**Online Supplementary Materials**

**Extra Findings for Poverty and Inequality Analysis**

Table S1 reports regional poverty rates for scenarios detailed in the main text. Poverty rates are significantly lower 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 the national average in absolute terms.

**Table S1. Regional poverty**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Original survey** | Basic income to all adults | women with children, plus elderly, plus adults with limited health | Basic income to youth – ages 18-26 | Basic income to those under ½ of median income | (youth and those under ½ of median income  - 1000 TRY |
| Istanbul | 9.1 | 0.6 | 2.6 | 6.9 | 4.5 | 4.5 |
| Western Marmara | 13.7 | 0.8 | 5.3 | 10.3 | 5.8 | 5.6 |
| Aegean | 10.9 | 0.4 | 2.9 | 8.0 | 4.4 | 3.8 |
| Eastern Marmara | 10.5 | 0.1 | 2.5 | 7.9 | 4.2 | 4.8 |
| Central-West | 11.4 | 0.5 | 4.4 | 9.0 | 6.0 | 6.1 |
| Mediterranean | 20.9 | 1.4 | 8.4 | 16.0 | 11.0 | 11.2 |
| Central | 20.9 | 1.1 | 7.8 | 16.4 | 12.0 | 10.6 |
| Western Black Sea | 16.2 | 0.6 | 5.8 | 12.5 | 8.7 | 8.1 |
| Eastern Black Sea | 15.9 | 0.8 | 4.2 | 12.9 | 8.3 | 7.5 |
| Northeastern | 34.6 | 3.6 | 15.9 | 24.8 | 22.5 | 18.5 |
| East-Central | 40.7 | 4.8 | 20.9 | 26.6 | 26.3 | 21.8 |
| Southeast | 53.5 | 9.8 | 30.3 | 39.1 | 38.9 | 34.1 |
| **Turkey Total Poverty rate (%)** | **17.6** | **1.5** | **7.2** | **13.1** | **9.9** | **9.1** |
| **Turkey Total Poverty gap** | **28.1** | **13.6** | **19.4** | **25.6** | **23.4** | **18.9** |

*Note:* The poverty threshold for income poverty estimates is 50 % of median of the original survey.

In addition to Gini coefficients and p90/p10 ratios reported in Table 1, measuring income inequality by income groups provides further insights. To obtain income groups, all households are ranked by level of income, from lowest to highest, and divided into ten groups with equal numbers of people, known as deciles. Table S2 displays per capita income by income deciles. The first decile is the bottom 10%, the second decile is the next lowest, and so on. Income inequality can be observed by comparing the level of income earned by each decile.

In the original case, per capita income of the lowest decile is 3,516 TRY, and per capita income of the highest decile is 63,802 TRY. In other words, the top income decile of the population earns 18 times higher income than the bottom income decile. This gap between the incomes of the lowest and highest income groups is narrower when there is a transfer policy in place. Each policy affects the gap at varying degrees. Under UBI, where the gap is the smallest, the top decile of the population earns 8 times than the bottom income decile, whereas under youth BI, where the gap is the largest, the difference is 14 times.

**Table S2. Per capita income (annual) by income deciles**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Original survey** | Basic income to all adults | all women with children, elderly, and with limited health | Basic income to youth – ages 18-26 | Basic income to those under ½ of median income | youth and those under ½ of median income  - 1000 TRY |
| 1 | 3,516 | 9,289 | 6,262 | 4,620 | 5,331 | 5,506 |
| 2 | 6,136 | 13,057 | 9,433 | 7,332 | 7,972 | 8,323 |
| 3 | 8,114 | 15,675 | 11,657 | 9,324 | 8,328 | 9,128 |
| 4 | 10,066 | 18,290 | 13,666 | 11,286 | 10,308 | 11,077 |
| 5 | 12,212 | 20,918 | 15,845 | 13,377 | 12,501 | 13,209 |
| 6 | 14,704 | 23,603 | 18,321 | 15,826 | 15,002 | 15,692 |
| 7 | 17,777 | 26,977 | 21,128 | 18,938 | 18,121 | 18,784 |
| 8 | 21,885 | 31,168 | 24,949 | 23,041 | 22,139 | 22,895 |
| 9 | 29,267 | 38,611 | 32,124 | 30,227 | 29,609 | 30,163 |
| 10 | 63,802 | 73,350 | 66,169 | 64,774 | 64,180 | 64,778 |
| Turkey average | 19,138 | 27,495 | 22,220 | 20,364 | 19,739 | 20,407 |
| Turkey median | 13,393 | 22,400 | 16,820 | 14,856 | 13,787 | 14,576 |

**Characteristics of CGE Model**

The CGE apparatus is an applied framework of the Walrasian general equilibrium system where economic agents respond to endogenous price signals. The system is driven by the interaction of production – incomes generation- aggregate demand activities within an open economy framework. Commensurate with the production activities, incomes are generated through the disposition of wages, profits, and other factor payments. Income remunerations are channeled to the households whose role in the system is to dispose-off the generated factor income as (private) consumption expenditures on goods and services or (private) savings. Saving funds, in turn, are driven by the aggregate investment demand in the short run to accentuate the potential output in the next production cycle.

