and its welfare effects as benchmark. The amount of basic income (BI) support in each scenario is 874 TRY per capita per month adding up to 10,488 TRY per capita annually. It is calculated as half of the net minimum wage (MW) in 2021 deflated by using the consumer price index (CPI). Using 2021 MW as the level of monthly support, instead of 2017 MW, enables us to perform the analysis at 2021 threshold levels since real MW has increased almost 25% between 2017 and 2021.

Once we establish a baseline scenario (UBI to all adults), we proceed with two broad targeting scenarios. The first one assumes an income support policy targeting women with children, elderly, and those with limited health. The second one assumes all youth between the ages 18-26 are provided monthly income support.

In addition to broad targeting scenarios, we employ the means-testing approach (to those below poverty line, 50% of median income). Previous research by Tekgüç (2018) reports that on average 50% of social assistance recipients were in the lowest three deciles (see Table 2 in Tekgüç, 2018). In this scenario, we optimistically assume a randomly selected 75% of 4.1 million (3.13 million) households below the threshold from among the households whose per capita income are below the threshold. The rest 25% are randomly selected from among the households above the threshold.

In the final scenario, we combine means-testing approach with broad targeting of the youth. We project a hybrid scenario where all young people between the ages 18-26 are provided monthly income support, and households who are still below the poverty line are provided the support as well. We experiment with a new level of monthly income to see the fiscal impacts; 1,000 TRY in 2021.

### 4.1. Income Poverty Analysis

**Error! Reference source not found.** displays the poverty and inequality rates in the original case a nd in 5 alternative scenarios. A quick glance reveals that basic income alleviates poverty. In all scenarios where basic income policy is implemented, poverty rate and poverty gap are lower than in the absence of it. The level of decline varies by the coverage of the policy. The decline in poverty is the highest in the scenario where all adults are provided monthly income support, whereas it is the lowest when only young people between the ages 18-26 are provided the support. The change in poverty is explained by increases in both average and median per capita income. This finding is in line with earlier arguments in the literature that BI injects purchasing power into the economy (Rodríguez Enríquez, 2007; Bugra & Keyder, 2007). In both relative and absolute terms youth scenario is the least effective in reducing poverty, nevertheless even in this scenario decline is substantial (4.5 percentage points).

The poverty alleviating effect of basic income policy is better captured by observing the regional poverty rates provided in **Error! Reference source not found.**. Poverty rates are significantly l ower than the original case with variations across regions. Particularly, in three Eastern regions (Northeast, East-Central and Southeast), where poverty is widespread with more than one third of population below half of the median per capita income, basic income policy with broad-targeting leads to considerable decreases in poverty rates. In these regions, every scenario reduces poverty more than national average both in absolute terms.

**<Insert Table 1 here>**

**<Insert Table 2 here>**

### 4.2. Income Inequality Analysis

Gini coefficients for our analysis are provided in **Error! Reference source not found.**. We also r eport the percentile ratios p90/p10 and p90/p50 which show the ratio of income of the 90th percentile of population to that of 10th percentile, and of 50th percentile, respectively.

In the original situation Gini coefficient is 0.448. The ratio of income of the 90th percentile to that of 10th percentile is almost seven-folds, and of 50th percentile is over twice. Introduction of basic income policy leads to improvement in inequality observed by all measures. Youth and means-tested scenarios are least effective in reducing inequality. Comparing alternative scenarios' effectiveness on poverty versus inequality reduction shows that means-tested programs are much less effective in reducing income inequality.

**<Insert Figure 1 here>**

### 4.3. Fiscal Impact Analysis

Table 3 displays a summary of all scenarios by number of recipients and each policy's cost to the economy. The share of the total cost of the policy in GDP varies across scenarios. As expected UBI is the most expensive scenario and means-tested the least. Youth BI and Youth BI plus means-testing have the second and third lowest costs by 3.5% and 3.4% of GDP. In this sense, both scenarios are comparable in total financing costs. But when their poverty reduction effect is taken into account, Youth BI plus means-testing is more effective than Youth BI both in terms of overall poverty and inequality (**Error! Reference source not found.**) and regional poverty (**Error! Reference source not found.**) reduction. Hence, we focus on modelling Youth BI plus means-testing in the rest of the paper.

