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ARTICLE

Toward 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-19 recovery rekindled interest in a social policy framework known as the Basic Income (BI) support. We test the potential of the BI program using five alternative scenarios ranging from households with income less than half of median income to all adults with estimates of 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. We evaluate the macroeconomic and welfare effects of both a business-as-usual fiscal program and an alternative (green BI scenario) 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) restructuring 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.

Keywords: Basic Income; social policy; green recovery; Turkey; applied general equilibrium; carbon tax

Introduction

As the adverse effects of climate change are experienced more frequently all around the world, international policy debate has shifted toward 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 United Nation's *2030 Agenda for Sustainable Development*. COVID-19 crisis further revealed the inadequacy of the social protection systems that

are modeled on employer-employee contracts and ignore both informal employment, and those that fail to participate to the labor market. The existing social protection systems failed to provide protection to those who are in need in rapidly evolving dire situations like the COVID-19 pandemic.[1] Both existing research on social protection against climate change (Aleksandrova 2020) as well as recent COVID-19 experience (Busso et al., 2021; Gerard et al. 2020; Tekgüç et al. 2022) point out the need for building social safety nets with a broad coverage. To ensure that social protection is incorporated in climate change mitigation, social safety nets must be able to rapidly respond to shocks, to be scalable and adaptable with broad coverage. Universal Basic Income (UBI) 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 toward simultaneously raising revenue and mitigation of carbon emissions is carbon taxation (Nordhaus 2018). It provides both to people and firms continuous and clear incentives to change their behavior to reduce their carbon intensive energy use. However, politically carbon taxes are regressive and, not surprisingly, are unpopular, in particular when proposed as a stand-alone policy without revenue recycling. 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 to all citizens or residents (Boyce 2019). In other words, while prices of the goods and services that use carbon inevitably increase, the net income of people in the lower socioeconomic strata is protected. Nevertheless, cap-and-dividend policy still posits ordinary economic activity as something that leads to undesirable outcomes that needs to be curbed. Hence, cap-and-dividend policies still have negative framing and can be unpopular, even may prove futile. Moreover, even in developed countries carbon taxes on consumption is unpopular, whereas taxes on fossil fuel industry are typically preferred (Harring et al. 2019; United Nations 2021).

Our contribution to this literature is to combine the Basic Income (BI) framework with distributional effects of carbon taxation and propose an alternative climate-*cum*-incomes policy mix where the emphasis is on social dividends to ensure social justice as well as abatement of greenhouse gas emissions. The main focus of this study is an income transfer policy that prioritizes poverty and inequality alleviation. We use the carbon tax instrument as one of the sources to fund this transfer program. Following the suggestions offered in United Nations (2021) and Harring et al. (2019) findings, we model carbon tax as part of a broader taxation and public spending reform package.

We argue that for political feasibility, social protection should not be merely 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 to be compensated by a dividend, we offer a BI framework with a broad coverage partly financed by taxes on fossil fuel industry, partly by taxes on corporate profits and

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

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reductions in nonessential public spending. Analytically, we assess the macroeconomic feasibility of such a BI policy in conjuncture with an active environmental policy within a developing country context, Turkey. We first evaluate the social welfare potential of the BI policy using five alternative scenarios distinguished by coverage of the receivers. The target groups include (i) all adults; (ii) women with children, elderly, and with limited health; (iii) youth between the ages 18–26; (iv) households below half of the median income; and (v) a hybrid scenario that combines iii and iv. Then, we employ an applied general equilibrium methodology to analyze the economy-wide effects over the dynamic run covering through 2030.

Empirical findings shed some light on the socioeconomic benefits of a BI program, particularly the poverty and inequality impact of targeted BI schemes. We find that BI policies have significant social welfare enhancing impact in the short-term, while in them medium- to long-run broad-based BI policies lead to budget deficits and economic slowdown. Introduction of a carbon tax, together with alterations in corporate tax and public policy spending, can achieve higher economic growth while alleviating poverty and inequality. Therefore, our analysis suggests that Turkey *can* adopt a BI scheme *only if* coupled with sustained fiscal sources; and carbon taxation is revealed as one such active instrument of abatement.

The next section provides a brief overview of recent debates on BI and alternative financing sources. The third section presents a detailed description of our methodology. The fourth and fifth sections present our findings regarding the social impact of the studied scenarios and their macroeconomic analysis, respectively. Concluding remarks and a policy discussion are offered in the last section.

What has been discussed in the literature? Theoretical background of basic income

Over the past decades, variations of the BI 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. For instance, van Parijs and Vanderborght (2017) argue that BI is necessary to radically restructure the way economic security is pursued in contemporary societies. In contrast, 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 (Birnbaum and de Wispelaere 2021; Standing 2011).

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

[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 1970s. The third, and the largest, wave, he suggests, started in 2000s. All three periods are characterized by rising inequality and/or economic instabilities.

