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IMF TaxFit Model Methodology and User Guidebook

Julia Cots-Capell, Aieshwarya Davis, and Duncan MacDonald

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Authorized for distribution by Alexander Klemm

- This document describes the TaxFit microsimulation model for personal taxes and benefits, including methodological and user guidelines. The model computes taxes and benefits for hypothetical households—defined by user-provided inputs on gross income levels and family structures—thus facilitating cross-country comparisons of the burden and generosity of the tax and transfer systems, respectively. Where microdata are available, it can be uploaded to the model to produce diagnostic indicators that better reflect the population while also allowing for econometric and simulation analyses of reforms of taxes and benefits.

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Abbreviations

AW	average wage
ETR	effective tax rate
FWD	formal work disincentives
ILO	International Labour Organization
IMF	International Monetary Fund
METR	marginal effective tax rate
MPTS	marginal participation tax rate of secondary earner
OECD	Organisation for Economic Co-operation and Development
PTR	participation tax rate
IT	income taxes
SSC	social security contributions
SSCR	social security contributions of the employer

1. Motivation

Addressing gender inequality has become essential in supporting economic growth, and tax and benefit policies have an important role to play. The COVID-19 pandemic has underscored the importance of improving social inclusion, tackling high levels of public debt, and improving growth prospects. In this context, policymakers must identify measures that can boost revenue mobilization in a way that is both inclusive and growth friendly, particularly among vulnerable groups, including women who are often overrepresented at the bottom of the income distribution (Coelho and others 2022).

Moreover, women tend to be more responsive to changes in net incomes compared with men—notably in terms of labor supply decisions—implying that tax and benefit policies affect both gender disparities and broader economic outcomes (Alesina, Ichino, and Karabarbounis 2011). On the tax side, the progressivity of the tax system, the unit of taxation, and the definition of the tax base can entail gendered outcomes. On the benefits side, the adequacy of the benefits, the eligibility and accessibility of these policies, their duration, the gender sensitivity of the design, and their interaction with work incentives can have larger implications for gender and labor force participation.

- **Unit of Taxation**—Income taxes (IT) can be applied at the individual or household (HH) level. With individual taxation, each person's tax is determined based on their own income. In contrast, HH systems tax families on a joint schedule. HH-level taxation ensures equal treatment across households but raises marginal tax rates for secondary earners. Even in some individual systems, the presence of family-based provisions generates some of the same disincentives as HH taxation systems.
- **Tax Base**—The tax base is the value of all assets subject to taxation, and it is often adjusted by exemptions and deductions to favor certain activities. For example, the deduction of work-related expenses can encourage some individuals to join the labor force. One common approach is to provide allowances, deductions, or benefits to households with young children. The specific design of these measures is key to ensuring well-targeted work incentives that minimize foregone revenues.
- **Adequacy of Benefits**—Inadequate benefits in social protection systems can create significant work disincentives, especially for women, who often face higher caregiving burdens. Comprehensive social benefits such as childcare, family allowances, and health coverage make it financially feasible for women to enter and stay in the formal workforce. Without sufficient support, the cost of paid employment—particularly for secondary earners—may outweigh the potential income gains, pushing women toward informal work or out of the workforce entirely. Adequate benefits also have a broader effect on poverty reduction and economic stability, particularly in low-income households.
- **Eligibility and Accessibility of Benefits**—Eligibility criteria and the ease of access to social benefits are pivotal in shaping labor supply incentives. When benefits are conditioned on specific income levels or hours worked, they may exclude those in need, particularly women working part-time or in low-income positions. Accessible, universal benefits enable women to manage both work and family responsibilities, encouraging greater participation in the formal workforce. Streamlined access also helps reduce the administrative burden that can deter eligible women from claiming these support systems.
- **Duration of Benefits**—Longer periods with benefit entitlements can provide a stable source of income during times of needed support (for example, unemployment and childbirth). However, if benefits that cover a complete absence from work are too long, they may also disincentivize individuals to return to work. For example, parental benefits that extend for significant durations may encourage mothers to take extended leaves and ultimately leave the labor force for long-term periods, making it more

difficult for them to return to work afterward. Conversely, if benefits are time-limited or too short, they may place undue pressure on individuals, particularly women, to quickly reenter the workforce, often before they are ready to do so.

- **Gender-Sensitive Benefits Design**—Benefits designed to address gender-specific needs, such as paid parental leave and childcare subsidies, directly affect women's ability to participate in the labor market. For example, childcare subsidies reduce the financial burden of caregiving, making formal work more appealing. Similarly, flexibility in benefits, like shared parental leave, encourages a more balanced division of caregiving roles between men and women. Gender-insensitive benefits, however, may reinforce traditional roles, inadvertently discouraging women from joining or staying in the workforce, especially in dual-earner households. For instance, benefits providing assistance to women contingent on their husband's work status tend not to incentivize women to engage in the labor market, because women's labor supply decision does not directly affect their eligibility for benefits.
- **Interaction with Work Incentives**—Benefits that supplement income—such as in-work benefits, employment subsidies, or contributory family allowances—directly influence labor supply by increasing net income from formal employment. This is especially important for secondary earners, who are frequently women. In-work benefits offset costs like commuting and childcare, making the decision to enter or stay in formal employment more financially attractive. Contributory allowances provide additional income to working individuals under special circumstances (for example, breastfeeding, childrearing). These benefits also reduce the relative appeal of informal work, which lacks the same protections and security but may otherwise seem more feasible without adequate support for working parents.
- **Coordination with Tax Systems**—The coordination of benefits with the tax system is essential for assessing net incentives to work. In systems where benefits phase out as income rises, high marginal benefit withdrawal rates can create substantial disincentives for increasing hours or earnings. This is particularly relevant for secondary earners, because the combined effects of taxes and benefit withdrawals can significantly diminish the financial returns of formal employment, particularly for women. In addition, **the cost of formalization**—the change in net income when transitioning from informal to formal work—can further discourage formal employment. Net income here is the income remaining after accounting for added cash benefits and deducting tax liabilities and social security contributions (SSC). Well-coordinated tax-benefit systems are necessary to ensure that work incentives are not undermined by high withdrawal rates, supporting women's labor force participation in a way that is sustainable and economically beneficial.

The gender implications of the taxation of labor income and benefits have been studied thoroughly in advanced economies, for which widely used microsimulation models have been developed, such as the Organisation for Economic Co-operation and Development's (OECD) TaxBen model and the European Commission's EUROMOD. TaxFit facilitates similar analyses in emerging market and developing economies by providing country-level diagnostics of the tax and benefit regimes for 21 countries.[1]

[1] TaxFit has been developed for 21 countries, with public access available for 16 of them. Modules for Argentina, Brazil, Chile, Mexico, and Peru are not yet published.

2. Introduction

This document describes the TaxFit microsimulation model for personal taxes and benefits, including methodological and user guidelines. The model is a microsimulation tool, which computes taxes and benefits for hypothetical households, defined by user-provided inputs on gross income levels and family structures. Cross-country comparisons are possible across a wide range of indicators that comprehensively capture the structure of the personal income tax (IT) regime—the tax rate schedule, allowances, deductions, credits, and so on—as well as features of the social protection systems that are likely to influence labor supply decisions—including contributions, unemployment insurance, family benefits, social assistance, and care benefits (Table 2.1).

Table 2.1. Household Characteristics and Tax and Benefit Provisions in the TaxFit Model

Taxes	Benefits	Household Characteristics
Labor income	Social assistance	Gender
Small business earnings	Family benefits	Age
Allowances	Care benefits	Work status
Deductions	Unemployment benefits	Earnings
Tax credits	In-work benefits	Age of children
Social security contributions	Mandated employer-paid benefits	Pregnancy
		Informality

Source: Authors.

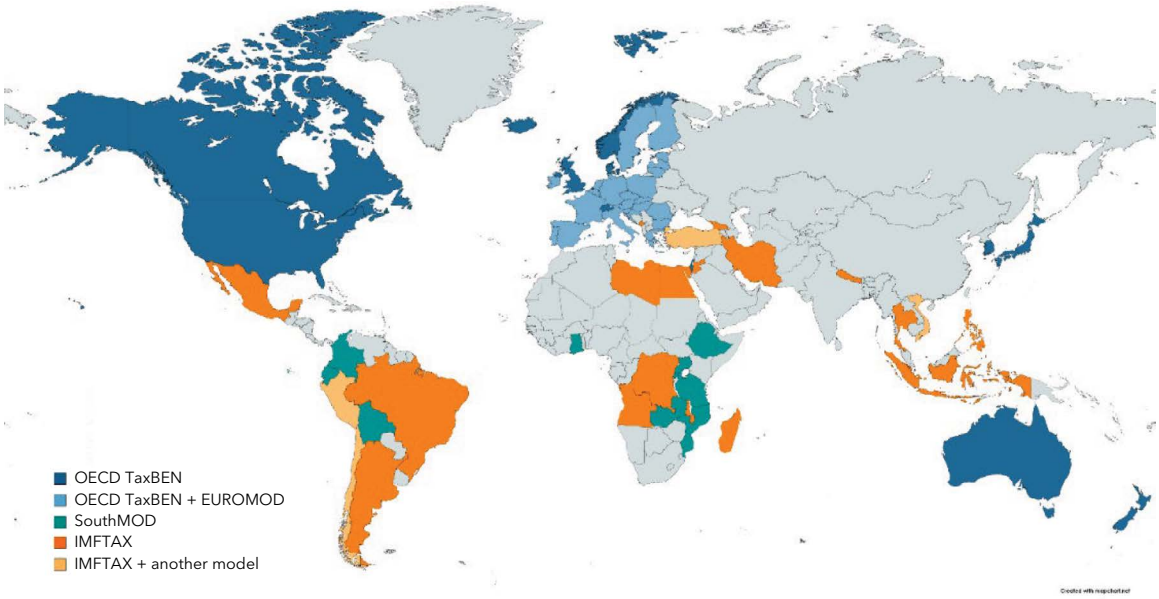
TaxFit generates indicators such as the effective tax rate (ETR)—the average tax rate paid by an individual or HH—and the marginal effective tax rate (METR), which represents changes in ETRs that are because of changes in income and labor supply decisions. Where microdata are available, the tool can produce indicators of progressivity of the tax and transfer system, such as the Kakwani index (Kakwani 1977) and model reform scenarios that estimate the welfare and fiscal effects of past or proposed reforms.

This methodology and user guide first outlines the country and year coverage of the model. The next section describes the income, tax, and benefit components included in the model, along with the simulation methodology. Assumptions and inputs used in the model are explained, including the calculation of reference wages. Subsequently, comprehensive instructions to use the model are provided to use both the Stata package and the online tool. The latter displays interactive graphs, showcasing results according to the users' selection criteria. Finally, the guide describes indicators constructed in TaxFit with the purpose of supporting cross-country analyses.

3. Country and Year Coverage

The TaxFit model initially covers 21 country modules that complement the coverage of existing models such as the Organisation for Economic Co-operation and Development (OECD) TaxBen model (OECD 2024), the European Union's EUROMOD (European Commission 2024), and SouthMOD (UNU-Wider 2024) (see Figure 3.1 and Table 3.1).

Figure 3.1. Country Coverage of TaxFit and Other Publicly Available Microsimulation Models



Source: Authors.

Note: The boundaries, colors, denominations, and any other information shown on the maps do not imply, on the part of the IMF, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries. OECD = Organisation for Economic Co-operation and Development.

Table 3.1. Country Coverage in the TaxFit Model

Country	ISO3 Code	Country	ISO3 Code	Country	ISO3 Code
Angola	AGO	Madagascar	MDG	Montenegro	MNE
Democratic Republic of the Congo	COD	Malawi	MWI	Egypt	EGY
Indonesia	IDN	Nepal	NPL	Philippines	PHL
Iran	IRN	Thailand	THA	Georgia	GEO
Jordan	JOR	Türkiye	TUR		
Libya	LBY	Vietnam	VNM		

Source: Authors.

These modules initially cover the year 2022—with Türkiye also having a module for 2021—and additional years are in development. The modules for Argentina, Brazil, Chile, Mexico, and Peru are not currently publicly available.

4. Components of Income

The TaxFit model uses individual gross income to compute the various income taxes (IT) and social security contributions (SSC), as well as family, care, in-work and unemployment benefits, and social assistance. Several cash benefits are currently out of scope for the model, including disability benefits, housing benefits, childcare provisions, sickness and injury benefits, and old-age pensions. The following sections outline the simulated outputs that are common to all country modules.

Taxable Income

Taxable income is computed within every country module to facilitate the calculation of IT. Taxable income is generally calculated at the individual level, except where IT are levied at the household (HH) level with no option for individual tax filing (for example, Libya), or where joint taxation is optional, and the HH average tax rate is lower under joint than under individual taxation. Taxable income is generally computed as gross employment earnings less any available deductions or allowances. These deductions commonly include mandatory SSC and health expenses or health insurance premiums, whereas allowances commonly include a basic personal allowance and allowances for dependent spouses and children.