Following the identities of national income accounting, any gap on the savings-investment balance domestically is met by foreign savings; that is, the balance on the current account of the balance of payments. Adjustment on a flexible (real) exchange rate (*conversion factor* of the price indexes of the *domestically produced versus foreign goods*) or quantity adjustments on foreign exchange flows are possible modes of adjustment to bring forth the warranted equilibrium. Government, in turn, is institutionalized at every aspect of economic activity. Through various administrative capacities of taxation/subsidization, the government acts as both an economic agent fulfilling public expenditure/saving accounts, and, also, as an administrative unit in designing alternative policy scenarios and implementing instruments of aggregate effective demand management. It is the capability of the CGE framework to provide an economic evaluation of the “*what if?*” policy interventions under various macroeconomic scenarios.

In the model, *the public sector* engages in taxation, transfers and subsidies, and public consumption activities. The model also implements economic policy tools (subsidization of employment and production promotion). Central government budget covers the main fiscal expenditure and revenue tools of the economy, and is resolved endogenously within the general equilibrium system. On the other hand, demand for imports, foreign borrowing, and export activities are again determined endogenously under the general equilibrium conditions. In this process, the real exchange rate internally solves the domestic economy's foreign exchange demand and earnings balance (current account financing, given balance of payments flows).

Private sector is represented as one aggregate household. The household budget comprises returns from factor payments, remittances of the corporate sector, and net foreign flows. The household further pays taxes, receives social transfers, and earns interest income on its holdings of public debt. The public sector’s main source of income is tax revenues, implemented in various forms –indirect production and consumption taxes, direct household and enterprise taxes, and various levies on imports. Given social transfers and public expenditures as policy instruments under the BI, the resulting *Public Sector Borrowing Requirement* (PSBR) is covered by issuing debt instruments. In the absence of full accommodation of money and financial markets, we set the (real) interest rate on these instruments exogenous.

Private consumption expenditures are allocated across sectors given relative prices with the assumption of a Cobb-Douglas type of preference maximization in the background. Saving propensities set aggregate private savings; and investment expenditures are directed to capital accumulation, net of depreciation.

In its foreign economic relations, the model relies on the hypothesis of imperfect substitution in trade (*Armingtonian composite good system* a la Armington, 1969). This specification is known to allow for more flexibility in the *domestic* price system, in contrast to traditional open economy trade models where the law of one-price rules (hypothetically convenient, yet unavoidably unrealistic at this level of aggregation).

The overall model is brought into equilibrium through endogenous adjustments of product prices to clear the commodity markets. The real wage rate of formal labor is regarded exogenous and the labor market equilibrium is sustained by quantitative adjustments on involuntary unemployment. The balance of payments is cleared through flexible adjustments of the *real* exchange rate (defined, in the auspices of our model, as the ratio of the index of domestic good prices to that of import costs). The “nominal” exchange rate (the conversion factor) across domestic and foreign prices) in contrast, is exogenously set as the *numéraire* of the system.

**Algebraic Structure of the CGE Model and the Data Base**

In this section, we tabulate the algebraic equations of the CGE model utilized for our scenario analysis. The equations and the consequent variables are grouped in functional categories, and is introduced in two broad sections: static (within period) and dynamics.

Sectoral production is modeled via a multiple-stage production technology where at the top stage, gross output is produced through a Cobb-Douglas technology defining capital (*K*), labor (*L*), intermediate inputs –excluding primary energy inputs (*ID*) and primary energy composite (*ENG*) as factors of production. In agriculture, in addition to these, the model accommodates *land aggregate* as an additional composite factor of production. Agricultural land aggregate is further decomposed as a constant elasticity of substitution (CES) function of *irrigated* and *rain-fed land*. This decomposition is responsive to rental rates of the type of the land respectively, which are solved endogenously by the model. Water used in irrigated land is set as a Leontief coefficient.

In algebraic terms, for the *non-agricultural* sectors the production technology is given as follows:

 (1-i)

whereas in agriculture, production entails *land aggregate* as an additional factor of production:

 (1-ii)

In Equations 1-i and 1-ii, *AX* is the technology level parameter, , , ,denote the shares of capital input, the labor input, aggregate land input (only for agriculture) and the energy input in the value of gross output in sector *i*. Under the assumption of constant returns to scale (*CRS*) technology, for every sector *i*:

 (2)

At the lower stage of the production technology, the *primary energy composite* is produced along a constant elasticity of substitution (CES) production function using the primary energy inputs, coal, petroleum and gas and electricity:

** (3)

Sectoral demands for labor, capital, and energy composite and intermediate inputs arise from the profit-maximization behavior of the representative firm in each sector:

We specify a dualistic structure in the labor markets where rural and urban labor are differentiated. Rural labor market wages are fully flexible and the low productivity problem is revealed in low wages. Urban labor market is subject to nominal wage fixity and an endogenous unemployment mechanism is generated.

Within intertemporal dynamics, rural labor migrates into urban centers via a simple *Harris-Todaro* framework with migrants responding to expected urban wage rate and rural wage differences. With this mechanism we try to capture some of the key historical adjustment characteristics of the Turkish growth patterns via effectively unlimited supplies of rural labor. This mechanism will also be explanatory in portraying a basis for the analysis of rural poverty issues.