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form of a Keynesian mechanism to boost aggregate demand, hence increased rate of employment, by injecting effective purchasing power into the economy (Bugra and Keyder 2007; Rodríguez Enríquez 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 (Bugra and Keyder 2007; Handler and Babcock 2006). 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; Lombardozzi 2020; Schulz 2017). 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 (Allegri and Foschi 2021; Cholbi and Weber 2019; Dermont and Weisstanner 2020).

Although the idea of a BI has been broadly discussed, major concerns persist. The most common counterarguments of BI 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 (Acemoglu 2019; Greenstein 2017; Schneider 2017).

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 and 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 is 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; Gan 2019; Widerquist 2017b). It is generally suggested to be funded in a specific, earmarked way. Taxes on consumption constitute 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). Şahin and Kılıç (2021) run simulations for alternative BI schemes for Turkey financed solely by income taxes. They show that BI has "*powerful positive effect on poor households' income at the cost of creating a burden on others, especially on the top deciles of the income distribution. Financing BI only with income taxation may not be the best way to sustain such a policy*" (ibid., 25). 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). Under the cap and dividend scheme, Boyce (2019) suggests that carbon dividends could be a type of UBI where the source of the income is a universal basic

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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 (e.g., Wang et al. [2019] for China or Fremstad and Paul [2019] for the United States) or progressive (e.g., Brenner et al. 2007 again for China), it is almost an anonymously held view that *redistribution of carbon revenues* has progressive impact (Brenner et al. 2007; Chepeliev et al. 2021; Gonzalez 2012; Soergel et al. 2021; Timilsina and Shrestha 2002; Wang et al. 2019). To assess the short-run distributional impacts, Fremstad and Paul (2019), for instance, modeled a \$50 tax per ton of CO_2 (tCO_2) in the United States using an input-output model. Once they model the cases in which 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 percent of people in the poorest decile when used to pay for carbon dividends. Carbon dividends benefit 56 percent of Americans, including 84 percent 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 et al. (2017) use a Social Accounting Matrix to assess the impact of a R\$25 and R\$50 carbon tax on GDP, employment, emissions, and the Gini coefficient in the case of Brazil. Their results indicate that 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 even when carbon revenues are used to finance rebates on labor and on sales taxes.

Methodology

We posit a reversal of 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. Under a standard analysis, carbon taxes are introduced at the first stage and then macroeconomic effects and social impacts are estimated. Such a framework inevitably portrays climate change policies necessary but potentially painful. Moreover, it limits the amount of the income support to the tax revenue. Instead, in line with the studies that propose alternative BI schemes in various country cases,[3] we introduce and analyze alternative BI policies at the first stage; then pick one alternative BI considering both positive welfare effects and its overall fiscal cost; and finally search for fiscal policy alternatives that are most compatible with economic growth and

[3] See Arcarons et al. 2014, Widerquiest 2017b, Specianova 2018, and Gan 2019 for examples of comprehensive analysis of BI schemes with cost estimates and alternative funding solutions.

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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 Survey of Income and Living Conditions in Turkey (TURKSTAT 2020) and carry on a social-impact analysis of a possible BI implementation across various alternative targeted groups. This exercise is carried out over the 2018 data and partitions the targeted groups based on age, gender, and income characteristics. We choose five alternative BI instrumentalization packages covering (i) all adults; (ii) women with children, elderly, and with limited health; (iii) youth between the ages 18–26; (iv) households below half the median income; and (v) a hybrid scenario that combines iii and iv and calculates the social impact of each separately. We then 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 the second stage we utilize this fiscal policy information within a macroeconomic general equilibrium setting and study the overall impact of the BI intervention over the domestic economy, at large. To this end we construct an applied general equilibrium model and simulate various alternative policy pathways within an open macroeconomy framework. The model is based on 2018 social accounting data and is carried out in a dynamic fashion spanning 2018 to 2030. Our analysis takes into account of informality because both the household and macro-level data cover incomes and employment from both formal and informal activities. Our analysis is limited by all the usual measurement problems with respect to informality.

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 gap (ii) income inequality.[4] Following Foster et al. (1984), poverty measures are calculated using the following formula:

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

where z is the poverty threshold, y_i is per capita household income, H represents the poor, and N represents the population. P_α 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 percent of median of the original distribution.[5]

For inequality, we provide estimates on Gini coefficients, income ratios at p90/p10, and at p90/p50[6]. We also provide the histograms of per capita income distribution for each scenario vis-à-vis the original distribution.

[4] 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 nonexpert 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.

[5] We present regional headcount poverty estimates in Online Supplementary Materials.

[6] Income ratios at p90/p10, and at p90/p50 show the ratio of income of the 90th percentile of population to that of 10th percentile, and of 50th percentile, respectively.

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Data for the social impact analysis is drawn from the Survey of Income and Living Conditions (SILC) 2018. 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 2018 survey comprises of approximately 81,000 people (of which about 61,000 are above 15 years of age) in 24,000 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 nonagricultural), property income, and social transfers (unemployment, retirement, old age, widow-orphan, disability, scholarships, and other transfers).