**<Insert Table 3 here>**

## 5. Design of the Dynamic Macroeconomic Impact Analysis

Given the social, economic and fiscal results of the alternative BI packages discussed above, next step is to investigate the impacts of these alternatives on the general equilibrium workings of the macroeconomic environment in a dynamic fashion. We utilize the CGE apparatus and examine the effects of the BI reform conjuncture on sectoral production, employment, wages, and capital revenues, national income, and foreign trade balances. Of particular attention here is the resolution of fiscal balances of the central government budget. We implement the CGE analysis in two sets of pathways. First, as is the traditional approach, we introduce a business-as-usual base path over the set horizon. This simulates the state of the economy as it evolves under the no-policy change *ceteris paribus* conditions and serves as a reference scenario against which the socio-economic results of the policy interventions are contrasted.

### 5.1. Dynamics of the Business-as-Usual Path

In this class of CGE models, economic growth is driven by three sources: population, productivity growth, and accumulation of capital. Typically, the first two are regarded exogenous, whereas path of capital accumulation remains responsive to income generation which is endogenously resolved by the general equilibrium system.

The contractionary effects of the COVID-19 pandemic that had been experienced in the aftermath of the 2019 crisis were felt severely especially in the first half of 2020, bringing the economy almost to a halt over 2019-2020. The most recent IMF estimations project that Turkey's economy will likely expand over 5% in 2021 given the low base level of the GDP (IMF, 2021). The economy will most likely fluctuate with abrupt adjustments given the worsened initial macroeconomic conditions of this trajectory. In what follows, rather than following these likely swings of the business cycle with an annual projection, the base scenario is characterized as a smooth pathway over the whole time horizon. Thus, the impacts of the 2019 crisis and the contraction due to the COVID-19 pandemic are averaged out over the whole cycle. This procedure instructed us to assume lower rates of total factor productivity (TFP) growth; and coupled with endogenized capital investments, led to a historically lower real rate of growth for the GDP, resolved at 2.04% over 2019-2030. This path brings the real level of GDP from 3.7 trillion TRY in 2008 to 4.7 trillion TRY (in fixed 2018 prices).

Along this path, level of employment is projected to reach 31.5 million in 2030 (from 2018 level of 28.7 million) and the unemployment ratio is calculated to remain at 13%. Fiscal deficit, a very critical indicator for our scenario analysis, is calculated to remain high at 2.56% to the GDP, and the ratio of public debt to GDP raises to 51%, up from its 2018 level of 30.4%. As we do not introduce any shocks to the workings of the foreign economy, the current account balance follows the business-as-usual conditions, and as a ratio to the GDP, stands around -2.7% over the decade.

The historical as well as the simulated base path is documented in **Error! Reference source not f ound.**, where the adverse effects of the pandemic are smoothed out, and the whole path generates an annual growth rate of 2.04% as indicated above.

**<Insert Figure 2 here>**

### 5.2. Macroeconomic Analysis of the BI Policy

Against this background we implement the BI fiscal strategy. As an operational procedure, we take the Youth BI plus means testing package introduced above as a representative framework. This package addresses both individuals and households and targets 10,364 million young (ages 18-26) and 4 million households under half of the median income. At a monthly income transfer of 1,000 TRY, the total fiscal cost of this operation reaches 107 billion TRY (all in 2017 prices) or about 3.4% of the 2017 GDP.

Given this structure, we design the BI strategy within the CGE model starting in 2021. Given the rate of population growth, the targeted operation is calculated to cost 126.6 billion TRY in 2021 and it follows a gradually declining path due to gradual decline in the share of youth in total population.[5] The ratio of fiscal costs to the GDP remains above 3% over the whole dynamic scenario horizon. The fiscal costs are directly met from the central government budget and no other adjustments are introduced in fiscal policy, nor do we impose any other adjustments on the private behavior.

The macroeconomic results are tabulated in tables 4 and 5. Of particular importance is the behavior of the gross domestic product and targeted worker household incomes. Figure 3a and 3b portrays the evolution of the GDP and worker household income and contrasts them against the base path.

[5] See Table S7 in Supplementary Materials for exact amount imputed for each year.

We show that all these interventions induce costs and unavoidable tradeoffs. In the absence of any accommodating fiscal interventions, the BI costs lead to a rise of the budget deficit by 2.3-folds in the immediate aftermath of the operation (Table 5). The expansion of the public budget deficit necessitates a series of onerous adjustments in the aggregate savings-investment balance of the domestic economy, and in the absence of any other external adjustment envisaged, the burden falls on private investment which contract by 19.3% by 2030 (or 22.7 percentage points, last row in Table 4). This results in a slower pace of capital accumulation hindering the potential growth of the GDP in the rest of the scenario horizon. Figures 4a and 4b portray the course and the extent of these adjustments.