The amount of rural labor migrating to the urban labor market is found by:

 (4)

Here *WAG* is the rural labor wage rate (flexible), and *EWU* is the expected urban wage rate. *μ* is an elasticity parameter used to control the responsiveness of the migration decision in response to the wage differentials. The expected urban wage rate is a weighted average of the (*nominally fixed*) urban formal wage rate and the sectoral employment levels in the urban sectors:

 (5)

Given the migrated labor and supplies of both types of labor, urban formal labor market is quantity adjusting via unemployment:

 (6)

Rural labor market wages are flexible:

 (7)

Likewise, given the aggregate physical capital stock supply in each period, the capital market equilibrium,  = **implies an equilibrium profit rate *r* for the economy. Thus the physical capital is mobile across sectors. It is the difference in sectoral profit rates that leads to the sectoral allocation of aggregate investments in within-period dynamics of the model.

**Income Generation and Demand**

Private sector is aggregated into one household. Household income comprises returns to labor input, net of social security (payroll) taxes, and land rental income. Household income is further accentuated by remittances of profits from the enterprise sector.

 (8)

The net profit transfer of the enterprise income to private household is mainly composed of returns to capital as a factor of production:

*EtrHH* = (1-)** - *EERPtrROW* - *NFI*G + *GtrEE +* + (9)

Here, a constant proportion *trrow*, of the total profit income is distributed to the rest of the world to represent the net factor income of foreigners in Turkey:

*EERPtrROW* =  (10)

In Equation (9), *GtrEE* is the net transfers of the government to private enterprises, *rDDomDebtG* is the interest income of the enterprises (banking sector) out of government domestic debt and *rFForDebtE* is the interest payments of the private enterprises for their already accumulated foreign debt. As *e* represents the exchange rate variable, *ForBORE* is the new foreign borrowing of the private sector in foreign exchange terms.

Finally, the primary sources of income, together with the secondary sources of income constitute the total private income to the household:

*YHH =* + *EtrHH* + *GtrHH + SSItrHH + eROWtrHH* (11)

In the equation above, *GtrHH* is government transfers to private households and *SSItrHH* is the social security institutions transfers to the households. *ROWtrHH* represents remittances. Private disposable income, is then private income of the households, net of income taxes:

 (12)

Private households save a constant fraction, *sp* of their income. The residual aggregate private consumption then is distributed into sectoral components through exogenous (and calibrated) shares:

 (13)

where *PC*i is the composite price of product *i* which consists of the unit prices of domestic and foreign commodities, united under the imperfect substitution assumption through an *Armingtonian* specification.

Likewise, aggregate public consumption is distributed into sectoral production commodities in fixed proportions:

 (14)

We set the aggregate public consumption as a policy ratio to aggregate public income:

 (15)

where *GREV* represents public revenues. *GREV* composes of direct taxes on wage and profit incomes and profit income from state economic enterprises. The income flow of the public sector is further augmented by indirect taxes on domestic output and foreign trade (net of subsidies), sales taxes and environmental taxes:



*+ TOTAL Environmental Taxes* (16)

The model follows the fiscal budget constraints closely. We regard the government transfer items to the households and to the enterprises as fixed ratios to government revenues net of interest payments. Then, public sector borrowing requirement (PSBR) is settled as a residual variable out of the public fiscal accounts.

*PSBR = GREV – GCON - rPGe ForDebtG - rDDomDebtG –GtrHH – GtrEE*  (17)

and is either financed by domestic borrowing, *ΔDomDebtG* or by foreign borrowing *ΔeForDebtG*.

**Environmental Pollution and Instruments of Abatement**

We will distinguish two types of environmental pollution: gaseous emissions (in terms of CO2 equivalents) and waste generation.

Waste is thought to be generated from (1) urban waste (to be formulated as a ratio of urban consumption); (2) waste from industrial processes and (3) waste from water usage in agricultural production.

On the other hand, three basic sources of *CO2* emissions are distinguished in the model: (i) due to industrial processes, (ii) due to (primary and secondary) energy usage, and (iii) due to energy use of households. Total *gaseouse*missions in the economy is the sum over from all these sources:

Depending on the source of emission, we assume different allocation mechanisms of carbon dioxide. Following Gunther *et al*. (1992), the emissions from industrial processes is regarded to depend on the level of industrial activity, therefore is hypothesized proportional to gross output:

=  (18)

On the other hand, total emissions due to energy usage, *TOTCO2ENG* are generated from two sources: sectoral emissions due to combustion of primary energy fuels (coal and petroleum and gas) and sectoral emissions due to combustion of secondary energy fuels (refined petroleum):

*TOTCO2ENG* =  (19)

Under both sources, the mechanism of emission is dependent on the level of pollutant-emitting inputs (energy input at primary and at secondary levels) in each sector:

=  *IDj,i* *j = CO, PG* (20)

 =  *IDj,I j = RP* (21)

Total emission of *CO2* in the use of energy by households is given by:

 (22)

Here,  is the coefficient of emissions of *CO2* in private consumption (*CDi*) of the basic fuels coal (*CO*) and refined petroleum (*RP*) by households.