Data and theoretical structure of the macro CGE model

The macroeconomic aspects of our study involve a general equilibrium model based on macroeconomic balances of the Turkish economy in 2018. The analytical approach is based on the methodology of applied general equilibrium distinguished as 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 (for a seminal introduction, see Derviş et al. 1982). Yet, our current application diverges from the traditional Walrasian setup as we introduce many structuralist/heterodox features that represent the salient characteristics of Turkey's economy – such as demand-driven output determination, heterogeneity in labor markets, open unemployment, and chronic balance of payments disequilibrium given deep import dependence of a debt-ridden economy (Orhangazi and 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 structuralist CGE modeling; see Agénor et al. [2007] for an application to Turkey). 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 toward 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

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TURKSTAT Labor Force Statistics data utilizing the aggregation scheme of the model. We then utilize the factor income to generate household-level disposable income. This is allocated to its macroeconomic components utilizing data from the National Accounts statistics of TURKSTAT. The compiled data is finally complemented by fiscal data from the Presidency, Strategy and Budget Office and by external accounts data from the Central Bank. All the data is compiled in a social accounting matrix format for final consistency check.

The model is updated over time with annual "solutions" up to 2030. Economic growth is the end result of (i) exogenous growth of population (labor force); (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 materials.

Empirical findings of the static social impact analysis

The goal of the social impact analysis is to estimate and evaluate the social and fiscal impacts of the BI 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.

We start with a UBI to establish a maximum budget and set its welfare effects as benchmark. The amount of BI support in each scenario is decided as 874 TRY per capita per month adding up to 10,488 TRY per adult annually (2,881 USD at 3.64 TRY/$ annual average exchange rate[7] in 2017). It is calculated as half the net minimum wage (MW) in 2021 deflated by using the consumer price index (CPI).[8] This scenario is closest to the Şahin and Kılıç (2021) baseline scenario in which they assign 8,416 TRY for each fifteen or above individual annually (additional 30 percent of baseline amount is allocated to children).

Once we establish a baseline scenario (BI to all adults), we then proceed with two broad targeting scenarios. The first alternative scenario assumes an income support policy targeting women with children, plus elderly (65 and older), plus those with ongoing health problems (at least six months) that severely limited their daily activities (in case of overlap, a person may receive only one BI payment). The second alternative scenario assumes all young between the ages 18–26 are provided a monthly income support.

In addition to the previously mentioned broad targeting scenarios, we employ the means-testing approach (to those below poverty line, 50 percent of median income).

[7] Annual exchange rates are obtained from Strategic Budget Directorate website: https://www.sbb.gov.tr/temel-ekonomik-gostergeler/#1594716589132-d3a64e97-2238, Section 5, Table 25.

[8] This enables us to perform the analysis at 2021 threshold levels because real MW has increased almost 25 percent between 2017 and 2021. However, exchange rates and inflation trajectories diverged significantly since 2018. In 2021, half of the annual equivalent of net monthly minimum wage was 16,950 TRY while the annual average exchange rate was 8.89 TRY/$; hence the equivalent threshold would be 1,907 USD.

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Previous research by Tekgüç (2018) reports that means-targeting is far from perfect in the case of Turkey. During 2006–2015 on average 50 percent of social assistance recipients were in the lowest three deciles, and many households below the threshold did not receive social assistance. Hence in the means-tested scenario, we allocate enough budget for all the households (roughly 4.4 million, see Table 2) below the poverty line, and optimistically assume that 75 percent of households below the threshold will receive BI payments. The rest of the budget are diverted to households above the threshold.

In the final scenario, we combine the means-testing approach with broad targeting of the youth. We project a hybrid scenario in which all young people between the ages 18–26 are provided monthly income support, and households who are still below the poverty line are included in the support program as well. We experiment with a new level of monthly (annual) income to see the fiscal impacts; 1,000 (12,000) TRY in 2021 or 618 (7,416) TRY in 2017 (roughly half the 2017 official minimum wage or 2,037 USD per year).

Income poverty analysis

Table 1 displays the poverty and inequality rates in the original case and in five alternative scenarios. A quick glance reveals that BI is indeed successful in alleviating poverty. In all scenarios where BI policy is implemented, both the poverty rate and poverty gap are lower and their level 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 eligible for support. Comparing the poverty impact of first scenario of Şahin and Kılıç (2021) and BI in this analysis reveals very similar poverty impacts: In both cases BI more or less eliminates income poverty despite different amounts, different treatment of minors and different years of microdata. The similarity of results from these two independent studies is an indication of robustness of findings. The change in poverty is explained by increases in both average and median per capita income and is in line with findings of Rodríguez Enríquez (2007). In both relative and absolute terms youth scenario is the least effective in reducing poverty, nevertheless even under this scenario decline is substantial (4.5 percentage points). Comparing poverty impact of youth BI versus means-tested scenarios also reveal one of the key issues of BI: administrative simplicity of youth BI versus the effectiveness of means-tested programs in poverty reduction.[9]

Income inequality analysis

Gini coefficients for our analysis are provided in Table 1. We also report the percentile ratios p90/p10 and p90/p50 that 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 the Gini coefficient is 0.448. The ratio of income of the 90th percentile to that of 10th percentile is almost sevenfold, and of the 50th percentile it is more than twice. We find that introduction of BI policy leads to improvement in inequality

[9] Regional poverty estimates for each scenario are presented Table S1 in Supplementary Materials.