Employment Income Tax

Employment income tax (IT) is computed from taxable income. Progressive IT systems involve a series of tax rates and thresholds, which are increasing in taxable income. Minimum tax levels are implemented where applicable.

Business Income Tax

Business IT is applied to net business income—defined as revenues less eligible expenses—or directly applied to business revenues where a turnover tax is in place. Eligible business expenses are not directly included in the model, and users have the option of directly specifying business income or turnover (revenues), along with an amount of eligible expenses defined as a share of turnover.[2]

In some cases, countries have implemented presumptive taxation for firms with very low revenues (for example, Democratic Republic of the Congo, Malawi, and Nepal). These presumptive taxes are included in the TaxFit model.

Social Security Contributions

Social security contributions are dedicated taxes paid by workers and firms to finance the social safety net, which commonly includes old-age pensions, unemployment benefits, and sometimes medical coverage. These contributions are computed for employees, the self-employed (that is, on business income, where applicable), and employers. Employee contributions are generally calculated based on gross earnings and often up to a maximum threshold. In some cases (for example, Jordan and Türkiye), minimum earnings thresholds are also applied.

Although employer contributions are not deducted directly from a worker's gross income, these contributions are useful metrics in the analysis of total labor costs and labor tax wedges.

[2] By default, this share is set to 30 percent of turnover. Note that some countries implement caps on the share of turnover that is eligible to be expensed. In these cases, the country rules override the users' input in the case of conflict.

The model also includes calculations for non-tax compulsory payments, which are computed separately and are included in social security totals for reporting purposes. These non-tax compulsory payments are mandatory contribution amounts that are paid to some entity other than the government. An example is mandatory contributions to private health care providers.

Family Benefits

Family benefits are government transfers to households with the purpose of easing the costs of raising children and maintaining the well-being of the family (or HH). These include benefits for dependents, such as a spouse or young children, and for lone parents when applicable. Family benefits do not encompass maternity and parental benefits, which are paid primarily to women and are conditional on pregnancy or childbirth. These benefits are classified as care benefits (see the following section).

Care Benefits

Care benefits and paid leave allowances, provided by either the government or employers, support the care of newborn children. These benefits include maternity, paternity, and parental leave, as well as transfers targeted at pregnant women or new mothers, such as prenatal and nursing benefits.

Unemployment Benefits

Unemployment benefits are amounts paid to unemployed individuals who are looking for work. Three types of benefits are included in the model: insurance, assistance, and individual savings accounts.

Unemployment insurance programs require formally employed workers to make contributions to the insurance program. Insured workers who become unemployed are then eligible for benefits, which are usually calculated as a share of earnings prior to separation and program contribution history. These benefits are often capped for high earners and are available for fixed durations.

Unemployment assistance usually provides a second tier of support for workers not eligible for unemployment insurance. Assistance benefits are not tied to prior contributions and often provide minimal benefit amounts relative to insurance. Like insurance, assistance benefits also tend to have limited duration.

Individual savings accounts are popular in Latin American countries and operate as forced savings mechanisms. Like insurance programs, formally employed workers make regular contributions but, rather than being pooled, contribution amounts accrue in individual savings accounts that workers can draw from under specific circumstances, one of which is becoming unemployed. Although these types of accounts are not strictly government-run benefit programs, they often serve as the primary form of support for jobseekers.

Social Assistance

Social assistance programs are addressed to the most vulnerable groups. Most programs focus on providing emergency assistance, which can include supplementary amounts for households with children. Eligibility for these programs is subject to a (proxy) means test and may include detailed behavioral requirements, such as regular medical checkups or mandatory school attendance.

In-Work Benefits

In-work benefits seek to encourage labor force participation. They are often targeted to specific groups, such as low-income women or youth. They may be time-limited, or they may be phased out as income increases.

Benefits Currently Out of the Scope of the Model

A number of cash benefits are currently not included in TaxFit model. They include the following:

- Housing benefits paid to households to assist with housing costs.
- Disability benefits paid to people who have a disability that interferes with their ability to earn an income.
- Sickness and injury benefits such as short-time leave.
- Childcare benefits, subsidies, or tax incentives provided directly to parents or indirectly to childcare providers to offset the cost of childcare.
- Old-age and survivor pensions paid to retired workers.

Future developments may introduce some of these benefits.

A. Assumptions

The model makes several assumptions to limit the complexity of the analysis and to ensure cross-country comparability. Following are the assumptions listed, along with a brief justification where required:

- **Income Types:** Income other than employment earnings, self-employment income, and cash benefits is excluded. This includes capital income—such as dividends and royalties—capital gains, and other forms of income.
- **Age:** Adults are aged 18–64.
- **Children:** Are unmarried, without a disability, and do not work if they are school-aged (25 or younger).
- **Business Income:** Corresponds to revenues of a small business with no employees. Paid voluntary or mandatory SSC are not deducted from business income because these deductions are explicitly calculated in the model.
- **Eligibility:** In addition to universal benefits, individuals and households who meet eligibility criteria regarding income, employment status, and HH composition are assumed to receive benefits. However, selective or geographically targeted programs fall outside the scope of the model.
- **Work History:** Workers are assumed to have worked continuously because the age of 20 with no unemployment spells. It is possible to override this assumption for the sake of computing contribution history (which is relevant for some benefits).
- **Employer Nationality:** Employers are domestic firms and are not affiliated with foreign enterprises.
- **Tax Credits:** Any accumulated tax credits or carryovers from previous tax years are ignored.
- **Work Type:** Employees are assumed to work full-time hours on permanent contracts.
- **Unemployment:** Unemployment is involuntary, and the unemployed actively search for a job.
- **Joint Taxation:** When some conditions are to be met for joint taxation, they are assumed to be met.
- **Minimum Wages:** When there are multiple minimum wages in a country, the model uses the lowest wage applicable to nonagricultural sectors or the wage applicable in the capital city. Daily, weekly, and monthly minimum wages are annualized, assuming 5 working days per week and 52 working weeks per year.
- **Effective Date:** July 1 of given year. The middle of the year minimizes the risk of ignoring updates to tax and benefit rates and thresholds in high-inflation environments. In this way, annual average wages (AWs) and tax-benefit parameters are better aligned.
- **Timing:** The model ignores the timing of tax payment schedules and does not consider any credits that arise from taxes withheld at source during the tax year, or any tax prepayments made on a previous year's tax bill.

- **SSC:** Contribution rates that are based on experience are set at their lowest levels. Occupation-specific contribution rates are generally excluded, unless there is a rate for every occupation, in which case the rate covering the largest portion of workers is applied.
- **Social Security Administration:** When workers have the option between a public system and a private system, they opt for the public system (relevant for health care providers).
- **Pregnancy:** Pregnant women successfully give birth to a single healthy child in a hospital setting.
- **Maternity Leave:** Mothers are assumed to take maternity leave after giving birth to a child. Although adoption of young children is generally covered by maternity leave, the corresponding paid leave is sometimes shorter.
- **Paternity Leave:** When fathers have the option of taking paternity leave, but they are not legally obliged to do so, they are assumed to take the maximum paid leave.
- **Parental Leave:** Mothers take all parental leave that can be shared between parents.
- **Proxy Means Testing:** Programs that employ proxy means testing to determine eligibility are difficult to incorporate into the TaxFit framework because of the wide set of parameters that play a role. When determining eligibility for these programs, TaxFit model relies on income and HH characteristics included in each proxy means test and assumes the presence or absence of other factors that provide the most favorable eligibility outcome for the HH.
- **Single Parents**: Single parents are divorced from the parent(s) of their children.
- **Alimony:** Alimony or child support payments because of former partners are assumed to be withheld.

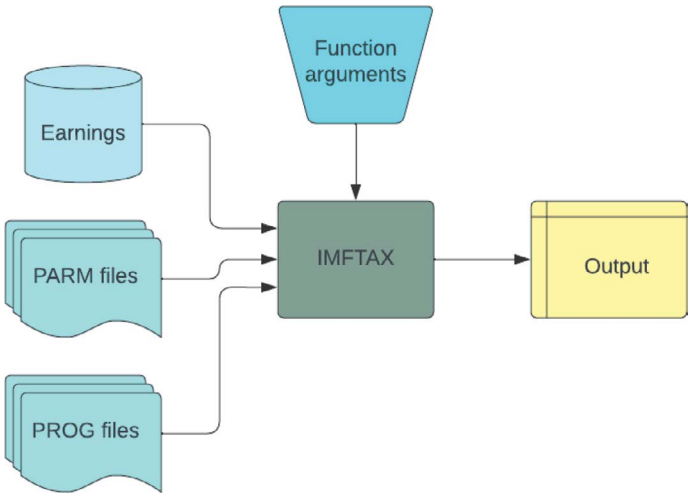
5. Methodology

The TaxFit model takes four primary inputs, with an optional fifth input. These include the following:

- **Reference wages:** Average wage (AW) for a full-time formal employee or the statutory minimum wage.
- **Function arguments** provided by the model's users, which specify the hypothetical households for which the model will provide results.
- **Program files** outlining the structure of tax and benefit policies in a given country and year.
- **Parameter files** that document the rates and thresholds related to modeled policies.

A fifth optional input in the model is observational data—taken either from household (HH) survey or administrative microdata—which replace the simulated households created by the function arguments. These various inputs are incorporated by the master TaxFit program to generate cross-country comparable indicators representing the burden and generosity of taxes and benefits, respectively (Figure 5.1). Each input is discussed in the following section.

Figure 5.1. A High-Level Overview of the TaxFit Model



Source: Authors.

A. Function Arguments

The function arguments are provided by the user with the purpose of generating a database of synthetic households to which the model applies tax and benefit rules (Table 5.1). These arguments are either text based (that is, strings) or number based (for example, numlists, integers, or numeric inputs). Arguments allow users to define HH characteristics, earnings levels, and eligible expenses for each potential worker. The arguments also allow users to specify the countries and years being modeled, as well as practical parameters relating to the location of input and output files.

Table 5.1. List of Available Functional Arguments in the TaxFit Model

Argument	Argument Type	Default Value	Description
year	numlist		List of modeled years
country	string		List of publicly available modeled countries
surveyfile	string		Survey data input file location and name (dta, csv, xls, xlsx)
spouse	string	No	Presence of legal cohabitating partner: "yes"/ "no"
earn	string	AW	Principal: Annual earnings
earnsp	string	0	Spouse: Annual earnings
empp	string	Emp	Principal: Employment status [emp, unemp, oow, inf]
emps	string	Oow	Spouse: Employment status [emp, unemp, oow, inf]
age	integer	40	Principal: Age (in years)
agesp	integer	40	Spouse: Age (in years)
gender	string	M	Principal: Gender [M, F]
gendersp	string	F	Spouse: Gender [M, F]
binc	string	0	Principal: Annual gross business income
bincsp	string	0	Spouse: Annual gross business income
brev	string	0	Principal: Annual business revenues
brevsp	string	0	Spouse: Annual business revenues
medexpenses	numeric	0	Principal: Annual out-of-pocket medical expenses
medspouse	numeric	0	Spouse: Annual out-of-pocket medical expenses
healthins	numeric	0	Principal: Annual health insurance premiums
healthspouse	numeric	0	Spouse: Annual health insurance premiums
travelexpenses	numeric	0	Principal: Commuting travel expenses
travelspouse	numeric	0	Spouse: Commuting travel expenses
contributionhist	integer	240	Principal: Social security contribution history (months)
contsphist	integer	240	Spouse: Social security contribution history (months)
udur	integer	2	Principal: Duration in unemployment (months)
udursp	integer	2	Spouse: Duration in unemployment (months)
time	integer	2	Household: Program duration (months)
nchildren	numlist	2	Number of dependent children–max 10
ach1	integer	2	Age of oldest child–max 25
ach2	integer	4	Age of second oldest child–max 25
ach3	integer	6	Age of third oldest child–max 25
ach4	integer	8	Age of fourth oldest child–max 25
ach5	integer	10	Age of fifth oldest child–max 25
ach6	integer	12	Age of sixth oldest child–max 25
ach7	integer	14	Age of seventh oldest child–max 25
ach8	integer	16	Age of eighth oldest child–max 25
ach9	integer	18	Age of ninth oldest child–max 25
ach10	integer	20	Age of tenth oldest child–max 25
pregnant			Is one of the adults pregnant?
sessc			Voluntary self-employed social security contributions
meb			Mandated employer-paid benefits
bincr	numeric	0.7	Ratio of gross business income to revenues (for inference)
logfile	string		Save the logfile to the filename specified
outloc	string		Output file location
outname	string		Output file name

Table 5.1. List of Available Functional Arguments in the TaxFit Model

Argument	Argument Type	Default Value	Description
outvars	string	Core	Output variable format: trim, core, extended, all
earningsfile	string		Wage data input file location and file name
progloc	string		Location of PROG and PARM files
yeararg			Survey data: use the year function argument as opposed to the year listed in the survey data

Source: Authors.

Note: Function arguments with partially bolded names can be provided using only the bolder portions. AW = average wage.