Pollutant tax/fee can serve as one of the instruments and is thought to be introduced at per tons of carbon dioxide emitted on intermediate input usage. The revenues are directly added to the revenue pool of the government budget.

*TOTCO2TAX* =  (23)

**General Equilibrium**

The overall model is brought into equilibrium through endogenous adjustments of product prices to clear the commodity markets and balance of payments accounts. With nominal wages being fixed in each period, equilibrium in the labor market is sustained through adjustments of employment.

Given the market equilibrium conditions, the following ought to be satisfied for each commodity *i*:

*CCi = CDi + GDi + IDPi + INTi* (24)

that is, the aggregate absorption (domestic supply minus net exports) of each commodity is demanded either for private or public consumption purposes, private or public investment purposes or as an intermediate good.

The model’s closure rule for the savings-investment balance necessitates:

PSAV + GSAV + e CAdef = PINV (25)

The *CAdef* in the equation above determines the current account balance in foreign exchange terms and equals to the export revenues, the remittances and private and public foreign borrowing on the revenue side and the import bill, profit transfers abroad and interest payments on the accumulated private and public debt stocks on the expenditures side:

 (26)

The private and public components of the external capital inflows are regarded exogenous in foreign exchange units. The additional endogenous variable that closes the *Walrasian* system is the private investments, *PINV.* Finally, the exchange rate *e*, (nominal conversion factor) serves as the *numeriare* of the system. The *real exchange rate –the ratio of traded good prices to domestic prices*, is endogenous to the system mocking the workings of a freely floating exchange rate regime.

**Dynamics**

The model updates the annual values of the exogenously specified variables and the policy variables in an attempt to characterize the 2021-2030 growth trajectory of the Turkish economy. In-between periods, first we update the capital stocks with new investment expenditures net of depreciation. Labor endowments are increased by the respective population growth rates. Similarly, technical factor productivity rates are specified in a Hick-neutral manner, and are introduced exogenously. Urban nominal wage rate is updated by the price level index which is endogenous to the system.

Finally, at this stage we account for the evolution of debt stocks. Government’s foreign borrowing is taken as a ratio to aggregate *PSBR*:

*e ForBorG = (gfborrat)PSBR* (27)

Thus, government domestic borrowing becomes:

*DomBor = (1 – gfborrat) PSBR* (28)

Having determined the equations for both foreign and domestic borrowing by the government, we establish the accumulation of the domestic and foreign debt stocks of the public sector:

*DomDebtt+1 = DomDebtt + DomBort*(29)

*ForDebtGt+1 = ForDebtGt + ForBorGt* (30)

Similarly, private foreign debt builds up as:

*ForDebtPt+1 = ForDebtPt + F*

**Table S3. Input-Output Table, 2018 (at basic prices, million TRY)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AG** | **MI** | **FO** | **TE** | **OE** | **PA** | **PE** | **CH** | **CE** | **IS** | **MW** | **AU** | **EL** |
| AG: Agriculture | 54,347.1 | 414.3 | 92,012.7 | 13,883.7 | 8,572.9 | 876.9 | 1.2 | 2,159.9 | 74.9 | 6.4 | 49.2 | 0.2 | 1.4 |
| MI: Mining | 834.6 | 6,049.1 | 1,362.9 | 2,534.7 | 3,271.5 | 713.6 | 109,944.9 | 8,517.2 | 20,902.0 | 38,420.7 | 1,135.5 | 597.9 | 174,812.2 |
| FO: Food Processing | 11,755.5 | 115.5 | 38,700.8 | 1,240.5 | 7,327.1 | 321.4 | 29.0 | 563.4 | 89.8 | 61.0 | 256.1 | 63.6 | 128.8 |
| TE: Textiles, Clothing | 201.3 | 329.3 | 503.7 | 127,766.3 | 11,917.5 | 1,171.6 | 12.8 | 2,275.1 | 488.5 | 237.8 | 1,023.5 | 1,511.1 | 28.5 |
| OE: Other Economy | 9,592.1 | 5,423.1 | 18,560.2 | 20,102.0 | 116,420.8 | 5,520.7 | 2,675.5 | 18,815.9 | 8,751.3 | 112,681.0 | 30,372.0 | 22,886.1 | 6,395.1 |
| PA: Paper Products | 207.7 | 27.8 | 4,049.0 | 2,650.9 | 11,860.5 | 20,388.0 | 114.5 | 3,448.5 | 1,356.6 | 929.3 | 2,691.8 | 426.1 | 471.9 |
| PE: Petroleum Products | 8,240.8 | 5,894.2 | 1,064.8 | 917.0 | 23,325.5 | 274.2 | 3,086.0 | 3,034.8 | 4,597.8 | 1,588.8 | 2,813.5 | 459.8 | 2,499.1 |
| CH: Chemicals | 16,511.5 | 2,075.5 | 9,180.6 | 27,868.0 | 25,259.2 | 8,000.6 | 118.1 | 137,504.6 | 5,444.3 | 8,654.6 | 20,491.5 | 10,791.5 | 465.6 |
| CE: Cement | 242.2 | 642.6 | 895.6 | 81.1 | 4,834.5 | 11.6 | 3.3 | 2,198.0 | 17,566.6 | 1,587.8 | 3,001.2 | 2,041.2 | 809.6 |
| IS: Iron and Steel | 11.4 | 1,138.2 | 178.8 | 82.9 | 16,873.7 | 340.9 | 53.5 | 2,164.5 | 1,024.6 | 86,702.2 | 110,280.4 | 31,650.1 | 446.4 |
| MW: Machinery, White Goods | 486.2 | 1,456.6 | 1,345.0 | 1,538.4 | 24,170.0 | 261.8 | 124.6 | 3,034.2 | 863.0 | 2,964.3 | 72,249.5 | 28,590.9 | 3,338.2 |
| AU: Automotive | 492.2 | 32.6 | 0.9 | 0.1 | 10,534.5 | 3.9 | 0.1 | 3.5 | 44.7 | 0.1 | 3,293.1 | 58,429.5 | 0.9 |
| EL: Electricity | 1,666.2 | 3,045.2 | 2,979.7 | 7,225.6 | 15,581.5 | 1,405.2 | 92.6 | 7,005.4 | 6,503.9 | 17,231.2 | 5,276.2 | 2,059.9 | 375,367.6 |
| CN: Construction | 672.1 | 289.8 | 568.9 | 446.4 | 23,781.2 | 119.0 | 7.1 | 779.4 | 216.5 | 1,000.0 | 1,100.8 | 347.0 | 2,542.7 |
| RT: Retail trade | 2,057.3 | 750.5 | 4,747.5 | 4,659.7 | 7,594.8 | 732.2 | 782.0 | 3,581.2 | 1,553.0 | 3,213.6 | 6,826.6 | 2,400.6 | 1,054.9 |
| TR: Transportation | 4,719.5 | 5,343.7 | 11,245.8 | 6,702.8 | 43,147.1 | 2,738.2 | 2,969.1 | 10,738.6 | 4,703.6 | 17,652.0 | 16,583.6 | 8,342.8 | 3,097.1 |
| AT: Air Transport | 179.9 | 747.9 | 1,229.3 | 709.2 | 15,254.9 | 372.4 | 320.4 | 3,258.7 | 305.3 | 697.9 | 1,391.8 | 644.5 | 156.8 |
| PS: Postal and Courier Services | 7.2 | 45.0 | 101.4 | 388.2 | 4,637.3 | 106.9 | 0.0 | 297.3 | 73.6 | 99.4 | 397.7 | 39.8 | 108.4 |
| AF: Accommodation and Food | 43.0 | 205.6 | 322.6 | 530.9 | 8,841.2 | 185.8 | 42.0 | 745.9 | 213.0 | 465.3 | 1,418.5 | 364.0 | 228.4 |
| PR: Professional Services | 1,503.6 | 2,404.0 | 3,277.5 | 2,260.7 | 40,907.2 | 1,598.4 | 300.8 | 5,925.0 | 1,581.7 | 2,081.7 | 7,082.0 | 2,505.2 | 4,170.7 |
| FS: Financial and Real Estate Services | 504.2 | 2,349.4 | 4,437.5 | 10,162.8 | 53,825.9 | 3,072.5 | 1,649.7 | 8,544.6 | 3,048.9 | 5,190.9 | 12,278.5 | 3,784.2 | 17,475.3 |
| TS: Tourism | 0.6 | 48.0 | 156.4 | 2.3 | 1,115.2 | 36.6 | 21.2 | 204.2 | 25.9 | 30.8 | 140.0 | 34.3 | 59.4 |
| ES: Education Services | 1.1 | 31.9 | 61.4 | 29.0 | 4,360.1 | 28.2 | 21.2 | 156.3 | 31.9 | 35.4 | 194.6 | 229.0 | 55.3 |
| HE: Health Services | 0.0 | 0.0 | 1.6 | 5.4 | 24.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Table S3. Input-Output Table, *continued***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CN** | **RT** | **TR** | **AT** | **PS** | **AF** | **PR** | **FS** | **TS** | **ES** | **HE** | **Totals (Row Sum)** |
| AG: Agriculture | 212.7 | 403.9 | 14.1 | 4.4 | 0.0 | 8,158.7 | 341.6 | 190.6 | 314.3 | 386.6 | 334.5 | 182,762.3 |
| MI: Mining | 9,136.9 | 517.5 | 400.3 | 6.7 | 1.2 | 288.5 | 565.4 | 4,433.1 | 59.3 | 34.5 | 871.9 | 385,411.9 |
| FO: Food Processing | 209.8 | 2,609.9 | 151.0 | 119.3 | 103.9 | 40,293.7 | 1,075.0 | 317.4 | 580.6 | 839.1 | 1,634.1 | 108,586.4 |
| TE: Textiles, Clothing | 281.2 | 619.0 | 155.0 | 170.7 | 147.7 | 735.9 | 3,447.6 | 176.5 | 647.9 | 201.6 | 494.4 | 154,544.5 |
| OE: Other Economy | 34,680.8 | 12,670.0 | 10,881.1 | 14,373.3 | 1,401.1 | 10,146.5 | 15,932.8 | 20,036.5 | 4,947.8 | 6,542.4 | 34,323.6 | 544,131.7 |
| PA: Paper Products | 295.5 | 3,813.9 | 365.9 | 1,118.0 | 331.0 | 1,337.4 | 8,194.1 | 2,517.6 | 1,983.0 | 1,660.8 | 1,663.5 | 71,903.1 |
| PE: Petroleum Products | 9,291.5 | 5,831.3 | 21,207.0 | 29,141.0 | 1,009.0 | 1,333.3 | 3,717.7 | 2,876.6 | 899.5 | 1,585.0 | 1,018.8 | 135,706.9 |
| CH: Chemicals | 16,794.9 | 2,856.8 | 2,364.1 | 460.1 | 119.7 | 1,354.6 | 3,741.8 | 9,492.8 | 569.1 | 528.8 | 11,613.6 | 322,262.0 |
| CE: Cement | 49,118.6 | 229.9 | 837.1 | 0.0 | 0.3 | 361.2 | 893.6 | 8,510.3 | 38.6 | 3.6 | 1,962.6 | 95,871.1 |
| IS: Iron and Steel | 46,831.0 | 387.3 | 205.1 | 210.9 | 0.3 | 236.3 | 839.2 | 194.8 | 20.6 | 0.3 | 2.0 | 299,875.7 |
| MW: Machinery, White Goods | 38,093.0 | 4,395.6 | 1,198.8 | 628.1 | 64.5 | 879.3 | 7,061.2 | 6,686.8 | 813.3 | 382.7 | 3,212.1 | 203,838.2 |
| AU: Automotive | 50.6 | 4.5 | 1,163.1 | 90.1 | 0.4 | 1.0 | 628.3 | 17.7 | 12.9 | 0.1 | 53.0 | 74,857.5 |
| EL: Electricity | 798.2 | 7,318.4 | 369.9 | 1,546.9 | 137.1 | 4,706.2 | 3,744.0 | 7,622.8 | 1,114.1 | 4,880.3 | 5,381.1 | 483,059.4 |
| CN: Construction | 88,047.8 | 4,497.8 | 372.5 | 129.4 | 91.3 | 1,105.3 | 3,257.0 | 8,469.1 | 2,178.2 | 1,152.3 | 1,656.8 | 142,828.3 |
| RT: Retail trade | 6,050.0 | 1,024.7 | 1,745.9 | 2,359.3 | 110.0 | 2,178.4 | 1,451.1 | 1,560.7 | 229.3 | 262.9 | 1,542.2 | 58,468.4 |
| TR: Transportation | 10,531.4 | 6,623.0 | 35,337.7 | 9,883.0 | 1,949.2 | 2,806.1 | 6,397.2 | 2,466.9 | 1,917.3 | 6,366.7 | 2,327.3 | 224,589.6 |
| AT: Air Transport | 685.9 | 1,173.9 | 10,093.3 | 32,725.1 | 1,295.2 | 63.1 | 1,019.9 | 1,360.6 | 4,578.1 | 94.3 | 240.5 | 78,598.9 |
| PS: Postal and Courier Services | 130.5 | 2,941.8 | 233.5 | 569.5 | 877.9 | 64.3 | 1,682.6 | 961.8 | 345.6 | 219.6 | 75.4 | 14,404.9 |
| AF: Accommodation and Food | 705.4 | 1,666.9 | 324.3 | 974.3 | 114.2 | 1,592.4 | 2,417.1 | 1,927.0 | 11,291.4 | 1,129.2 | 3,326.5 | 39,075.0 |
| PR: Professional Services | 15,155.3 | 13,186.8 | 2,149.6 | 5,232.1 | 1,137.2 | 2,735.2 | 66,837.4 | 14,246.8 | 6,292.0 | 2,706.1 | 10,454.7 | 215,731.7 |
| FS: Financial and Real Estate Services | 9,322.2 | 38,308.5 | 4,747.0 | 12,163.3 | 1,941.6 | 12,478.5 | 19,709.7 | 54,436.6 | 4,471.5 | 4,305.9 | 13,134.8 | 301,344.2 |
| TS: Tourism | 40.0 | 619.6 | 43.6 | 1,506.9 | 12.6 | 689.9 | 2,083.9 | 84.8 | 8,310.2 | 53.1 | 222.1 | 15,541.8 |
| ES: Education Services | 16.4 | 138.5 | 29.3 | 472.5 | 8.8 | 35.9 | 579.9 | 896.2 | 104.1 | 2,750.2 | 136.5 | 10,403.8 |
| HE: Health Services | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 79.0 | 58.7 | 44.0 | 0.0 | 16,798.5 | 17,011.2 |