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Table 1. Poverty and inequality

	Original survey	Basic Income to all adults	Basic Income to women with children, plus elderly, plus adults with limited health	Basic Income to youth – ages 18–26	Basic Income to those under half of median income	Hybrid: youth and those under half of median income - 1000 TRY
Poverty rate (%)	17.6	1.5	7.2	13.1	9.9	9.1
Poverty gap	28.1	13.6	19.4	25.6	23.4	18.9
Average per capita income (annual- TRY)	19,138	27,495	22,220	20,364	19,739	20,407
Median per capita income (annual- TRY)	13,393	22,400	16,820	14,856	13,787	14,576
Gini coefficient	0.448	0.341	0.395	0.426	0.428	0.417
p90/p10	6.959	4.115	5.240	6.193	5.360	5.233
p90/p50	2.652	2.018	2.319	2.463	2.609	2.503

Note: The poverty threshold for income poverty estimates is 50 percent of median of the original survey. Total household income is converted to per capita by dividing with household size, without any adjustment for household size. TURKSTAT adjusts the household size with OECD scale. Due to this difference our poverty rate and Gini estimates are higher than official estimates for 2018 (13.9 percent poverty rate and 0.408). The average exchange rate for 2017 was 3.64 TRY/$. The dollar equivalent of BI support was 2,881 USD in the first four scenarios and 2,031 USD in the fifth scenario.

Table 2. Direct fiscal effect of each income support scenario

Scenarios:	Number of people receive income support (a)	Number of households receive income support (b)	Total cost (c) (million TRY)	Share of GDP (d) (percent)
All adults	56,884,358	23,595,557	596,603	19.2
Women with children, elderly, and with limited health	20,479,477	16,538,682	214,789	6.9
Youth – ages 18–26	10,364,512	7,341,813	108,703	3.5
Households under half of median income	n/a	4,365,048	45,781	1.5
Youth + Households under half of median income – 1000 TRY	10,364,512 youth + 4,005,662 households	10,326,365	106,569	3.4

Note: The first three rows are based on individuals, whereas the fourth scenario is based on households, and the last one is a combination of both. These differences in target groups are reflected in the computation of the total cost (c). GDP 3,107,307 million TRY in 2017. The average exchange rate for 2017 was 3.64 TRY/$. The dollar equivalent of BI support was 2,881 USD in the first four scenarios and 2,031 USD in the fifth scenario.

observed by all measures.[10] 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.

Figure 1 illustrates the effect of the income support on the distribution of income with histograms.[11] Figure 1a depicts the pre- and post-distribution of income per capita for the following scenarios: (i) UBI, (ii) women with children and so forth, (iii) youth (18–26). Figure 1b depicts the pre- and post-distribution of income per capita the following scenarios: (i) means-tested (ii) hybrid. All charts show the new distribution after policy implementation compared to the original distribution colored in gray shade. The most obvious difference between Figures 1a and 1b is that in Figure 1a whole distribution is shifting to right, whereas the distributions in Figure 1b is clustered around half the median. In means-tested scenarios depicted in Figure 1b, BI transfers push recipients' income closer to the threshold but not above it. As a result, incomes of receiving households cluster around threshold (half median income), and incomes of household earning at or above median income are not affected much. Consequently, post-BI median incomes in Figure 1b are only slightly different than pre-BI median income. Yet poverty reduction impact is relatively more significant as previously shown in Table 1.

[10] Our inequality measures and those of Şahin and Kılıç (2021) are not comparable because we report pretax income inequality while they report after tax inequality measures.

[11] Investigating income groups by decile provides further insights. Means income by decile is presented in Table S2 in Supplementary Materials.