When specifying labor earnings ($earn_p$ and $earn_s$), the model uses the function arguments differently, depending on whether a simulated person's employment status (emp_p and emp_s) is working or unemployed. Earnings represent current earnings for workers but represent previous earnings for the unemployed, and these previous earnings are used to compute unemployment benefits.

When choosing employment status, users have four options:

- **emp**—A formal work arrangement. Assumed to be full-time work. These workers pay taxes and social security contributions (SSC) on their earnings or self-employment income.
- **inf**—An informal work arrangement. These workers generally do not pay taxes or SSC but may be eligible for some benefits.
- **unemp**—An unemployed person. This person is not working but is actively looking for a job and fulfills all the behavioral criteria for jobseekers to receive unemployment benefits (if relevant).
- **oow**—An out-of-work individual. This person is not working and is not looking for a formal job.

B. Reference Wages

Wages are one of the core inputs into the TaxFit model. An external database containing wage information is bundled with the TaxFit package. The database contains AWs, minimum wages, and average incomes by decile for each country and year combination selected by the user.

The AW in each country captures the average annual wage of a full-time formal worker who has worked all year long. AWs follow the Organisation for Economic Co-operation and Development (OECD) methodology for computing comparable wages by dividing the total amount of wages and salaries listed in the National Accounts by the number of employees in the total economy. This latter is subsequently multiplied by the ratio of total hours worked to the number of hours worked in a scenario in which all employees work full time.[3]

The OECD methodology requires some adjustments to reflect lower data quality in some emerging market and developing economies. For instance, only a few countries in the TaxFit sample report *wages and salaries* in the National Accounts, and often only report the headline category of *compensation of employees*, which includes both wages and salaries and employer's SSC.[4] As the TaxFit model simulates employers' contributions, these amount contributions should not be included in the wage figures. In these instances, *wages and salaries* are imputed from *compensation of employees* by dividing by one plus the employer's contribution rate.

[3] See comparable estimates of average wages per full-time equivalent (http://www.oecd.org/els/emp/AVERAGE_WAGES.pdf).

[4] TaxFit countries that report only compensation of employees include Angola, the Democratic Republic of Congo, Egypt, Georgia, Indonesia, Iran, Jordan, Philippines, Thailand, and Türkiye.

Some countries do not publish the income-approach components of GDP, so data information on the *compensation of employees* from the National Accounts data is lacking.[5] In these instances, wage estimates rely on the International Labour Organization's (ILO) Labour Income Distribution Database (ILO 2022), estimates of the labor share of nominal GDP, information of total employment (ILO-modeled estimates), and nominal GDP reported in local currency from the IMF's *World Economic Outlook* (IMF 2024).[6] An adjustment to account for employers' SSC is also made (because these contributions are explicitly modeled in the TaxFit model).[7]

Minimum wage data are taken from official sources and adjusted to reflect annual minimum wages of a full-time worker.

The earnings database also provides estimates of income deciles derived from the ILO's Labour Income Distribution Database (ILO 2022). These income deciles include both income from employment and self-employment. The combination of these data sources results in estimates of the AW, minimum wage, and the average income per income decile in local currency for each country.

C. Parameter and Program Files

The parameter and program files contain the elements necessary to construct a simulation model of the tax-benefit system of a given country and year.

The files follow a common naming convention: [CNT]_PARM_[YYYY].do for parameter files and [CNT]_PROG_[YYYY].do for program files. When running the model, users must provide the program with the location of the parameter and program files, or the program will not run. Both files are required for a given country–year combination.

[5] These countries include Libya, Madagascar, Malawi, Montenegro, Nepal, and Vietnam.

[6] Some of the ILO's modeled estimates are derived from imputed data. The ILO provides the following warnings against using imputed wages for international comparisons: "Imputed observations are not based on national data, are subject to high uncertainty and should not be used for country comparisons or rankings. The labour income share in GDP is the ratio, in percentage, between total labour income and gross domestic product (a measure of total output), both provided in nominal terms. Labour income includes the compensation of employees and part of the income of the self-employed. Self-employed workers earn from both their work and capital ownership. Total compensation of employees refers to the remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period. The labor income of self-employed is imputed on the basis of a statistical analysis of employees of similar characteristics. The labour income share after accounting for the labour income of the self-employed is often referred to as the adjusted labour income share in GDP." For more information, refer to the ILO Modelled Estimates (ILOEST) database description (https://ilostat.ilo.org/methods/concepts-and-definitions/ilo-modelled-estimates/).

The following TaxFit countries rely on imputed data: Angola, Madagascar, Malawi, Montenegro, Georgia, and Libya.

[7] With this approach, data availability requires that income from both employees and the self-employed are included, a departure from the process for other countries that focuses strictly on employment income. However, because self-employment is the dominant form of employment in many emerging markets and developing economies (ILO 2022), the proposed approximation is acceptable.

Parameter files outline the parameters, rates, and thresholds used by a program file. All parameters are stored as scalars. The files use a common naming convention, with parameters having specific prefixes for each type (see Table 5.2). Parameter values are prefixed with a "p," whereas rates and thresholds are prefixed with an "r" and "t," respectively. Parameter values are annualized to facilitate the cross-country comparison of tax-benefit systems.[8]

Table 5.2. Parameter File Prefix Naming Conventions

Prefix	Parameter Type
p_*	Parameter (for example, number of months)
r_*	Rate (for example, tax rates)
t_*	Thresholds (for example, tax brackets)

Source: Authors.

Program files outline the structure of tax and benefit policies and rely on parameter files for specific values. Program files are organized as a main program that calls a series of smaller programs relating to specific tax or benefit policy. For instance, there are separate programs for unemployment benefits and family benefits, though various distinct family benefits could be defined within the family benefits program. Programs are run separately for individually based policies, whereas HH-level programs are run once, with benefits attributed either to the HH or to individual partners based on their share of earnings within the HH.

D. Observational Data

Users have the option to import survey or administrative microdata into the TaxFit model and then run the model using the imported data. This option usually requires users to reformat survey data into a structure compatible with TaxFit. Specifically, each row of the input represents a HH, with information that broadly aligns with the options available through the TaxFit function arguments. Although variable names will need to follow specific naming conventions (see Table 5.3), if the uploaded data do not include some variables, the latter will be computed based on function arguments provided by the user when loading the data. For example, if the survey does not include information on business income (*binc_p* and *binc_s*), the model will use the value specified by the *binc* and *bincsp* function arguments for all households (zero by default).

Table 5.3. Naming Conventions for Survey Data Input Variables

Input Variable	Variable Type	Description
country	String	Country name
iso3	String	Three-digit country code according to ISO 3166 standard
year	Integer	Year of analysis
earn_p	Numeric	Principal: Annual earnings
earn_s	Numeric	Spouse: Annual earnings
binc_p	Numeric	Principal: Annual gross business income
binc_s	Numeric	Spouse: Annual gross business income
brev_p	Numeric	Principal: Annual business revenues

[8] Monthly values are annualized by multiplying the monthly amounts by 12. Weekly amounts are multiplied by 52. Daily amounts are multiplied by 5 × 52 (representing 5 working days per week). Hourly amounts are multiplied by 40 × 52 (representing 40 work hours per week).

Table 5.3. Naming Conventions for Survey Data Input Variables

Input Variable	Variable Type	Description
brev_p	Numeric	Spouse: Annual business revenues
Spouse	String	Presence of legal cohabitating partner: "yes"/ "no"
emp_p	String	Principal: Employment status [emp, unemp, oow, inf]
emp_s	String	Spouse: Employment status [emp, unemp, oow, inf]
age_p	Integer	Principal: Age (in years)
age_s	Integer	Spouse: Age (in years)
gender_p	String	Principal: Gender [M, F]
gender_s	String	Spouse: Gender [M, F]
Nchild	Integer	Number of dependent children—max 10
ach1	Integer	Age of oldest child—max 25
ach2	Integer	Age of second oldest child—max 25
ach3	Integer	Age of third oldest child—max 25
ach4	Integer	Age of fourth oldest child—max 25
ach5	Integer	Age of fifth oldest child—max 25
ach6	Integer	Age of sixth oldest child—max 25
ach7	Integer	Age of seventh oldest child—max 25
ach8	Integer	Age of eighth oldest child—max 25
ach9	Integer	Age of ninth oldest child—max 25
ach10	Integer	Age of tenth oldest child—max 25
medical_exp_p	Numeric	Principal: Annual out-of-pocket medical expenses
medical_exp_s	Numeric	Spouse: Annual out-of-pocket medical expenses
health_ins_p	Numeric	Principal: Annual health insurance premiums
health_ins_s	Numeric	Spouse: Annual health insurance premiums
travel_exp_p	Numeric	Principal: Commuting travel expenses
travel_exp_s	Numeric	Spouse: Commuting travel expenses
cont_hist_p	Integer	Principal: Social security contribution history (months)
cont_hist_s	Integer	Spouse: Social security contribution history (months)
udur_p	Integer	Principal: Duration in unemployment (months)
udur_s	Integer	Spouse: Duration in unemployment (months)

Source: Authors.

Note: Wages and expense amounts are interpreted as being in the local currency of the country being modeled. All financial amounts are to be reported in annual terms. Users can specify the ISO3 code in either the country variable or the iso3 variable.

Once the microdata are loaded, the model runs as normal and produces simulated components of net income for each HH. It is possible to include additional useful variables in the input data (for example, unique identifiers, weights, or other HH characteristics). These variables are retained in the final output, but these variables may interfere with the simulation process, if their names pose a conflict with existing variables. Because of this, users who wish to use survey data should construct two data sets: one to load into the TaxFit model, containing only the variables required to run simulations and identify households, and another that contains all additional HH information. After running the model using the first data set, users can merge the resulting output with the second data set.

6. How to Use the Model

There are two ways to use the TaxFit model. Users can explore the online tool developed to help users examine the outputs visually, or they can use the model directly in Stata, either by calling the taxfit function or by using the graphical interface to construct a command. The online tool is user-friendly, and it provides access to a large—but limited—range of outputs. For example, although the Stata function allows users to specify the age of any children in the household (HH), the online tool does not allow users to specify children's ages, assuming that multiple children are two years apart in age. The Stata function allows interested researchers to explore specific scenarios not included in the online tool.

Although designed to identify gender biases in the tax and transfer system, the applicability of TaxFit extends to multiple other research areas concerned with the interaction between fiscal policy and the labor market.

A. Online Tool

The online tool is a user-friendly interface to the IMF's TaxFit model, which is designed to accommodate users of varying expertise in taxes and benefits. The tool allows users to conduct comparisons of the burden and generosity of taxes and benefits across countries and HH types. Households can consist of either a single woman or a married couple.

The green "Launch Simulator" button on the landing page, as in the following picture (Figure 6.1), initiates the online tool.

Figure 6.1. TaxFit Online Tool Landing Page

Source: Authors.

Once launched, users can use the navigation pane on the left-hand side to move through the different tabs within the dashboard (Table 6.1). The online interface consists of an Input tab, where users select the HH types and countries they are interested in. Subsequently, four charts are produced with diagnostic comparisons. The output also includes the data generated by the microsimulation model, as well as background documentation, data sources, and country pages summarizing the parameters, assumptions, and properties of the model constructed for each country.

Table 6.1. Summary of Tabs in the TaxFit Online Tool

TaxFit Tool Tabs	Short Description
Inputs	Hypothetical HH design
Taxes and benefits	Cash inflow (benefits) from and outflow (taxes and social security) to the government
Participation tax rate	Change in the woman's effective tax rate when taking up work
Benefit decomposition	Breakdown of cash benefits
Cost of formalization	Change in net income—moving from formal to informal work
Simulator output/background data	Database of underlying data for HH designed
Bibliography	Sources and classification of benefits
Documentation	Links to project documentation
Stata program	Access to Stata program and related documentation
About the team	About the Project and the Team