**Table S4. Aggregates from Input-Output Table (following Table S1)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AG** | **MI** | **FO** | **TE** | **OE** | **PA** | **PE** | **CH** | **CE** | **IS** | **MW** | **AU** | **EL** |
| Compensation of Employees | 19,836.2 | 103,930.0 | 56,498.0 | 51,120.3 | 280,667.2 | 7,786.6 | 1,686.8 | 10,077.7 | 10,921.6 | 7,553.6 | 36,599.7 | 26,612.0 | 8,761.5 |
| Gross Payments to Capital | 224,708.1 | 247,468.4 | 140,193.5 | 83,261.1 | 199,798.6 | 16,196.0 | 11,317.5 | 30,273.2 | 20,609.7 | 21,672.8 | 33,703.3 | 32,807.7 | 22,180.7 |
| Net Taxes on Production | -954.5 | 3,206.3 | 3,411.0 | 5,972.9 | 42,188.3 | 2,314.1 | 2,321.0 | 9,778.7 | 4,523.0 | 10,585.9 | 10,839.4 | 6,029.5 | 2,908.0 |
| Total Value Added (at MP) | 243,589.8 | 354,604.6 | 200,102.4 | 140,354.3 | 522,654.1 | 26,296.7 | 15,325.3 | 50,129.6 | 36,054.4 | 39,812.3 | 81,142.5 | 65,449.2 | 33,850.2 |
| Total Production Exp | 357,867.3 | 393,464.3 | 397,087.1 | 372,143.2 | 1,006,092.2 | 74,577.3 | 137,694.9 | 275,085.8 | 115,515.8 | 341,344.5 | 381,490.2 | 243,648.3 | 627,564.6 |