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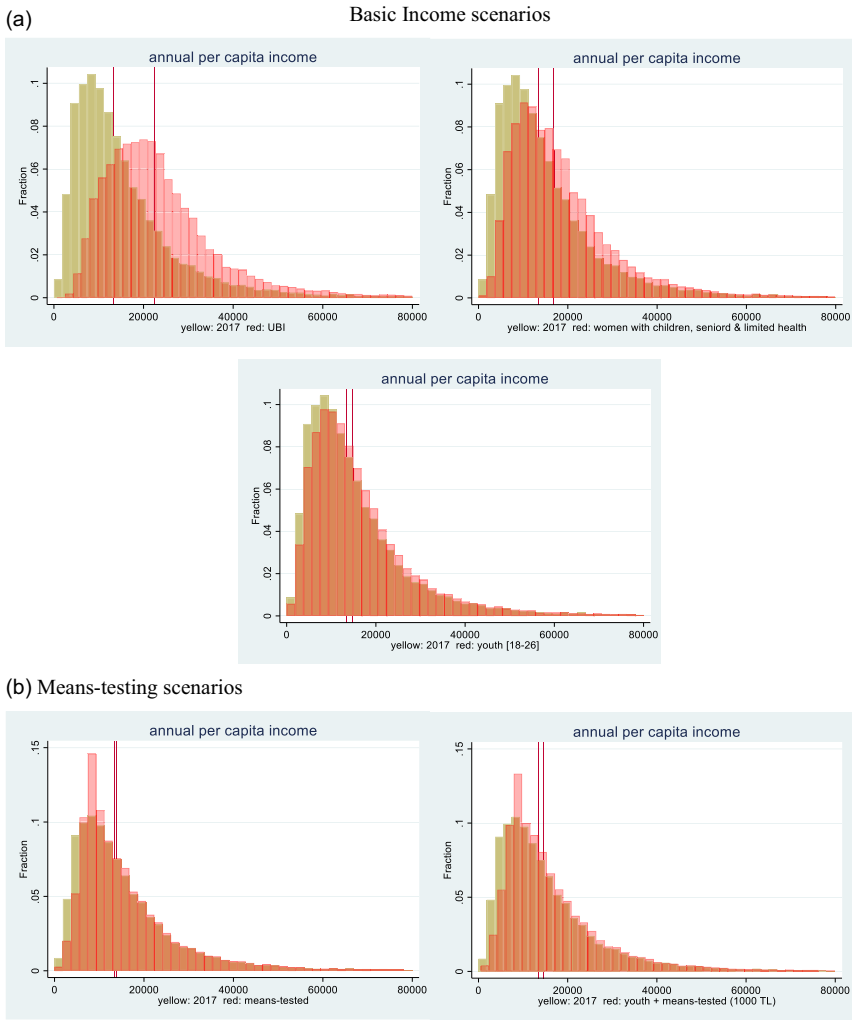

Figure 1. Distribution of per capita income.
Notes: 2017 prices. Vertical line on the left is median income of 2017 income distribution, vertical line on the right is median income of post-BI distribution. BI: 50 percent of 2021 minimum wage deflated to 2017 prices. The average exchange rate for 2017 was 3.64 TRY/$. The dollar equivalent of BI support was 2,881 USD in the first four scenarios and 2,031 USD in the fifth scenario.

Fiscal impact analysis

Table 2 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 while means-tested is the least. Our estimated fiscal cost of UBI scenario, 19.2 percent of GDP, is similar to Şahin and Kılıç (2021) estimate, 17.8 percent of GDP. The difference between the studies can be explained by higher UBI per capita in the present study. Youth

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BI and Youth BI plus means-testing have the second and third lowest costs by 3.5 percent and 3.4 percent of GDP. In this sense, both scenarios are comparable in total financing costs. But the hybrid Youth BI plus means-testing scenario is more effective than Youth BI scenario both in terms of inequality and poverty reduction (Table 1). Hence, from now on we focus on modeling the "Youth BI plus means-testing" approach in the macroeconomic analysis.

Design of the dynamic macroeconomic impact analysis

Given the social, economic, and fiscal results of the alternative BI packages discussed in the preceding text, the next step is to investigate the impacts of these alternatives on the domestic economy in a dynamic fashion. We utilize the CGE apparatus and examine the effects of the BI reform conjuncture on sectoral production, employment, wages, 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 horizon of analysis, 2018–2030. 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 socioeconomic results of the policy interventions are contrasted.

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 that 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 throughout 2019–2020. After a strong recovery following the pandemic in 2021 Turkey grew by 11 percent in real terms. However, the postpandemic deterioration of the transportation value chains and the deceleration of global economic activity due to the Russian invasion of Ukraine, Turkey once again faces dire conditions in her future growth path.

The most recent IMF estimations, for instance, project that Turkey's economy will likely expand more than 5 percent in 2022 to be followed by a slow down to 3 percent throughout 2023 (IMF 2022). Likewise, the World Bank forecasts that Turkey will close 2022 with a rate of 4.7 percent real growth, which is expected to decelerate to 2.7 percent in 2023 (World Bank 2022). Thus, it is clear that the Turkish 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 by a smoother pathway over the remaining time horizon where the recovery following the COVID-19 pandemic is averaged out over the whole cycle. This procedure led to a historically lower real rate of growth for the GDP, resolved at 2.04 percent throughout 2019–2030. This path brings the real level of GDP from 3.7 trillion TRY in 2018 to 4.7 trillion TRY (in fixed 2018 prices, or from 771 to 985 billion USD).

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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 percent. Fiscal deficit, a very critical indicator for our scenario analysis, is calculated to remain high at 2.56 percent to the GDP, and the ratio of public debt to GDP raises to 51 percent, up from its 2018 level of 30.4 percent. 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 percent over the decade.

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 in the preceding text as a representative framework. This package addresses both individuals and households and targets 10,364 million young (ages 18–26) plus 4 million households. 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 percent 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. The ratio of fiscal costs to the GDP remains above 3 percent 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 macro environment.

