**Supplementary Material 1**

**Estimation Methodology: Direct and Indirect Emissions**

Figure A1 illustrates the methodology behind estimating the direct and indirect emissions of Turkish households using HBS and EXIOBASE.

**Figure A1. Household expenditures and CO2 direct and indirect emissions**



**Table A1. Income and Expenditure Patterns of Households, 2019**



**Data Preparation for the Estimation of Indirect Emissions**

**EXIOBASE3**

EXIOBASE (Stadler et al., 2021) stands as a publicly available Environmentally Extended Multi-Regional Input-Output Dataset (EE-MRIO) developed by the earth scientists with the specific purpose of conducting environmental analyses. It incorporates a wide range of metrics quantifying the environmental pressure stemming from 200 different products. Effectively, we utilize the readily available emission coefficients of these 200 products reported within EXIOBASE v3.8.2. The emission coefficients represent the kgCO2-equivalent of CO2, CH4, N2O, and SF6 emitted through one million euros expenditure on any given product. This mix of various emission factors is decided using Global Warming Potential 100 metric (Solomon et al., 2007). To determine the kgCO2-equivalent emitted per TL of expenditure, we divide the emission coefficients by (1,000,000 \* 6.37), where 6.37 is the effective average EUR/TRY exchange rate in 2019 as reported by the Central Bank of the Republic of Turkey. Due to variations in transportation expenses, input-output relationships, and production methods, emission coefficients differ between countries and across years. The process of deriving the emission coefficients using the EE-MRIO approach is detailed in other sources (such as Peters and Hertwich (2004) or Stadler (2021)).

EXIOBASE3 additionally reports Supply-Use Tables (SUTs) based on national accounts. SUTs contain information on the country-level annual expenditure in basic prices on 200 products as well trade, transport and tax margins of these products. This information is helpful to convert the survey expenditure (which is in purchaser prices) into basic prices and to correct for survey under/over reporting.

**Harmonization of HBSs and EXIOBASE3**

Definitions of COICOP expenditure categories differ from those in EXIOBASE. Thus, a rule is needed to transform the expenditures in HBS categories into expenditures in EXIOBASE products. As mentioned in the main text, Ivanova and Wood (2020) aggregates HBS expenditures into 63 COICOP categories (a combination of two, three- and four-digit categories) and constructs a concordance table for European countries to achieve this conversion, i.e., the allocation of 63 COICOP categories into 200 EXIOBASE products.

We follow the concordance table of Ivanova and Wood (2020) but implement some modifications in order to ensure that this conversion remains consistent with the expenditure patterns of households in Turkey. These modifications are as follows.

**Electricity.** Whereas HBSs do not report the expenditure on electricity by source, emission coefficients of electricity expenditures differ depending on the source of electricity in EXIOBASE. When assigning four-digit HBS category “Electricity” into different EXIOBASE products, Ivanova and Wood (2020) rely on EU-wide averages, which are inconsistent with the expenditure patterns of Turkish households. For example, there is no electricity via nuclear energy in Turkey but Ivanova and Wood (2020) assigns 40% of total electricity expenditure to EXIOBASE product “Electricity by Nuclear”. The Energy Market Regulatory Authority in Turkey reports annual electricity production volumes by source (EPDK, 2020). We modify the concordance table accordingly.

**Fuels and Lubricants for Personal Transport Equipment.** Another important difference between the expenditure patterns of European and Turkish households is related to the type of fuel used in vehicles. Ivanova and Wood (2020) mainly allocates the four-digit HBS category “Fuels and Lubricants for Personal Transport Equipment” into EXIOBASE products “Motor Gasoline” and “Diesel”. In Turkey, “Liquefied Petroleum Gas (LPG)” is also frequently used as a fuel for vehicles. Fortunately, five-digit COICOP categories separately report expenditures on “Motor Gasoline”, “Diesel” and “Others” for personal transport equipment. We assume that the expenditure on “Others” represent LPG expenditures. Thus, different than Ivanova and Wood (2020) we directly assign the expenditures on these five-digit HBS categories to the associated EXIOBASE products.

**Solid Fuels.** The majority of the solid fuel (four-digit) expenditure category is allocated into the EXIOBASE product “Wood” in the concordance table of Ivanova and Wood (2020). In Turkey, however, “Coal” is also a popular solid fuel. Once again, five-digit HBS categories distinguish between total solid fuel expenditure into “Coal” and “Other Solid Fuels”. We assume that the latter represents the expenditure on wood products and assign it directly into respective EXIOBASE product. The five-digit HBS category “Coal” is assigned into different types of coal products in EXIOBASE (e.g., Bituminous Coal, Lignite Coal etc.) consistent with the aggregates reported in national accounts.

As a result of the modifications, we employ 67 COICOP categories that that adds up to total expenditures for the purposes of conversion of HBS expenditures into EXIOBASE products. The 67 categories employed in our analyses are a combination of two-, three, and four- and five-digit categories, and recovered by aggregating the five-digit categories in the HBSs of Turkiye. The resulting concordance table can be found in Supplementary Material 2.

A main concern related to self-reported expenditures is systematic under/over reporting. Hence, it is of crucial importance to ensure that the expenditures in the survey data are consistent with the expenditures in national accounts. For this purpose, utilizing the data on expenditures in basic prices, trade margins, transport margins and tax margins reported in SUTs (national accounts), we calculate the expenditures per capita in purchaser prices for 200 EXIOBASE products. Subsequently, we scale survey expenditures of each household on each product proportionately to ensure that the expenditures per capita in our dataset is consistent with that of national accounts. This procedure generates an effective scaling factor of 1.61, i.e., total expenditures of households are multiplied on average by a factor of 1.61.

Scaling expenditures carry the risk of manipulating the expenditure totals in a slightly arbitrary manner. We calculate that the correlation coefficient between scaled and unscaled total household expenditures is 0.58 which is rather low. Thus, we face a trade-off. If we do not scale expenditures at all, total amount of emissions would be inconsistent with the expenditure patterns in the national accounts. If we scale the expenditures on all 200 products, our dataset’s capacity of analyzing the emissions across the income distribution (and possibly across other demographics) would be limited. Via visual inspection, we identify four categories (out of 200) that severely reduce the correlation between scaled and non-scaled total expenditures and exempt them from scaling. These categories are:

* heavy fuel oil,
* motor-vehicles, trailers and semi-trailers,
* railway transportation services,
* financial intermediation services.

Exempting these four categories from scaling increases the correlation coefficient between scaled and non-scaled expenditures from 0.58 to 0.91. Some simple calculations over the data in the national accounts suggest that the size of household-consumption-based emissions is approximately 3108 kgCO2-equivalent per capita in Turkey in 2019. If the aforementioned four categories were not exempted from scaling, our dataset would yield a similar amount of emissions per capita. Exempting these four categories from scaling reduces the emissions per capita to 3031 kgCO2-equivalent. Thus, increasing the correlation between scaled and non-scaled expenditures by exempting four categories from scaling comes at the cost of 77 kgCO2-equivalent emissions per capita loss.

Survey expenditures are reported in purchaser prices (i.e., the expenditure amount includes the trade costs, transportation costs and taxes). The accurate measurement of emissions requires calculation of expenditure in basic prices. Making use of the country aggregates on trade, transport and tax margins reported in SUTs (national accounts) for each product, we remove taxes from purchaser prices (i.e., we assume that taxes are not associated with consumption-based emissions) and reallocate trade and transport margins into respective products. This completes the preparation of our dataset.

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