**Table S4. *continued.***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CN** | **RT** | **TR** | **AT** | **PS** | **AF** | **PR** | **FS** | **TS** | **ES** | **HE** | **Totals (Rows Sum)** |
| TOTALS (Column Sum) |  |  |  |  |  |  |  |  |  |  |  | **4,180,808.4** |
| Compensation of Employees | 76,438.0 | 38,340.9 | 84,232.2 | 22,266.9 | 6,087.9 | 51,869.1 | 70,165.2 | 48,914.3 | 18,021.0 | 132,868.5 | 52,599.9 | 1,223,855.2 |
| Gross Payments to Capital | 203,469.8 | 98,110.5 | 238,877.9 | 19,042.0 | 2,436.7 | 82,034.2 | 147,984.7 | 381,955.7 | 20,312.9 | 8,637.3 | 14,605.9 | 2,301,658.1 |
| Net Taxes on Production | 16,833.3 | 6,227.3 | 31,272.5 | 8,999.6 | 523.7 | 6,340.4 | 9,737.5 | 11,499.2 | 1,258.6 | 1,096.1 | 1,962.9 | 198,874.7 |
| Total Value Added (at MP) | 296,741.1 | 142,678.7 | 354,382.7 | 50,308.5 | 9,048.3 | 140,243.6 | 227,887.4 | 442,369.2 | 39,592.4 | 142,602.0 | 69,168.7 | **3,724,387.9** |
| Total Production Exp | 633,220.7 | 254,518.3 | 448,771.9 | 164,193.3 | 19,902.5 | 233,825.3 | 383,584.6 | 591,912.0 | 91,355.0 | 178,688.0 | 181,649.3 | **7,905,196.3** |