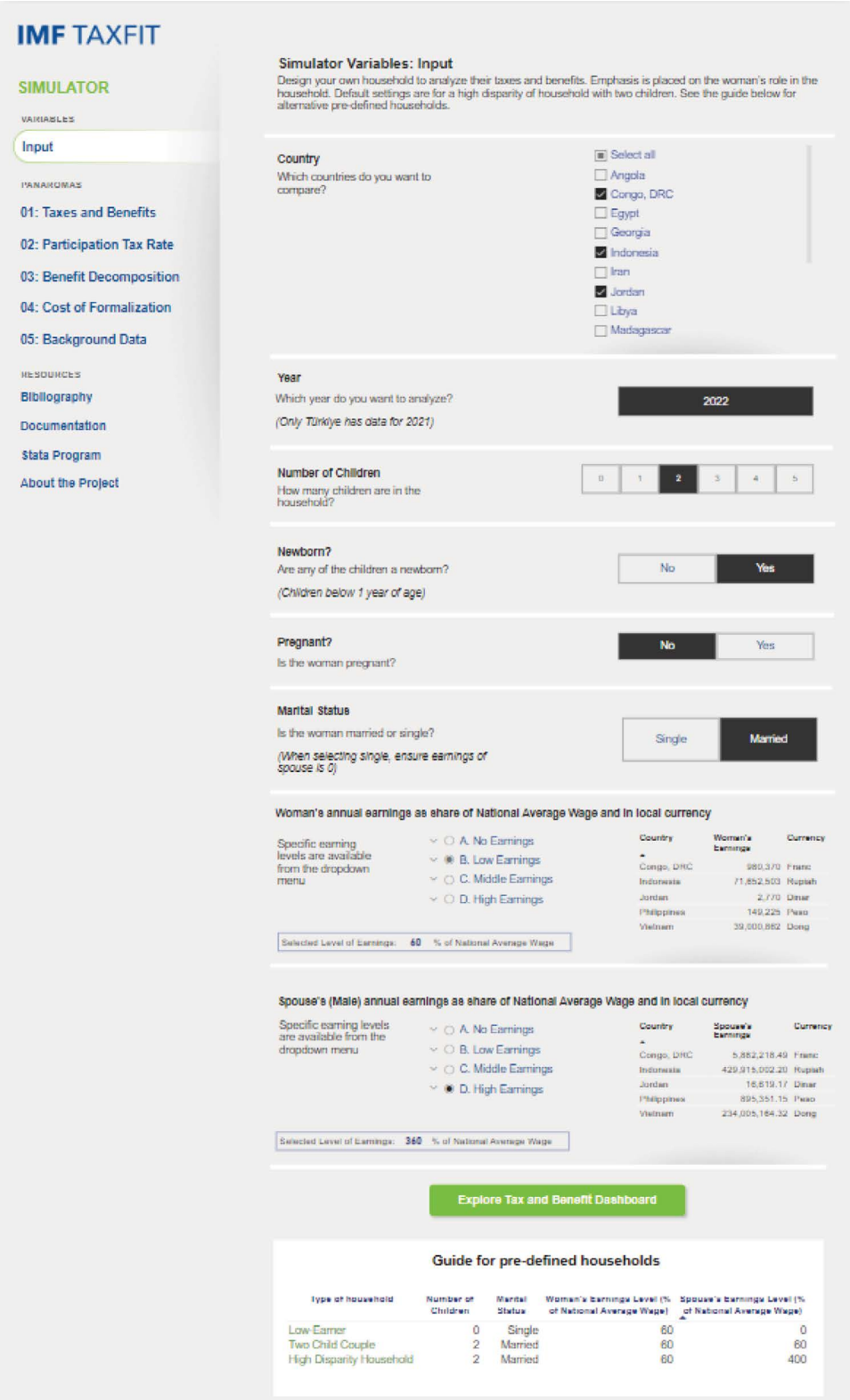
Source: Authors.
Note: HH = household.

Within each of the previously mentioned main tabs, dynamic slicers are available to allow users to adjust the charts and understand how certain selections change the output. These customizations are synced throughout the tool, allowing changes in one tab to be reflected in the output of all tabs. Elements in the legend across the chart can be highlighted, contributing to a clearer visualization. Users may also examine the simulated data in tabular format and export it for further analysis.

In the Inputs tab (Figure 6.2), users choose from 16 countries,[9] the HH type and year of comparison. At this moment, most countries have data for 2022, whereas Türkiye also contains data for 2021. A box describing the characteristics of the predefined households is available at the bottom of the tab (Figure 5).

[9] TaxFit has been developed for 21 countries, with public access available for 16 of them. Modules for Argentina, Brazil, Chile, Mexico, and Peru are currently unavailable to the public.

Figure 6.2. Input Tab



Source: Authors.

Figure 6.3. Guide for Predefined Households

Type of household	Number of Children	Marital Status	Woman's Earnings Level (% of National Average Wage)	Spouse's Earnings Level (% of National Average Wage)
Low-Earner	0	Single	60	0
High Disparity Household	2	Married	60	400
Two Child Couple	2	Married	60	60

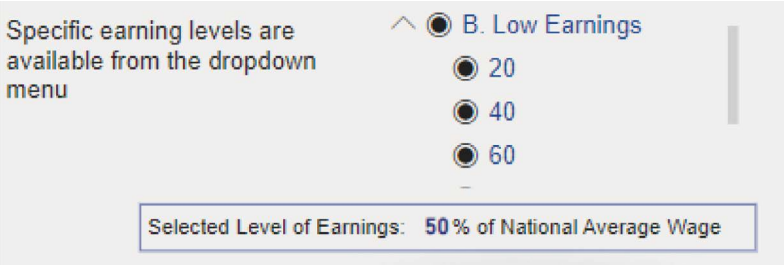
Source: Authors.

Users can choose the number of children in the HH, if the child is a newborn or if the woman is pregnant, and her marital status. Because the tool focuses on women, users can also choose the annual earnings of the woman (Figure 6.4) and that of her husband (when marital status is "married"). Earnings are expressed relative to the national AW, comprising four categories: no income, low income, middle income, and high income. Econometric analyses allowed these income categories to be mapped to specific shares of the national AW. For instance, if "Low Earnings" is chosen, the category corresponds to the average of HH-type earning 20, 40, 60, and 80 percent of the national average wage (AW) (Figure 6.5). Earnings in local currency for the selected income level or category are also displayed. Note that any outputs when an aggregate income category is chosen will be averaged across the corresponding outputs for those income levels. For example, when "Low Earnings" is the input chosen for the analysis, the output corresponding to earnings of 20, 40, 60, and 80 percent of the AW will be averaged and displayed.

Figure 6.4. Woman's Earnings Section of Input Tab

Source: Authors.

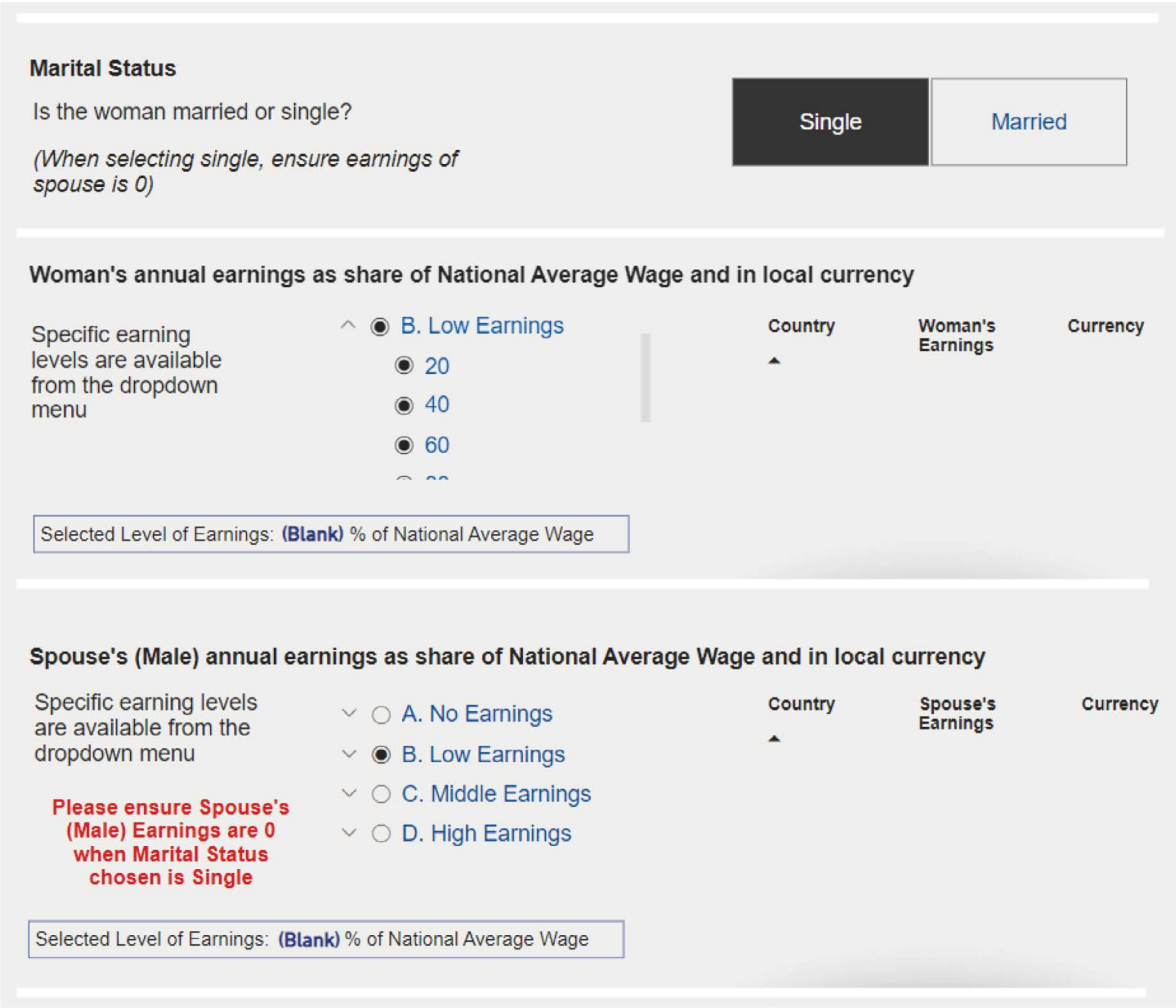
Figure 6.5. Aggregated Earnings Groups



Source: Authors.

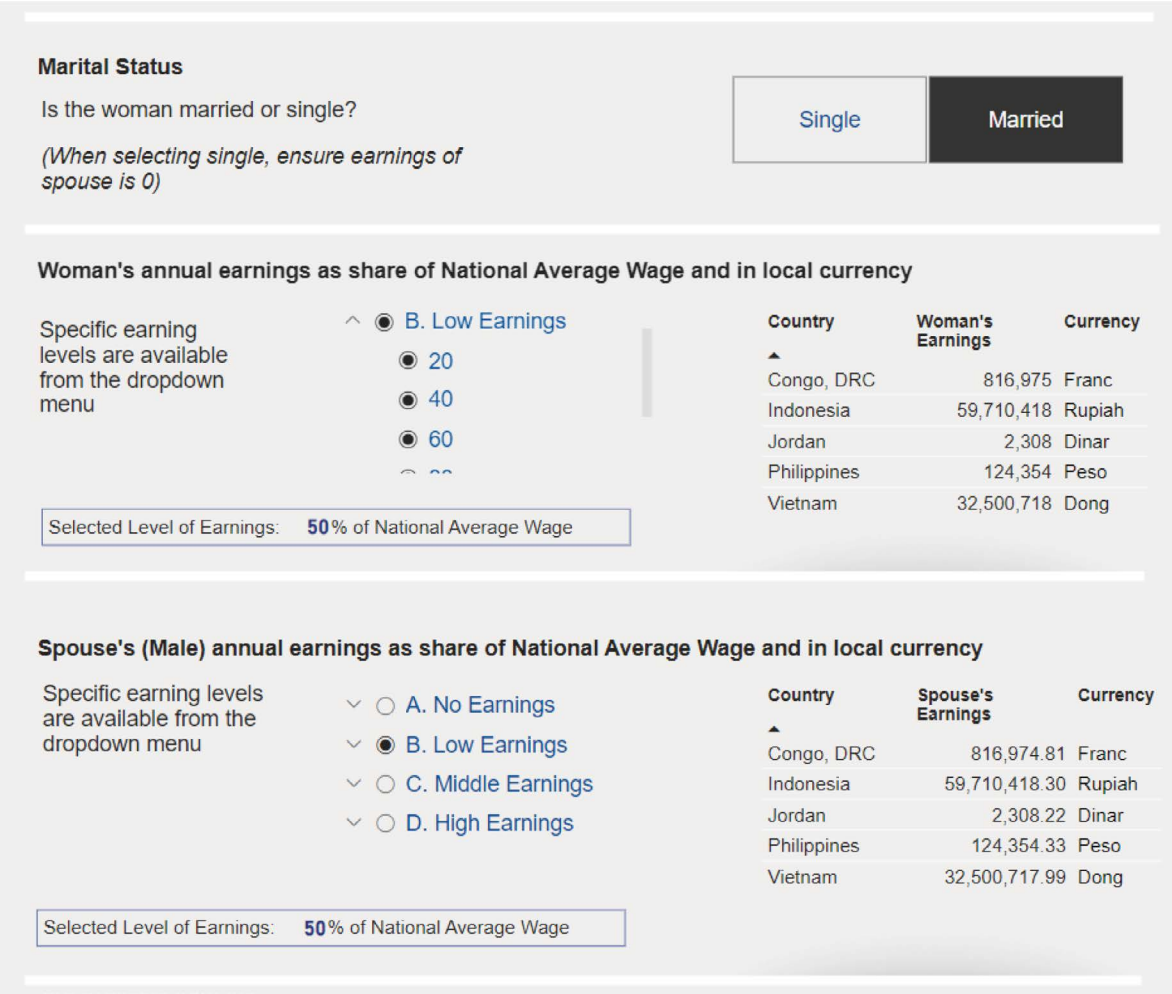
When selecting marital status, users cannot set the status to be "Married" when the husband's earnings are greater than 0 or "No Income." See Figures 8 and 9 for improper and proper specifications. Similarly, users shall not specify households with zero children while selecting "yes" for the newborn option.