The macroeconomic results are tabulated in Table 3. Of particular importance is the behavior of the gross domestic product and targeted worker household incomes. Figures 2a and 2b portray the evolution of the GDP and worker household income and contrasts them against the base path. 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 five years, and by the end of the horizon the BI level of GDP falls short of the base path by 13 percent (or 16.3 percentage points, first row in Table 3). The worker household real income level (Figure 2, panel b), 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 because budget deficit as a share of GDP immediately more than doubles from less than three percent to more than 6 percent (Figure 2, panel c), nor economically in the longer run because private sector investment permanently declines (Figure 2, panel d).

We show that all these interventions induce costs and unavoidable trade-offs. In the absence of any accommodating fiscal interventions, the BI costs lead to a rise of the budget deficit by 2.3-fold in the immediate aftermath of the operation (Table 3). 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 that contracts by 19.3 percent by 2030 (or 22.7 percentage points). This results in a slower pace of capital accumulation hindering the potential growth of the

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Table 3. Macroeconomic aggregates and fiscal balances

	2018		2021 Index Values (2018 = 100)			2025 Index Values (2018 = 100)			2030 Index Values (2018 = 100)		
(million TRY)	Value	Index Value	Base path	BI only	BI Green	Base path	BI only	BI Green	Base path	BI only	BI Green
Real GDP	3,724,388	100.00	102.29	106.56	100.62	110.92	107.11	108.83	127.80	111.55	128.37
Aggregate Labor Employment (mill persons)	28.74	–	29.24	31.91	28.99	30.37	31.49	30.02	31.50	29.49	31.85
Unemployment rate	10.96	–	12.46	7.07	13.20	12.90	10.66	13.89	13.52	19.03	12.54
Capital-owner household disposable income	2,012.89	100.00	98.46	102.91	93.83	105.98	103.17	100.62	120.58	105.71	117.05
Worker household disposable income	1,145.36	100.00	102.82	129.94	120.54	111.45	129.16	127.25	128.32	132.87	145.57
Real private consumption	2,111.25	100.00	100.72	108.67	100.58	108.96	109.04	107.92	125.21	112.86	126.14
Aggregate private savings	1,047.00	100.00	100.04	108.72	99.52	107.96	108.83	106.52	123.39	111.91	123.75
Aggregate Investment Expenditures	1,101.64	100.00	97.64	94.22	96.95	103.58	92.42	103.66	117.91	95.25	122.30
Fiscal Balances											
Aggregate Public Revenues	577.06	100.00	101.63	104.68	113.69	110.19	105.21	122.90	126.96	109.47	144.85
Aggregate Public Expenditures	649.86	100.00	105.52	127.98	116.57	115.81	131.68	124.64	131.25	135.63	140.30
Aggregate Public Consumption	552.36	100.00	112.25	115.62	101.82	121.71	116.20	110.06	140.23	120.90	129.72
Public Budget Deficit	72.8	100.00	136.33	312.64	139.38	160.33	341.55	138.46	165.26	342.99	104.23
Environmental Indicators											
CO_2 Total, mill tons	456.097	100	100.51	104.64	85.76	105.65	101.95	89.85	116.94	101.94	101.77
Total CO_2 Energy Related mill tons	325.047	100	100.53	104.72	83.34	104.35	100.75	86.13	113.32	98.86	95.58
CO_2 Taxes on Fossil Fuels (Billions TRY)	–	–	–	–	71.405	–	–	77.28	–	–	91.341
CO_2 Taxes/GDP (%)	–	–	–	–	1.92	–	–	1.93	–	–	1.94
CO_2 Taxes/Coal Gross Output Value (%)	–	–	–	–	24	–	–	24.03	–	–	24.06

Note: The average exchange rate for 2018 was 4.83 TRY/$ and GDP was 771 billion USD at market exchange rates.

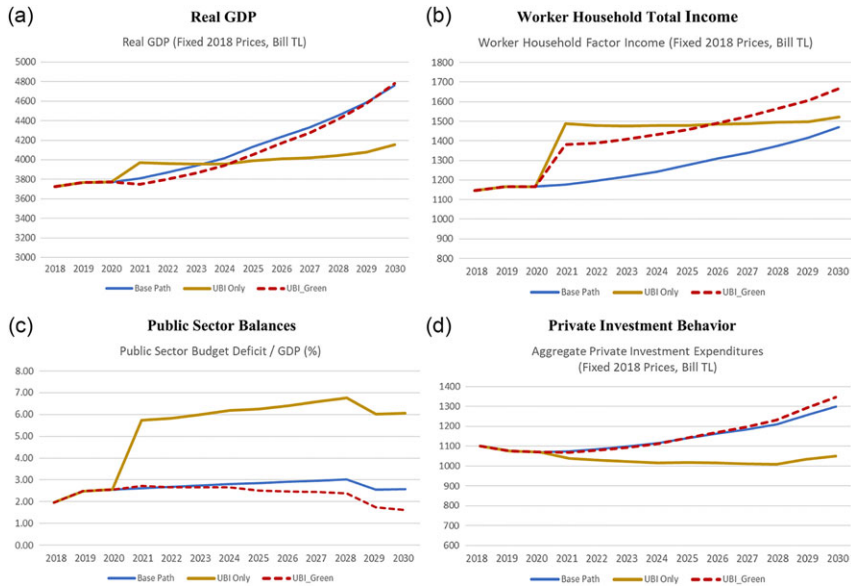

Figure 2. Aggregate income and fiscal policy results.