**Table S5. Expenditures**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PCE:**  **Private Consumption Exp** | **GCE:**  **Government Consumption Exp.** | **GFCF:**  **Gross Fixed Capital Formation** | **EXP: Exports** | **IMP: Imports (-)** | **Total Expenditures on Value Added** | **Total Expenditures** |
| AG: Agriculture | 154,302.6 | 0.0 | 38,500.6 | 28,337.8 | 46,036.0 | 175,105.0 | 357,867.3 |
| MI: Mining | 13,406.2 | 0.0 | 7,603.8 | 16,449.0 | 29,406.6 | 8,052.3 | 393,464.3 |
| FO: Food Processing | 254,147.6 | 0.0 | 1,657.2 | 66,454.2 | 33,758.2 | 288,500.7 | 397,087.1 |
| TE: Textiles, Clothing | 113,631.6 | 0.0 | 902.4 | 141,790.9 | 38,726.1 | 217,598.7 | 372,143.2 |
| OE: Other Economy | 155,583.1 | 232,161.0 | 99,782.0 | 71,701.0 | 97,266.7 | 461,960.5 | 1,006,092.2 |
| PA: Paper Products | 9,573.2 | 0.0 | 0.0 | 11,916.2 | 18,815.2 | 2,674.3 | 74,577.3 |
| PE: Petroleum Products | 53,661.5 | 0.0 | 299.9 | 26,353.7 | 78,327.0 | 1,988.1 | 137,694.9 |
| CH: Chemicals | 34,237.3 | 22,767.7 | 670.0 | 86,906.2 | 191,757.3 | -47,176.2 | 275,085.8 |
| CE: Cement | 6,203.9 | 0.0 | 1,940.6 | 20,352.1 | 8,851.9 | 19,644.7 | 115,515.8 |
| IS: Iron and Steel | 0.0 | 0.0 | 106,098.0 | 93,482.9 | 158,112.1 | 41,468.8 | 341,344.5 |
| MW: Machinery, White Goods | 47,211.8 | 0.0 | 196,452.8 | 158,434.5 | 224,447.1 | 177,651.9 | 381,490.2 |
| AU: Automotive | 39,210.6 | 0.0 | 76,285.7 | 144,610.5 | 91,316.1 | 168,790.8 | 243,648.3 |
| EL: Electricity | 144,298.5 | 0.0 | 0.0 | 483.1 | 276.4 | 144,505.2 | 627,564.6 |
| CN: Construction | 4,478.4 | 13.5 | 484,118.9 | 2,740.7 | 959.1 | 490,392.4 | 633,220.7 |
| RT: Retail trade | 171,003.4 | 7,616.3 | 17,430.2 | 0.0 | 0.0 | 196,049.9 | 254,518.3 |
| TR: Transportation | 184,509.6 | 1,419.2 | 16,029.9 | 49,153.9 | 26,930.2 | 224,182.4 | 448,771.9 |
| AT: Air Transport | 32,810.2 | 0.1 | 203.5 | 69,384.8 | 16,804.2 | 85,594.4 | 164,193.3 |
| PS: Postal and Courier Services | 4,655.8 | 0.0 | 0.0 | 1,004.5 | 162.8 | 5,497.5 | 19,902.5 |
| AF: Accommodation and Food | 160,921.2 | 0.0 | 0.0 | 44,751.3 | 10,922.2 | 194,750.3 | 233,825.3 |
| PR: Professional Services | 119,022.7 | 17,855.3 | 53,666.2 | 22,889.1 | 45,580.5 | 167,852.9 | 383,584.6 |
| FS: Financial and Real Estate Services | 295,571.6 | 0.0 | 0.0 | 9,287.1 | 14,290.8 | 290,567.9 | 591,912.0 |
| TS: Tourism | 44,356.0 | 6,056.6 | 0.0 | 33,332.1 | 7,931.5 | 75,813.2 | 91,355.0 |
| ES: Education Services | 38,086.5 | 130,197.8 | 0.0 | 0.0 | 0.0 | 168,284.3 | 178,688.0 |
| HE: Health Services | 30,368.1 | 134,270.0 | 0.0 | 0.0 | 0.0 | 164,638.1 | 181,649.3 |
| **TOTALS (Column Sum)** | **2,111,251.4** | **552,357.5** | **1,101,641.6** | **1,099,815.6** | **1,140,678.2** | **3,724,387.9** | **7,905,196.3** |

**Table S6. Parameters of the Labor Market (2018)**

|  |  |  |
| --- | --- | --- |
|  | **Labor Employment (Thousand Workers)** | **Total Wages (Million TRY, in 2018 )** |
|  | **Total Labor Emp** | **Total wages** |
| **AG: Agriculture** | 4,739.000 | 19,836.196 |
| **MI: Mining** | 150.000 | 103,929.964 |
| **FD: Food Processing** | 610.158 | 56,497.962 |
| **TE: Textiles, Clothing** | 1,241.675 | 51,120.331 |
| **OE: Other Economy** | 4,676.522 | 280,667.178 |
| **PA: Paper Products** | 144.412 | 7,786.640 |
| **PE: Petroleum Products** | 10.380 | 1,686.809 |
| **CH: Chemicals** | 409.504 | 10,077.691 |
| **CE: Cement** | 305.010 | 10,921.630 |
| **IS: Iron and Steel** | 172.456 | 7,553.612 |
| **MW: Machinery, White Goods** | 990.347 | 36,599.741 |
| **AU: Automotive** | 215.077 | 26,612.040 |
| **EL: Electricity** | 288.000 | 8,761.482 |
| **CN: Construction** | 1,972.000 | 76,437.971 |
| **RT: Retail trade** | 3,960.000 | 38,340.916 |
| **TR: Transportation** | 1,174.709 | 84,232.204 |
| **AT: Air Transport** | 295.028 | 22,266.918 |
| **PS: Postal and Courier Services** | 93.460 | 6,087.943 |
| **AF: Accommodation and Food** | 1,611.000 | 51,869.097 |
| **PR: Professional Services** | 1,336.826 | 70,165.227 |
| **FS: Financial and Real Estate Services** | 1,043.998 | 48,914.279 |
| **TS: Tourism** | 233.439 | 18,020.950 |
| **ES: Education Services** | 1,682.000 | 132,868.524 |
| **HE: Health Services** | 1,383.000 | 52,599.863 |
| **TOTAL** | **28,738.000** | **1,223,855.169** |

**Table S7. Fiscal Costs of the BI Scenario, 2021-2030**

|  |  |  |
| --- | --- | --- |
|  | **BI Payments**  **(Billion TRY, 2018 prices)** | **BI/GDP (%)** |
| 2021 | 126.626 | 0.034 |
| 2022 | 122.905 | 0.033 |
| 2023 | 122.905 | 0.033 |
| 2024 | 122.905 | 0.033 |
| 2025 | 119.18 | 0.032 |
| 2026 | 119.18 | 0.032 |
| 2027 | 119.18 | 0.032 |
| 2028 | 119.18 | 0.032 |
| 2029 | 115.456 | 0.031 |
| 2030 | 115.456 | 0.031 |