<Insert **Figure 4a & 4b here>**

**<Insert Tables 4 & 5 here>**

Macroeconomic results reveal that over the course of dynamic adjustments, the GDP of the base path catches up with that of the BI scenario within three years and by the end of the horizon, the BI level of GDP falls short of the base path by 13% (or 16.3 percentage points, first row in Table 4). The worker household real income level, in the presence of BI support, ends up higher than the under the base path value (by 4.5 percentage points) but this Pyrrhic victory is not supportable neither politically, nor economically in the longer run.

**<Insert Figure 4a & 4b here>**

**<Insert Tables 4 & 5 here>**

### 5.3. Towards A Green BI Policy

The dismal dynamic results of the BI scenario call for fiscal action. It is clear that BI mandate without fiscal consolidation is not manageable in the medium to longer run and needs a more active fiscal intervention. This section investigates the viable instruments of such a fiscal strategy.

The necessary fiscal space for introducing the BI is sought in raising the tax base, yet not only in conventional areas, but expanding into areas of a green trajectory as well. In what follows, we start by introducing a carbon tax levied on the fossil fuel sector. The tax rate is introduced ad valorem on the input price of the fossil fuels (coal and petroleum products) at a rate of 25% to the sectoral value added. This raises the intermediate input costs in the remaining sectors of the economy.

Introducing carbon taxes on fossil fuels, or – what amounts to an equivalent policy measure, dismantling the existing subsidies on fossil fuel sectors – is on the agenda of a green pathway along the target of net zero emissions economic growth. Data from independent sources indicate that the existing subsidy bill for the coal sector in Turkey reaches to 0.5% as a ratio to the GDP (Shura, 2020; Acar & Yeldan, 2016). Acar and Yeldan (2016) show that elimination of this subsidy alone, with no complementary environmental policies envisaged, entails a reduction in aggregate domestic emissions by 5%, at a modest loss in economic activity. Thereby, we impose the taxation scenario as a complementary environmental policy action towards carbon emissions abatement. The carbon tax rate is implemented only on fossil fuel sectors and is administered through the central government budget. Moreover, a carbon tax on coal and petroleum is not a farfetched idea. On the contrary it is very likely to be imposed by Turkey's main trading partner, European Union (EU). The EU is preparing to levy extensive carbon taxes for its domestic sectors. In order to protect competitiveness of its firms, EU is planning to levy carbon taxes at the border on imports from countries without carbon taxes.[6] By taxing carbon in its own terms, Turkish policymakers can take into account strategic sectors and do not leave each firm at the whims of EU customs officials.

Next, we consider raising the corporate income tax revenue by 20% over its base value. The corporate income tax revenue currently stands at 2.5% of total GDP and 6% to the aggregate value of capital incomes. Extension of the corporate taxation over capital incomes is also regarded as an important progressive element in the current debates addressing the need for a globally set minimum. Introduced by the Biden administration, the G7 countries had already agreed on imposing a global tax rate of at least 15% on corporate incomes.[7] The current scenario works through these steps in generating additional tax revenues for the implementation of the BI strategy.

Finally, we administer rationalization to the aggregate public consumption expenditures, and reduce the ratio of public consumption expenditures by 20% over public revenues. This reduces the share of public expenditure in GDP from 16.7% to 14.9% in 2030.

Consequently, from these three sources the green-BI scenario generates an additional tax revenue of 1.9% from carbon taxes on fossil fuels; 1.3% from rationalization of public consumption expenses and 0.4% from increased corporate taxation – a total of 3.6% to the GDP. This suffices to close the gap on fiscal costs of the BI administration in 2021.

The findings reveal that the green-BI scenario achieves a higher GDP in the medium to long run. Its GDP path is higher than that of the BI only in 2025 and catches up with the base path by 2027. The worker household income is higher than its base path and the BI-only counterpart by 17 and 13 percentage points, respectively in 2030. The driving force behind this result is the control of the budget deficit and leaving space for the private investment expenditures to maintain its trajectory along the path.