GDP in the rest of the scenario horizon. Figures 2c and 2d portray the course and the extent of these adjustments.

Toward a green Basic Income policy

The dismal dynamic results of the BI scenario call for fiscal action. It is clear that a 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 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. The first component of the green BI scenario is 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 percent to the respective sectoral value added. This unavoidably results in raising 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. Data from independent sources indicate that the existing subsidy bill for the coal sector in Turkey reaches to 0.5 percent as a ratio to the GDP (Acar and Yeldan 2016; SHURA 2020). 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 percent, at a modest loss in economic activity.

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Thereby, we impose the taxation scenario as a complementary environmental policy action toward 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 an unrealistic idea. On the contrary it is very likely to be imposed by Turkey's main trading partner, the European Union. To protect the competitiveness of its firms, the European Union is planning to levy carbon taxes at the border, that is, EU carbon border adjustment mechanism, on imports from countries without carbon taxes (European Commission 2021). By taxing carbon in its own terms, Turkish policy makers can take into account strategic sectors and do not leave its firms at the decisions of EU customs officials.

Next, we consider raising the corporate income tax revenue by 20 percent over its base value. The corporate income tax revenue currently stands at 2.5 percent of total GDP and 6 percent 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 percent on corporate incomes (Rappeport 2021). 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 percent over public revenues. This reduces the share of public expenditure in GDP from 16.7 percent to 14.9 percent by 2030.

Consequently, the *green-BI scenario* generates an additional tax revenue of 1.9 percent from carbon taxes on fossil fuels; 1.3 percent from rationalization of public consumption expenses and 0.4 percent from increased corporate taxation – a total of 3.6 percent 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 simple BI by 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 these results is the control of the budget deficit and the provision of financial space for the private investment expenditures to maintain its trajectory along the path.

When we compare sectoral gross output projections of the base path and green-BI scenarios in 2030, we find that the most significant declines occur in mining, electricity, and iron and steel sectors. However, these sectors are very capital intensive and employment losses are minimal with largest employment losses being observed in mining (30,000). These findings show that the impact of taxes on fossil fuel sector is mostly to be felt on their respective gross output, while the overall macro effect of the reform package is expected to be alleviated through the rationalization of public expenditures and crowding-in of private investments.

In so doing we also observe from environmental results that aggregate CO_2 emissions by 2030 is reduced by 15 percentage points over the base path. At a total of 464 mtons of CO_2 in 2030 under the green-BI, the 2018 level of emissions is almost maintained without a significant rise, and thus the peak is achieved in 2030 setting the

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course for a net zero emission economy in the decade to follow. This significantly decreases the intensity of CO_2 emissions to 458 gr/$GDP in 2030 from 578 gr/$GDP back in 2018 (Table 3).

Policy discussion and conclusion

In this study we provided an assessment of the macroeconomics of a BI policy for Turkey. Using five alternative scenarios distinguished by coverage of the receivers, we evaluate the social and fiscal impacts of the policy. Then we simulate the findings of the first stage analysis to a CGE model to investigate the economy-wide effects covering the period 2018–2030. To aid the reader to follow up the steps and findings of our analysis, we offer the following flowchart as Figure 3 (we tabulated the policy interventions and the end results leading to our conclusion).

Results of our model indicate that BI has significant social welfare enhancing impact in Turkey. Poverty rates, poverty gap, and Gini coefficients considerably improve 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. For scenario 5 we estimate a reduction of poverty rate from 17.6 percent (4.2 million households) to 9.1 percent (2.2 million households). We also find that in terms of income inequality, targeted BI policy is more efficient than the means-testing methods.

In the business-as-usual scenario of general equilibrium model we project that, when the adverse effects of the pandemic are smoothed out, the whole path generates an annual growth rate of 2.04 percent over the period. Based on this business-as-usual path we study the effects of a *Youth BI plus means-testing* scenario that is expected to cost between 3.1 and 3.4 percent 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 are strong multiplier effects in the short run leading to significant increases in GDP, employment, and real income of worker households. However, without any fiscal adjustments, this impact is not long-lasting. The cost of BI leads to an increase of the budget deficit by 2.3-fold. The expansion of the public budget deficit leads to a contraction of private investment expenditures by 19.3 percent due to conventional crowding-out effects. As a result, capital accumulation slows down hindering the potential growth of the GDP revealing that 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 reveal 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 through environmentally friendly means creating a *green-BI scenario*. We focus on three viable instruments of such a fiscal strategy. We discuss the effects of introducing a carbon tax levied on the fossil fuel sector, implementation of an increase of the corporate income tax rate by 20 percent over its current value, and reduction of the ratio of public consumption expenditures by 20 percent over public revenues. These three sources generate an additional tax revenue of 1.9 percent from carbon taxes on fossil fuels, 1.3 percent from rationalization of public consumption expenses, and 0.4 percent from increased corporate taxation – a total of