Figure 6.6. Improper Income Specification for Nonexistent Husband



Source: Authors.

Figure 6.7. Proper Income Specification for Nonexistent Husband



Source: Authors.

The selection in the Inputs tab is synced with the controls for the rest of the tabs. Although selection slicers are in each tab, the country and HH-type selections can only be adjusted in the Inputs tab.

To illustrate the functionality of the tool, the following specifications are chosen (Table 6.2):

Table 6.2. Input Example Specification

Input	Selection
Country	DRC, Indonesia, Jordan, Philippines, Vietnam
Year	2022
Number of children	2
Newborn	Yes
Pregnancy	No
Marital status	Married
Woman's annual earnings	Low earnings
Husband's annual earnings	High earnings

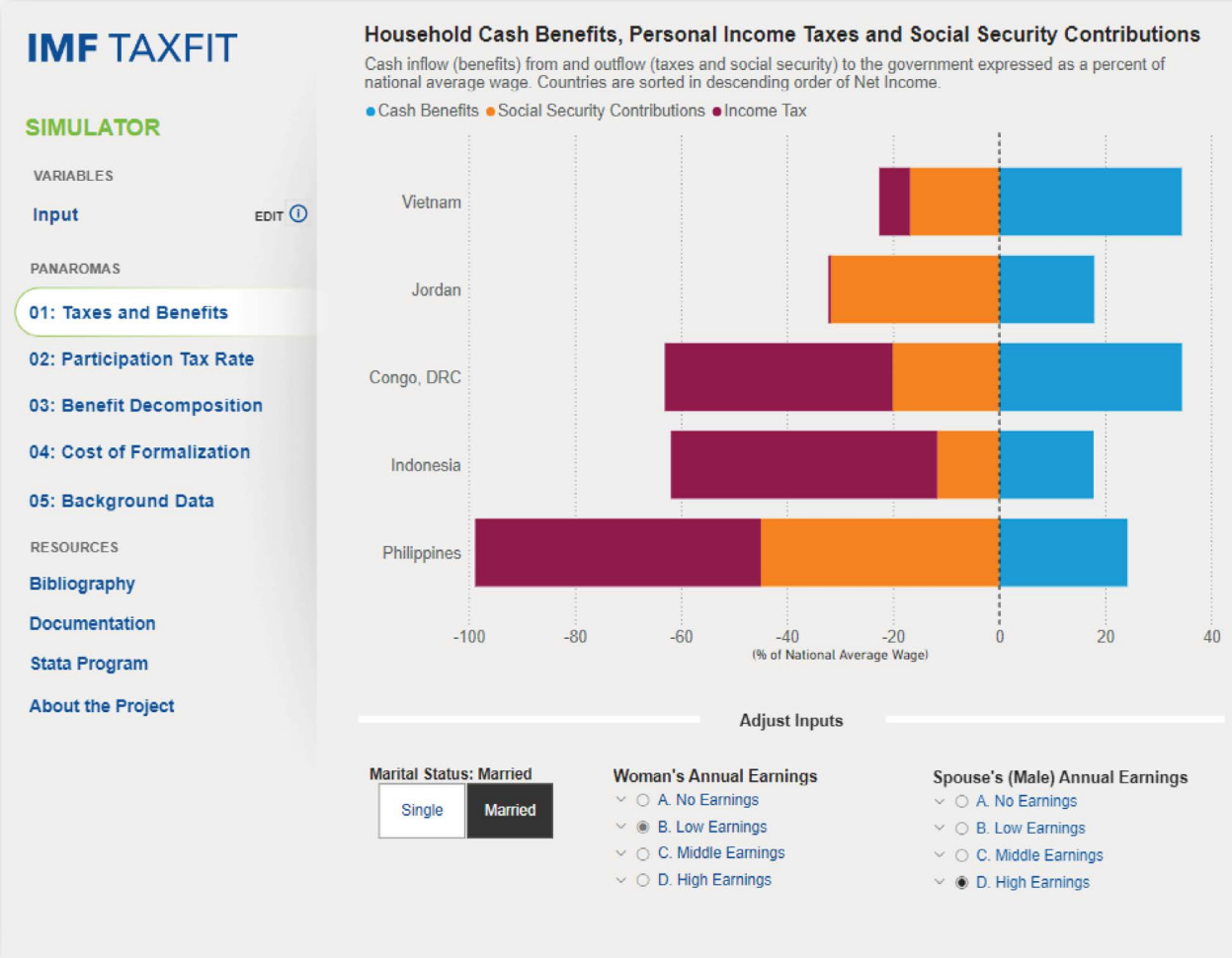
Source: Authors.
Note: DRC = Democratic Republic of the Congo.

01: Taxes and Benefits

The first figure compares taxes (and social security contributions [SSC]) owed and benefits the selected HH type is entitled to across (the selected) countries (Figure 10). The countries are sorted by HH net income.

Users can adjust marital status and earnings of both earners at the bottom.

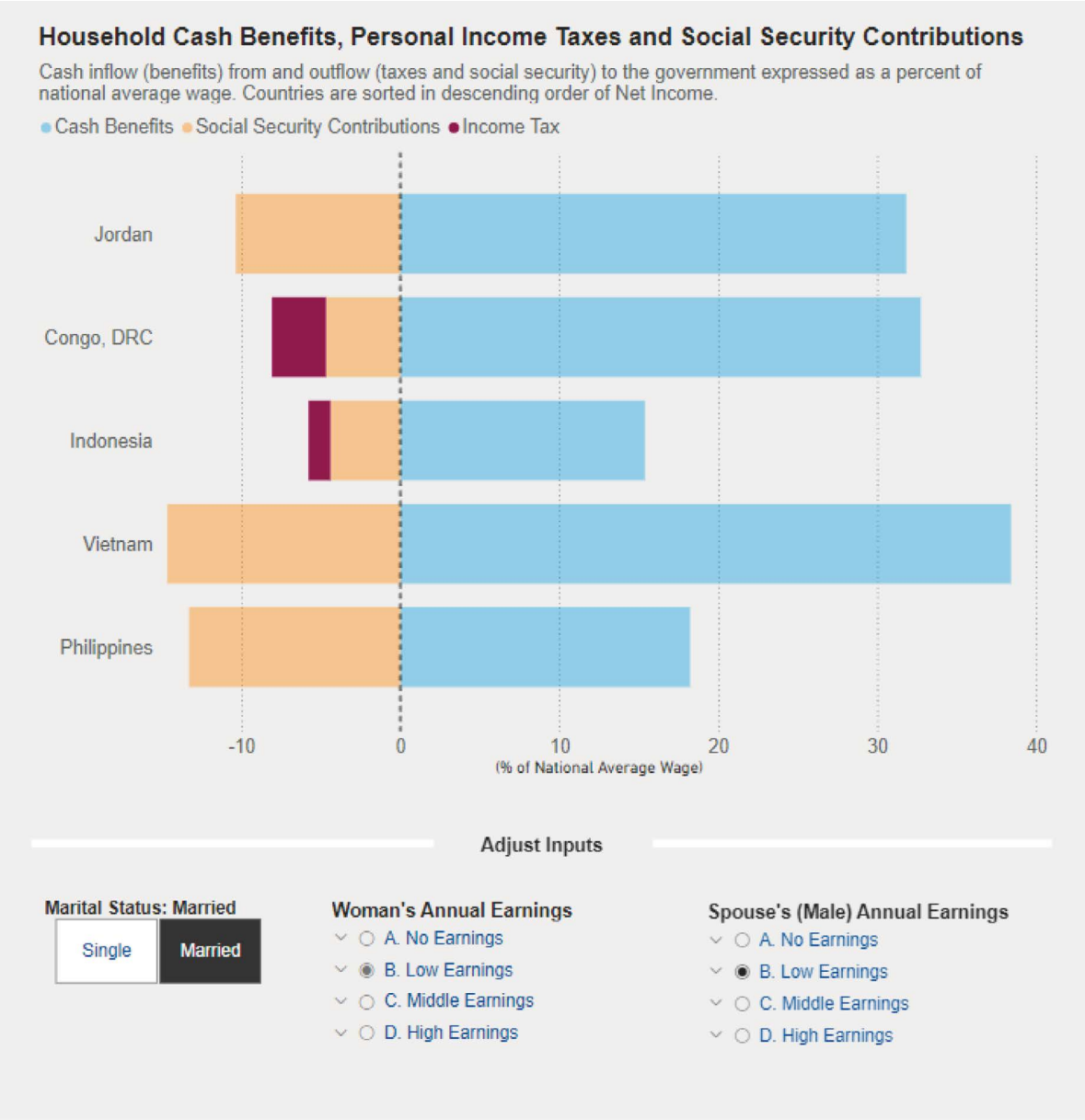
Figure 6.8. Taxes and Benefits



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

For example, if users change their selection to the "Low Earnings" option for the spouse's income (Figure 6.9), by clicking on the dark red circle denoted by "Income Tax," highlights the corresponding data in the figure. Users will thus be able to gauge that only the Democratic Republic of the Congo (DRC) and Indonesia levy IT for that HH configuration.

Figure 6.9. Highlighting Individual Income Components

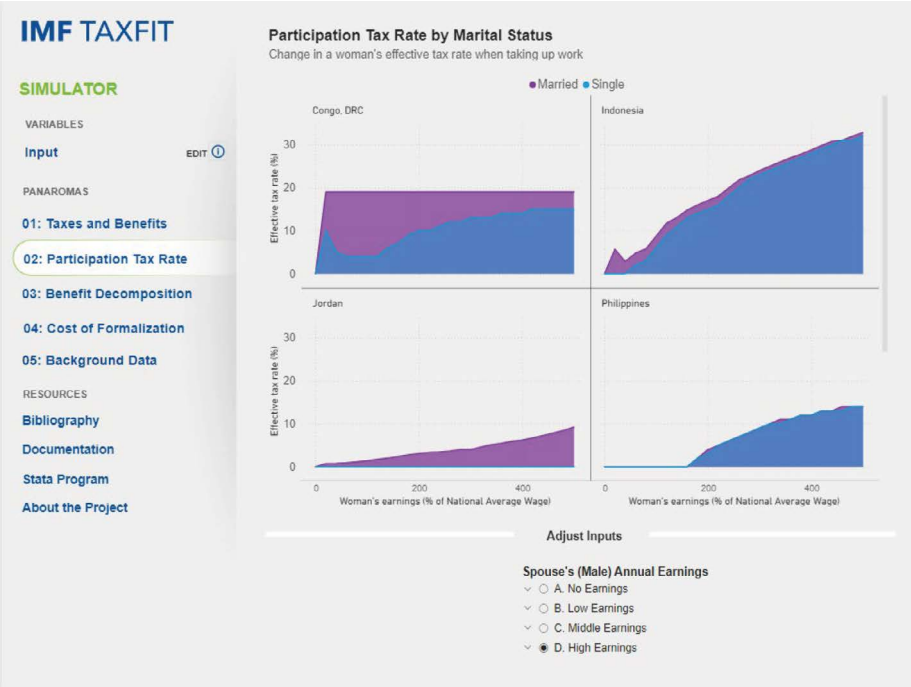


Source: Authors.
Note: DRC = Democratic Republic of the Congo.

02: Participation Tax Rate

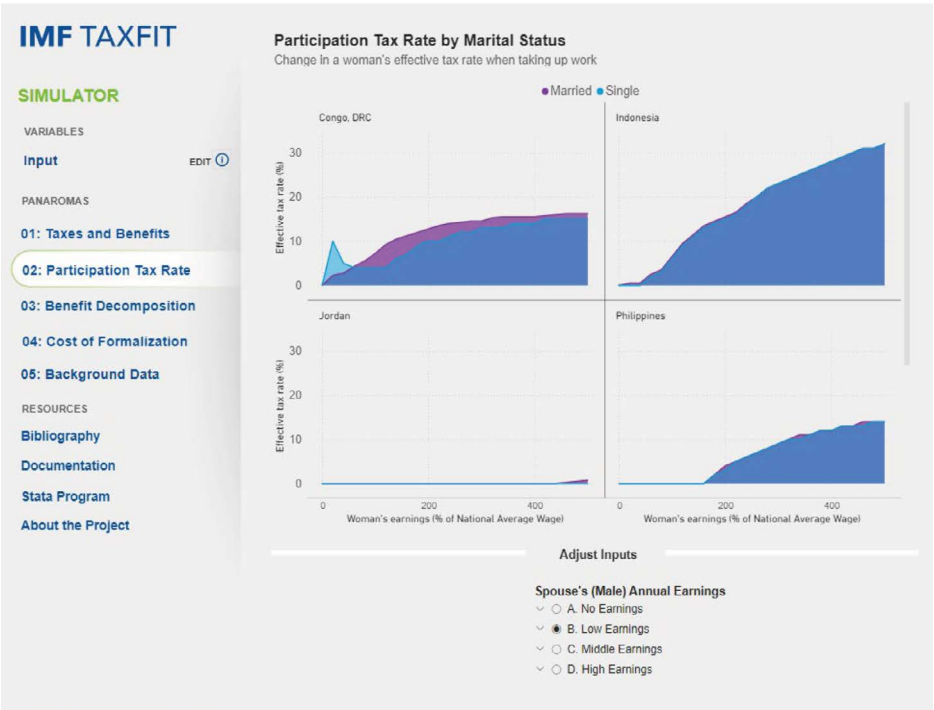
The next chart looks at the participation tax rate (PTR) of married and single women in otherwise identical households (Figure 6.10). The PTR is the additional tax a woman owes when entering the workforce as a share of the additional income she brings to the HH. For example, in the predesigned HH from the Inputs tab, the PTR of a woman married to a high-income spouse is higher than that of a single woman with otherwise the same characteristics. This phenomenon is evident across the income distribution, except in Philippines and Vietnam, where the PTR of low-income women is zero. In contrast, PTRs of individuals married to low-income spouses are not always lower than for single individuals (Figure 6.11).