Sectoral production and employment results follow in tables 6 and 7, respectively. When we compare sectoral gross output projections of base path and green-BI scenarios in 2030, the most significant declines occur in mining, electricity and iron and steel sectors (Table 6). However,

[6] See European Commission: European Green Deal at https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal

[7] Rappeport, A. (2021). Finance leaders reach global tax deal aimed at ending profit shifting, retrieved on June 18, 2021 from https://www.nytimes.com/2021/06/05/us/politics/g7-global-minimum-tax.html

these sectors are very capital intensive and employment losses are minimal (Table 7). Largest employment losses among those three sectors are in mining (30 thousand). For comparison, employment losses in health and education sector are larger in green-BI scenario compare to Base path. These findings show that the impact of taxes on fossil fuel sector is mostly felt on gross output while the impact of rationalization of public expenditures is on employment.[8]

In so doing we also observe from our environmental results that aggregate CO2 emissions by 2030 is reduced by 15 percentage points over the base path. At a total of 464 mtons of CO2 in 2030 under the green-BI, the 2018 level of emissions is almost maintained without significant rise, and thus the peak is achieved in 2030 setting the course for a net zero emission economy in the decade to follow. This significantly decreases the intensity of CO2 emissions to 458 gr/$GDP in 2030 from 578 gr/$GDP back in 2018 (Table 8).

**<Insert Tables 6-8 here>**

## 6. Policy Discussion and Conclusion

In this study we provided an assessment of the macroeconomics of a Basic Income policy for Turkey. Using five alternative scenarios developed by coverage of the receivers, we evaluate the social and fiscal impacts of the policy. Then we integrate the findings of the first stage analysis to a Computable General Equilibrium (CGE) model to investigate the economy-wide effects covering the time period 2021-2030. Results of our model indicates that BI has significant social welfare enhancing impact in Turkey. Poverty rates, poverty gap, and Gini coefficients considerably improve to various degrees based on the coverage of the policy introduced. Per capita incomes are better-off overall, and especially for lower income groups the improvement is large enough to pull millions of people out of poverty. BI also contributes to reduce regional differences in poverty. In three Eastern regions where poverty is widespread with more than one-third of population below half of the median per capita income, we observe significantly lower poverty rates once BI is introduced. In terms of income inequality, targeted BI policy is more efficient than means-testing methods.

In the base scenario of general equilibrium model, level of employment reaches 31.5 million in 2030 (from 2018 level of 28.7 million) and the unemployment ratio is calculated to remain at 13%. Fiscal deficit remains high at 2.6% of the GDP, while the share of public debt in GDP raises to 51% from its 2018 level of 30.4%. We project that, when the adverse effects of the pandemic are smoothed out, the whole path generates an annual growth rate of 2.04% over the period.

We model the effects of Youth BI plus means testing which is expected to cost between 3.1 and 3.4% of GDP over the study period. We observe that the economy kicks off with an upsurge in demand following the introduction of the BI policy. There is a strong multiplier effect in the short run leading to significant increases in GDP, employment, aggregate private disposable income, and real income of worker household. However, without any fiscal adjustments, this impact is not

[8] Further details of the sectoral exchanges are provided in the format of an input-output table in Supplementary Materials.

long-lasting. The cost of BI leads to an increase in budget deficit by 2.3-folds. The expansion of the public budget deficit leads to a contraction of private investment expenditures by 19.3% similar to a crowding-out effect. As a result, capital accumulation slows down hindering the potential growth of the GDP in the rest of the period covered in the analysis. Initial increases in the macroeconomic indicators come along with high costs and trade-offs in the medium- and longer run.

Dynamic results of the BI scenario reveals that a BI mandate without fiscal consolidation is not manageable in the medium to longer run and needs a more active fiscal intervention. We take this opportunity to introduce a discussion on the options for financing the BI via environmentally friendly means creating a green-BI scenario. We focus on three viable instruments of such a fiscal strategy. We discuss carbon tax levied on the fossil fuel sector, corporate income tax revenue raised by 20% over its current value, and reducing the ratio of public consumption expenditures by 20% over public revenues. These three sources generate an additional tax revenue of 1.9% from carbon taxes on fossil fuels; 1.3% from rationalization of public consumption expenses and 0.4% from increased corporate taxation – a total of 3.6% to the GDP. This suffices to close the gap on fiscal costs of BI administration in 2021.

To summarize, our model reveals that a green-BI scenario with fiscal consolidation is not only macro-economically feasible, but it achieves a higher GDP in the medium to long run. Furthermore, it helps Turkey to stabilize $CO_2$ emissions and be prepared rapidly evolving carbon tax policy arena driven by the main trading partner, the EU.

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