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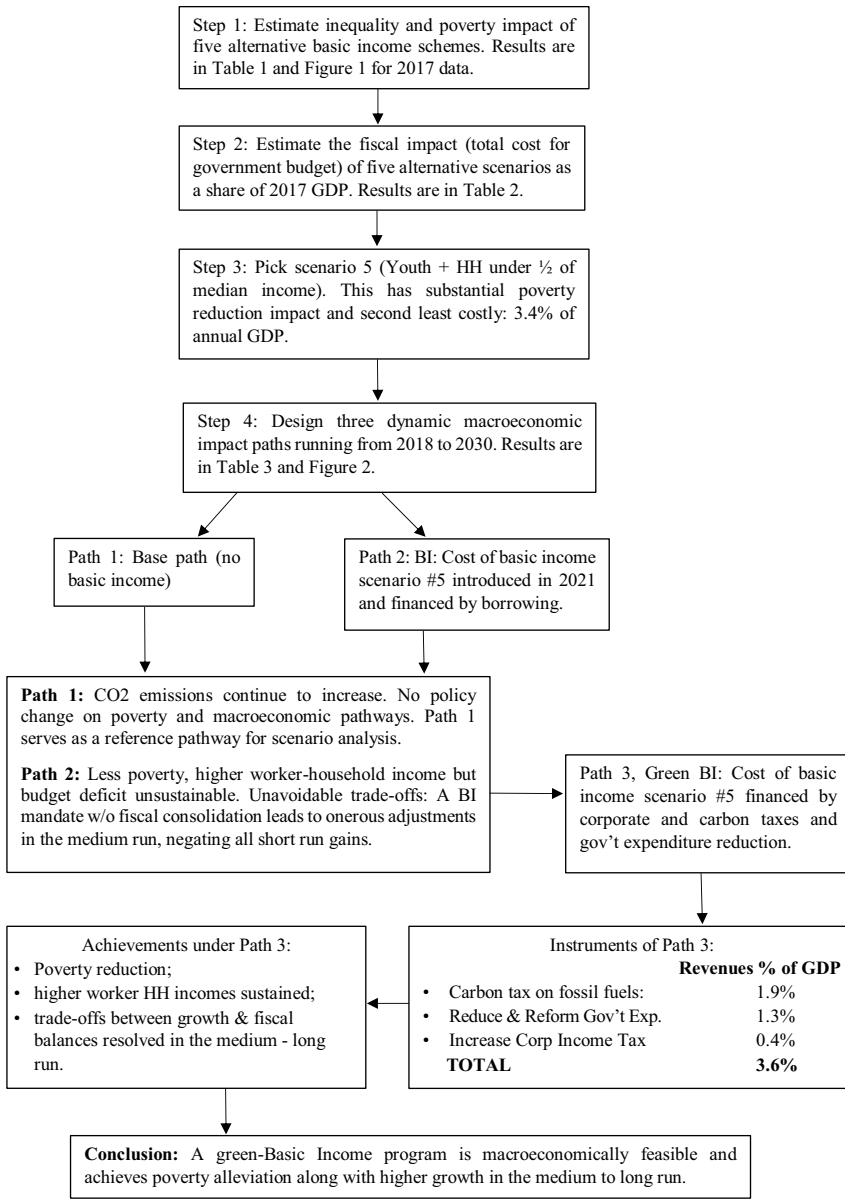

Figure 3. Flow of policy interventions and findings.

3.6 percent 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 also it achieves a higher GDP in the medium to long run. The modest carbon tax proposal is very short of achieving

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net zero emission targets but it helps Turkey to stabilize CO_2 emissions at around 2018 level and be prepared to the rapidly evolving carbon pricing arena of her main trading partner, the European Union. In all probability, achieving net zero emission will require active industrial policy encouraging innovation and investment in renewable energy and energy conservation in addition to carbon taxes. Designing such industrial policy with careful attention to poverty and inequality consequences is a promising research area.

In the final analysis we must also recognize, however, that introduction of such diverse reform packages necessitates strong political will and public support that, unfortunately, will likely face adverse constraints under the current conjecture that put issues of stabilization first and foremost onto the policy agenda. Turkey faces strong, binding dilemmas in policy choice under conditions of huge external (current account) deficits. Furthermore, various lobby groups favoring fossil fuel industries are likely to resist new taxes on their products. Hence, implementation of a wide reform package favoring poor income groups who do not necessarily have due power in forwarding their voice through the formal institutional channels will prove difficult. We propose, however, that rather than ad hoc propositions in rhetoric, a coherent set of policy interventions that will succeed in promoting poverty alleviation and income support that respect both the fiscal and external constraints of Turkey is economically feasible.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/npt.2023.2

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