Figure 6.10. Participation Tax Rate—High Earnings Disparity



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

Figure 6.11. Participation Tax Rate—Low Earnings Disparity



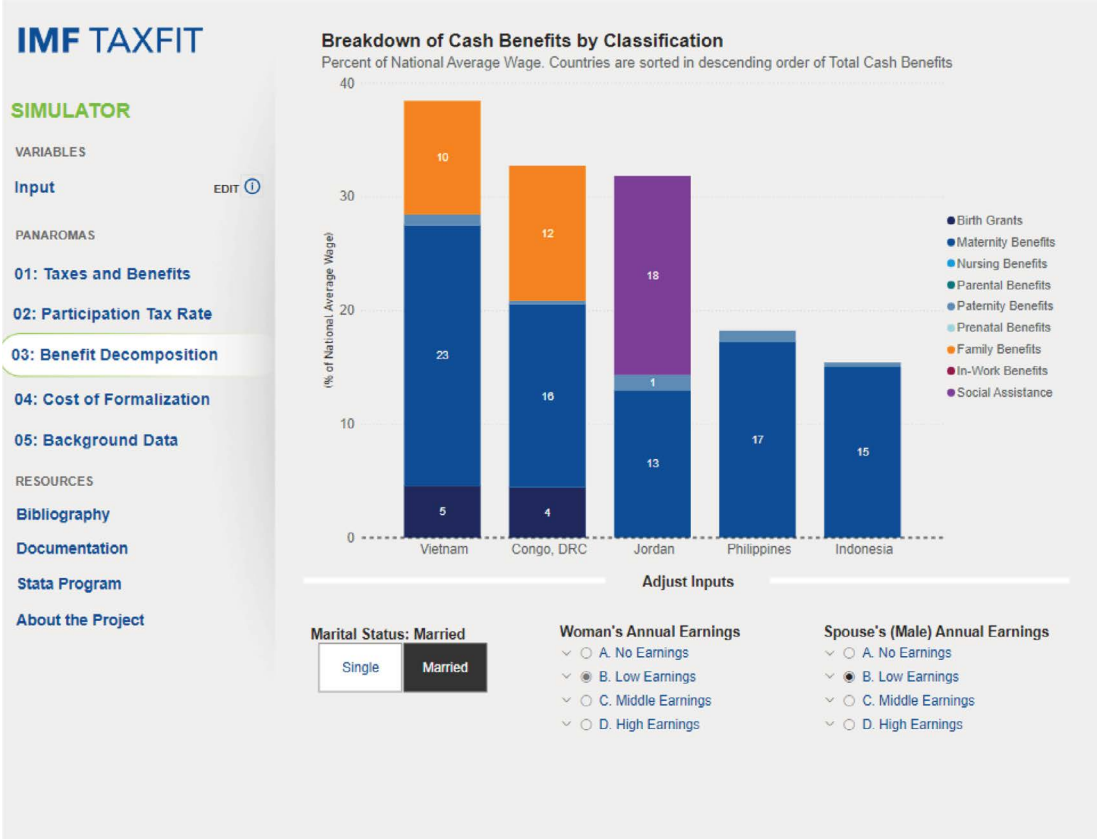
Source: Authors.
Note: DRC = Democratic Republic of the Congo.

In the selected countries, the PTRs are very similar across marital status in most countries, implying that work disincentives for secondary earners for lower-earning households are less of a concern. The difference between the PTRs of single and married women is often explained by the structure of the tax system, specifically the presence of joint tax filing and family-based tax provisions (Coelho and others 2022).

03: Benefits Decomposition

The third chart provides a decomposition of benefits that households are entitled to, given their income and family configuration (Figure 6.12). Benefits include family benefits, social assistance, in-work benefits, and care benefits.[10] Care benefits, which are essential to labor force supply decisions, are further disaggregated into birth grants, maternity-, paternity-, parental leave, nursing benefits, and prenatal benefits.

Figure 6.12. Benefits Decomposition



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

Following with the example of the country and HH-type selection described earlier, Figure 6.12 visualizes a cross-country comparison of the size and composition of benefit programs. For low-earning married couples, care benefits appear to consist of the largest share of the benefits package, as well as a higher contribution from family benefits, potentially social attitudes in support of redistribution toward vulnerable

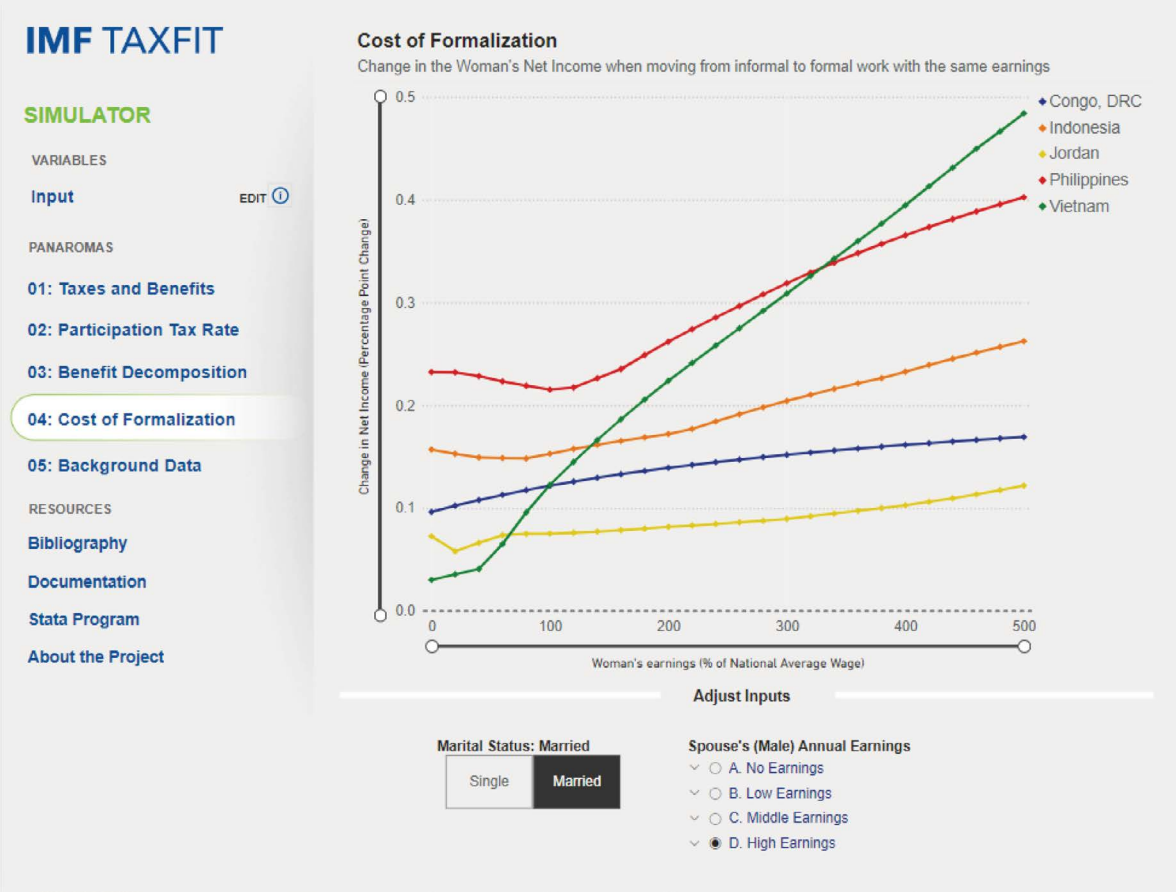
[10] The section "Components of Income" includes a detailed description of the different benefits programs.

households. If users specify households without children or pregnancy, care and family benefits drop to zero.

04: Cost of Formalization

The cost of formalization is computed as the change in net income when moving from informal to formal work, assuming that gross income and HH characteristics remain unchanged (Figure 6.13). A negative value implies that it is financially beneficial to enter the formal labor market, whereas a positive value implies that the tax-benefit system creates a net cost to formal work.

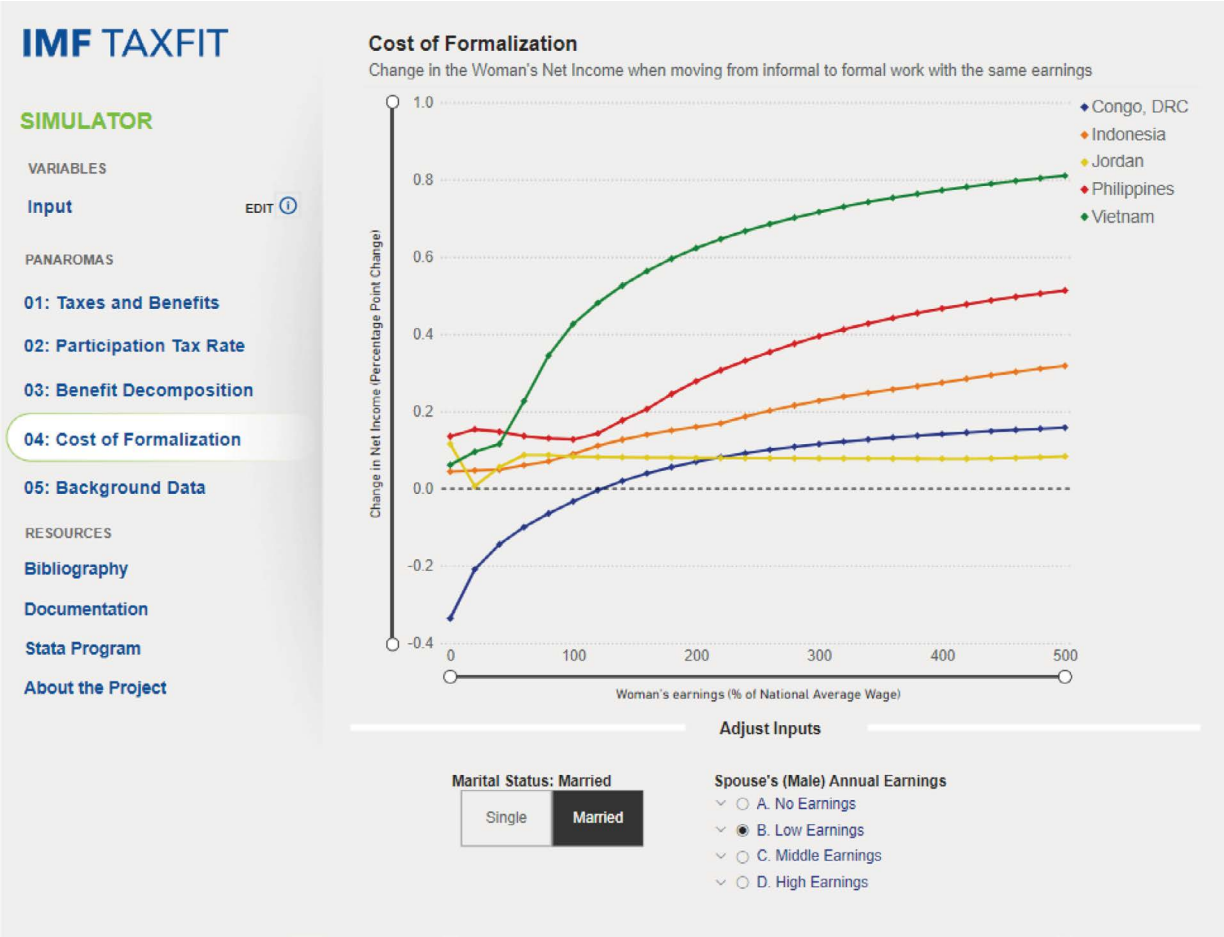
Figure 6.13. Cost of Formalization in Households with a High-Earning Spouse



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

At the bottom of the figure, users can adjust the spouse's income to explore alternative scenarios (Figure 6.14).

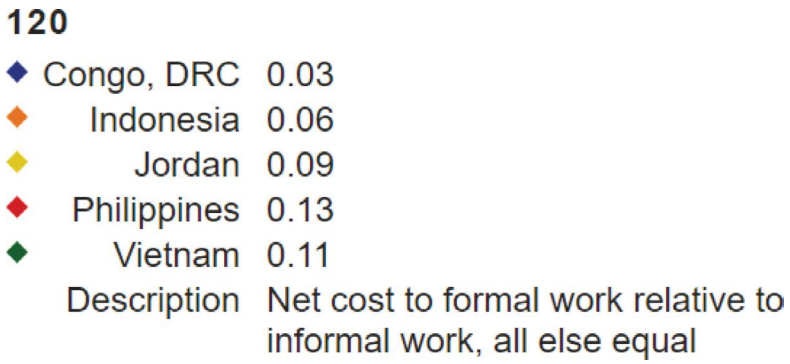
Figure 6.14. Cost of Formalization in Households with a Low-Earning Spouse



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

When hovering over a point on the line, the tooltip will provide an explanation for interpretation of the cost of formalization (Figure 6.15).

Figure 6.15. Cost of Formalization Tooltip



Source: Authors.
Note: DRC = Democratic Republic of the Congo.

05: Background Data

Based on the inputs selected, the final tab shows the benefits and tax obligations (as a share of the AW) simulated for the user's country and HH-type selections (Figure 6.16). The table also displays AW in local currency units, net income, and gross income and is sorted by HH net income. The data displayed in the Background Data tab are the underlying data used in the charts presented in the previous tabs.

Figure 6.16. Background Data Panorama

Simulator Variables: Output

Percent of National Average Wage

Country	Household Gross Income	Family Benefits	Care Benefits	In-Work Benefits	Social Assistance	Social Security Contributions	Income Taxes	Household Net Income	Average Wage in Local Currency Units
Jordan	97.92	0.00	14.32	0.00	17.50	10.35	0.00	119.56	4,616.43
Congo, DRC	93.57	11.90	20.83	0.00	0.00	4.68	3.39	118.24	1,633,949.58
Indonesia	94.62	0.00	15.38	0.00	0.00	4.40	1.37	104.23	119,420,833.94
Vietnam	79.04	9.97	28.44	0.00	0.00	14.66	0.00	102.79	65,001,434.53
Philippines	92.74	0.00	18.22	0.00	0.00	13.28	0.00	97.67	248,708.65

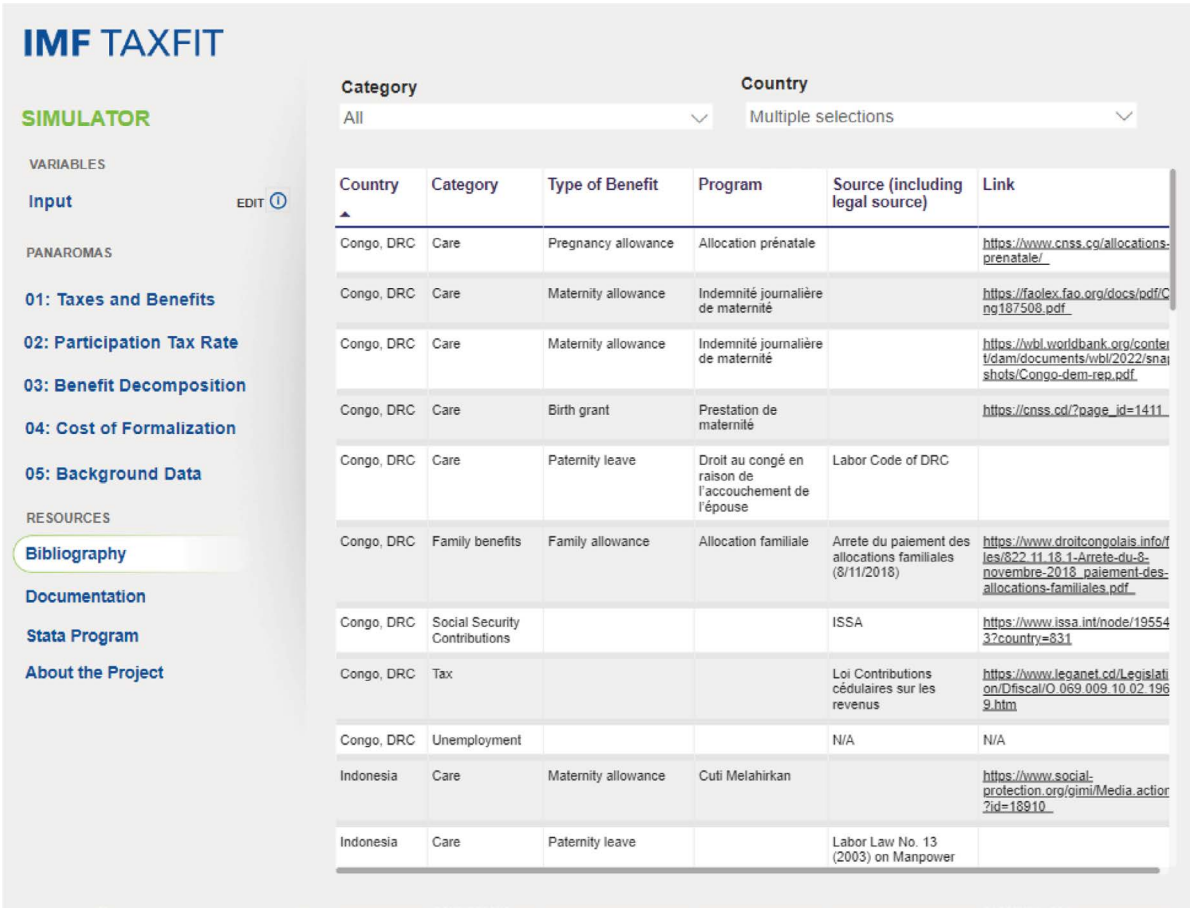
Source: Authors.
Note: DRC = Democratic Republic of the Congo.

Beyond the five display tabs, the online tool also includes several resources that provide users with additional information about the project and underlying model.

Bibliography

This tab allows users to explore the underlying laws and tax codes used to construct the TaxFit model. Users can choose the country and policy category (tax, benefit, and so on) for which they want to examine the associated documentation (Figure 6.17).

Figure 6.17. Bibliography Tab



Country	Category	Type of Benefit	Program	Source (including legal source)	Link
Congo, DRC	Care	Pregnancy allowance	Allocation prénatale		https://www.cnss.cg/allocations-prenatale/
Congo, DRC	Care	Maternity allowance	Indemnité journalière de maternité		https://faolex.fao.org/docs/pdf/Cng187508.pdf
Congo, DRC	Care	Maternity allowance	Indemnité journalière de maternité		https://wbl.worldbank.org/content/dam/documents/wbl/2022/snapshots/Congo-dem-rep.pdf
Congo, DRC	Care	Birth grant	Prestation de maternité		https://cnss.cd/?page_id=1411
Congo, DRC	Care	Paternity leave	Droit au congé en raison de l'accouchement de l'épouse	Labor Code of DRC	
Congo, DRC	Family benefits	Family allowance	Allocation familiale	Arrete du paiement des allocations familiales (8/11/2018)	https://www.droitcongolais.info/files/822.11.18.1-Arrete-du-8-novembre-2018_paiement-des-allocations-familiales.pdf
Congo, DRC	Social Security Contributions			ISSA	https://www.issa.int/node/195543?country=831
Congo, DRC	Tax			Loi Contributions cédulaires sur les revenus	https://www.leganet.cd/Legislation/Dfiscal/O.069.009.10.02.1969.htm
Congo, DRC	Unemployment			N/A	N/A
Indonesia	Care	Maternity allowance	Cuti Melahirkan		https://www.social-protection.org/gimi/Media.action?id=18910
Indonesia	Care	Paternity leave		Labor Law No. 13 (2003) on Manpower	

Source: Authors.
Note: DRC = Democratic Republic of the Congo.

Documentation and Stata Program Tabs

The Documentation tab provides users with detailed information about the methodology and country documentation, outlining the policies and parameters included for each country model. The Stata program tab allows users to download the underlying Stata-based simulation model.

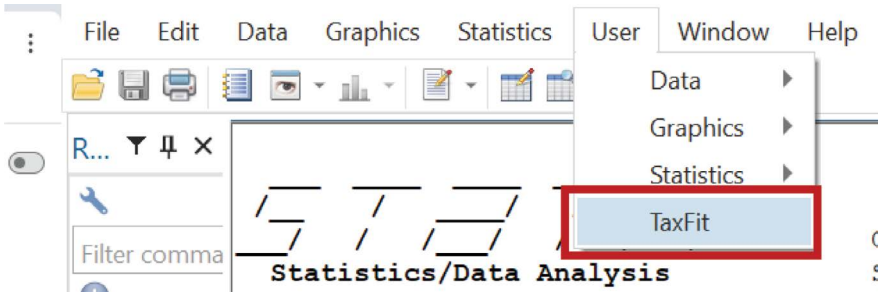
Project Overview

The Project Overview tab lists the project's developers and contributors. If users face any difficulty or would like more information or access to all the underlying data, they are directed to contact the project team at TaxFit@imf.org.

B. Stata Graphical Interface

After installing the user-defined program, Stata users have the option of using a graphical interface to construct a TaxFit command.[11] The interface is available at Users > TaxFit in the main menu bar (Figure 6.18).

Figure 6.18. Stata TaxFit Drop-Down Menu



Source: Authors.

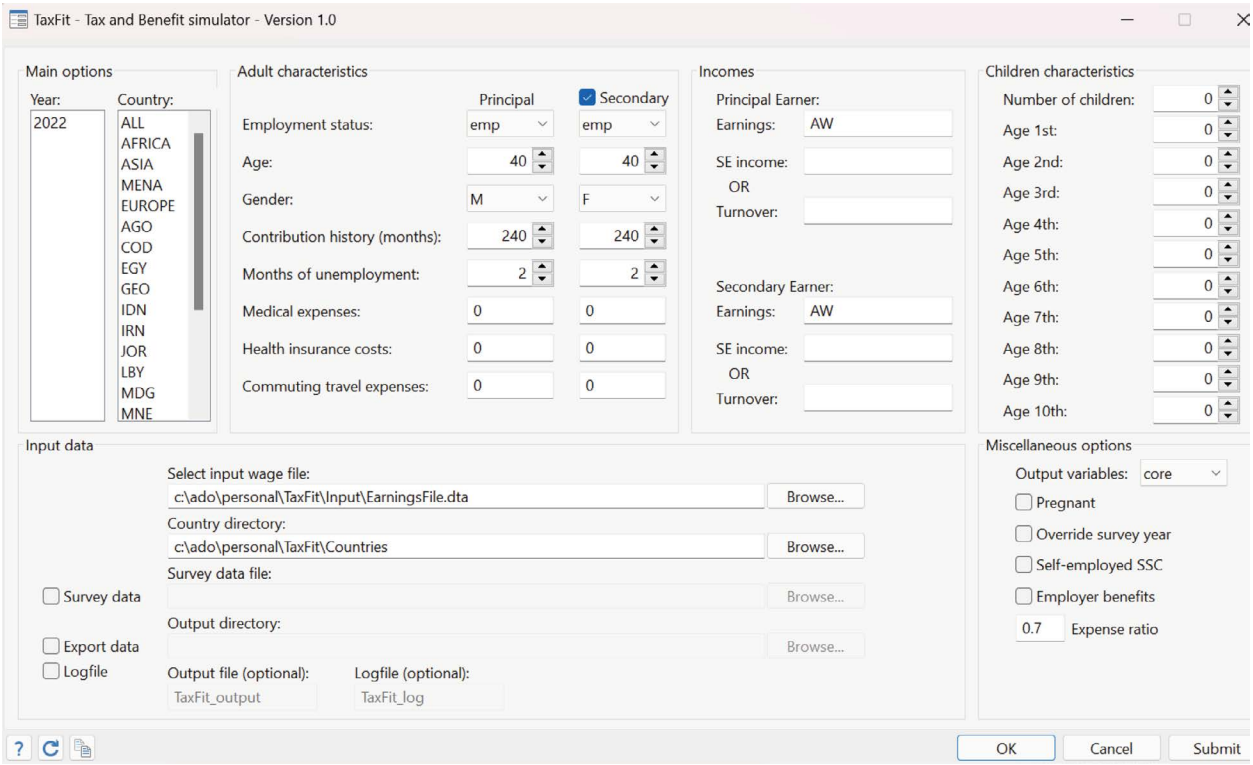
After clicking on the TaxFit command, users are presented with a panel with several options representing the various available inputs into the TaxFit command. They are classified as follows:

- **Main options**—Countries and model years to be simulated.
- **Adult characteristics**—Employment status, age, gender, working history, and eligible expenses for each adult.
- **Incomes**—Employment and self-employment income for each working adult.
- **Children characteristics**—The age and number of dependent children in the HH.
- **Input data**—Location and name of relevant input data.
- **Miscellaneous options**—Administrative model options and options that are not easily classified.

Each section of the panel is described in more detail in the following section (Figure 6.19).

[11] Installation instructions are included in the readme file of the TaxFit Stata function, available at: https://data-download.imf.org/iDataContent/Taxfit/TaxFit.zip

Figure 6.19. TaxFit Stata User Interface



Source: Authors.
Note: AW = average wage.

Main Options

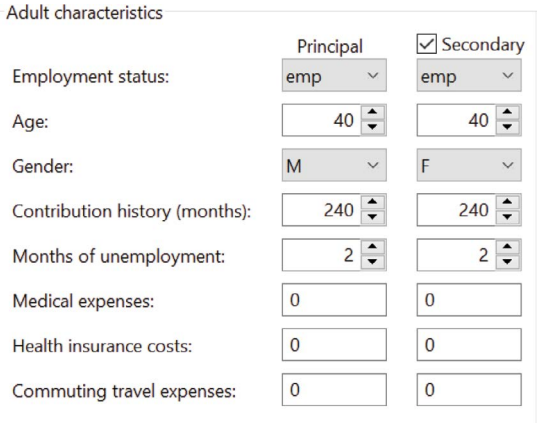
The *Main options* (Figure 6.22) are two necessary inputs required to run the model: the countries to be examined and the model year to be examined. Currently, only the year 2022 is available in the model.

Users can specify a single country by clicking on the relevant ISO3 three-digit country code. Users can select multiple countries either by using Ctrl+Click to select additional countries or by selecting one of the regional aggregations: AFRICA, ASIA, MENA, and EUROPE.

Figure 6.20. Main Options Menu

Source: Authors.

Figure 6.21. Adult Characteristics Menu



Source: Authors.

Adult Characteristics

The *Adult characteristics* section (Figure 6.21) allows users to specify the presence of a second adult in the HH (the "Secondary" option box), as well as the employment status, age, gender, and employment history of all adults.

Users can also specify a set of eligible expenses for tax deductions. Note that these expenses are defined in local current units and that this may limit comparability when conducting cross-country comparisons.

Incomes

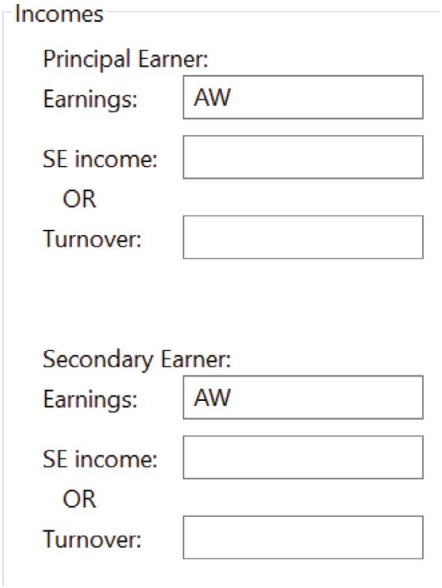
The earnings for each working adult are specified in the *Incomes* section (Figure 6.22). By default, employment earnings are set to the AW in each country, though these values can be set to some fraction of average or minimum wages. For example, earnings of "120AW" represent 120 percent of the AW, whereas earnings of "200MIN" represent 200 percent of the minimum wage.

Alternatively, users can specify raw income values (for example, 10,000) which represent local currency units. However, raw inputs make it difficult to compare net incomes across countries when conducting cross-country analysis.

Users also have the option of specifying self-employment income, either in terms of turnover (gross revenues) or in terms of business income (turnover net of eligible expenses). If both turnover and eligible expenses are provided, business income is used as the preferred value.

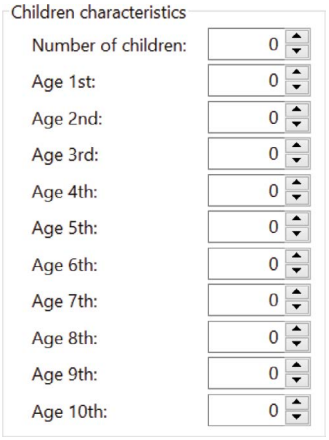
All income fields allow for the specification of a range of incomes using either one-unit increments (for example, 0/100AW) or increments with user-defined steps (for example, 0(10)100AW). Incremental incomes can be used with both reference wages and raw income values.

Figure 6.22. Incomes Menu



Source: Authors.
Note: AW = average wage.

Figure 6.23. Children Characteristics



Source: Authors.

Children Characteristics

Users can specify the number of children (up to a maximum of 10) and their ages (Figure 6.23). Their age must be greater than 0 and less than 25. Children aged less than 1 year are considered to be newborns born in the model year.

Although users of the command line function have the option of specifying ages less than one (which can be relevant when determining parental benefits), the graphical interface currently only allows whole numbers, meaning that it is not possible to specify the presence of newborn children.

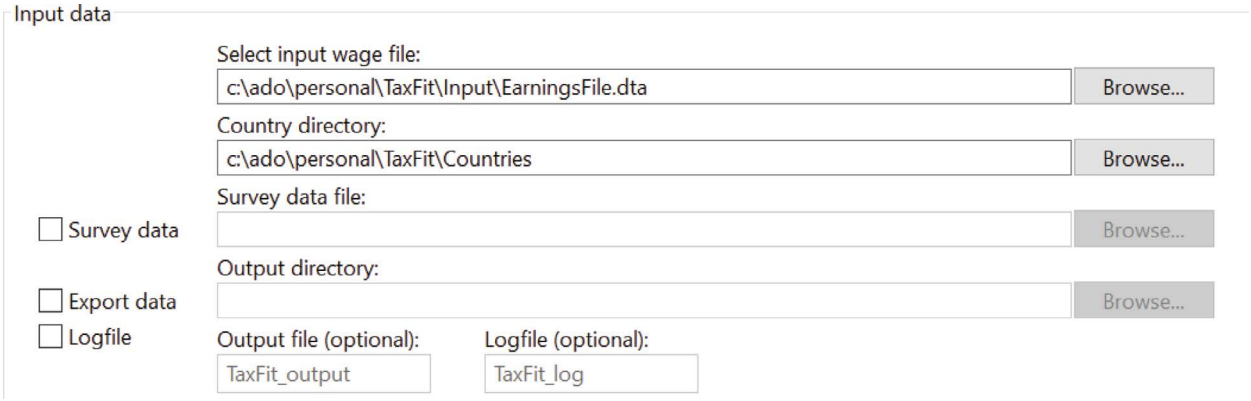
Input Data

The *Input data* section (Figure 6.24) allows users to specify the input earnings data that informs the model's use of reference wage and the country directory that holds the parameter and program files for each country–year combination. Both fields are required to run the model and are provided with default values that point to the folders that come with the TaxFit Stata package. To conduct reform analysis, users can make alterations to the earnings data or country files in alternate file locations and point the model to these folders.

Users may also optionally specify microdata input sources from HH surveys or administrative data to provide as inputs in lieu of the function arguments. Users who specify this option can point to the survey data that contain HH information on each row such as employment status, income, and other HH characteristics.

If users would like to export the data or logfile associated with their run specification, they can check the option boxes ("Export data" and "Logfile") to indicate their output preferences and specify their output location. If no file name is provided for the output files, default values of "TaxFit_output.dta" and "TaxFit_log.log" are used.

Figure 6.24. Input Data Menu



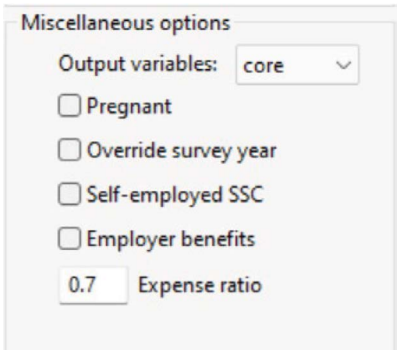
Source: Authors.

Miscellaneous Options

The *Miscellaneous options* (Figure 6.25) section includes administrative model specifications such as the choice of output variables and the option to override the survey year found in the data in favor of the year provided in the function arguments.

This section also includes the options to specify if an adult woman is pregnant, to set the assumed expense ratio between gross turnover and business income for self-employment income, to allow the self-employed to opt into SSC, and to indicate whether to include mandated employer-paid benefits in the calculations.

Figure 6.25. Miscellaneous Menu



Source: Authors.
Note: SSC = Social Security Contributions.

Submitting Commands

Users specify the options relevant to their model run and click either the "OK" button—which submits the command and closes the window—or the "Submit" button—which submits the command but does not close the window. Once the command is submitted, the output is the same as if the command was run from the Stata command line and any output it loaded into the data browser.

C. Stata Command

The Stata function consists of a master ado file and a series of required inputs in the form of an earnings database, as well as program and parameter files for each country. Users who load the ado file will be able to either call the TaxFit function directly from the Stata command line or employ a graphical interface to construct their command. This section outlines the model syntax for the Stata command line. A list of possible warnings and errors that may arise, along with instructions on how to interpret these warnings, is listed in Annex A.

TaxFit Command Line Syntax Examples

The following examples highlight some of the core functionality of the model. Additional details can be found by typing "*help taxfit*" into the Stata command line.

Note that the model supports condensed syntax for income variables (for example, earn, earnsp, binc, bincsp, brev, brevsp). Users can specify percentages of the reference wages as inputs in the model, and they can also specify a range of variables. Syntax can use either the forward slash ("/") to specify one-step incremental increases in the reference wage (for example, 1/100AW or 30/50MIN) or they can specify the increment size using brackets (for example, 0(5)100AW or 100(25)200AW). Table 6.3 outlines some examples of this income syntax and their interpretation.

Table 6.3. Alternative Syntax for Income Variables

Syntax	Interpretation
AW	100% of AW = 100AW
50AW	50% of AW
1/100AW	1AW, 2AW, 3AW, …, 100AW
0(50)200AW	0AW, 50AW, 100AW, 150AW, 200AW
MIN	100% of minimum wage = 100MIN
20(40)180MIN	20MIN, 60MIN, 100MIN, 140MIN, 180MIN
55/56MIN	55% of MIN and 56% of MIN
AW	100% of AW = 100AW
50AW	50% of AW

Source: Authors.
Note: AW = average wage; MIN = minimum wage.

Example 1—Most Basic Run

This example presents the most parsimonious function arguments that can be provided to the TaxFit model to produce results. The user specifies the country and years to be modeled (2022 and Angola) while also specifying the location of the earnings file and parameter and program files.

As outlined in the console output, several inputs are missing, and default values are supplied by the model. These include indicators on a spouse's presence, the number of children, the employment status of any adults, and their gender. The console output also outlines that as no output file location is specified, the model output is not displayed, and it is only displayed in the Stata data browser.

This syntax results in one line of output.

Code

```
local wfile     = "C:\Location\of\Earnings\file\EarningsFile.dta"
local ploc      = "C:\Location\of\PARM\and\PROG\files"


taxfit, year(2022) country(AGO) earningsfile(`wfile') progloc(`ploc')
```

Console Output

```
Note: No survey data is specified. TaxFit will use function arguments to generate results.
Warning: SPouse() contained no valid values. SPouse() reset to default 'no' value.
Warning: EMPp() contained no valid values. EMPp() reset to default 'emp' (employed) value.
Warning: emps() contained no valid values. emps() reset to default 'NA' (not applicable) value and any spousal earnings specified are not considered.
Warning: NCHildren() contained no valid values. NCHildren() reset to default value of '2'.
Note: No output file location or name specified. Data will be output but not saved. Check the options outloc() and outname()

Building data from function arguments...

Note: 1 value(s) of principal gender (gender_p) missing or incorrectly specified. They have been set as 'M' for Male.
Note: 1 value(s) of spouse gender (gender_s) missing or incorrectly specified. They have been set as 'F' for Female.


Computing AGO-2022 ...

Country computation completed.
Output displayed in the data browser.
```

Example 2—Explicit Arguments

The second example replicates the same simulation as in Example 1, with the exception that missing values are explicitly provided in the function call (changes from the previous example are highlighted in **red**). In this example, the data output into the data browser is identical to the output in Example 1. However, the console output does not specify the inclusion of default values because they have been supplied directly.

This syntax again results in one line of output.

Code

```
local wfile     = "C:\Location\of\Earnings\file\EarningsFile.dta"
local ploc      = "C:\Location\of\PARM\and\PROG\files"


taxfit, year(2022) country(AGO) spouse(no) earn(AW) earnsp(NA) emp(emp) emps(NA) nch(2) gender(M) gendersp(F) earningsfile(`wfile') progloc(`ploc')
```

Console Output

```
Note: No survey data is specified. TaxFit will use function arguments to generate results.
Note: No output file location or name specified. Data will be output but not saved. Check the options
outloc() and outname()

Building data from function arguments...

Computing AGO-2022 ...

Country computation completed.
Output displayed in the data browser.
```

Example 3—Adding Household Members

Example 3 specified a HH with no spouse and two children. Users can specify both the presence of a spouse and the age of children. By providing multiple values in the function arguments, users can generate additional households. Changes from the previous example are highlighted in red.

This syntax results in six lines of output: three where the HH has no spouse, which have either two, four, or no children, and three where there is a spouse, each with a different number of children.

Code

```
local wfile     = "C:\Location\of\Earnings\file\EarningsFile.dta"
local ploc      = "C:\Location\of\PARM\and\PROG\files"


taxfit, year(2022) country(AGO) spouse(yes no) earn(AW) earnsp(0AW) emp(emp) emps(oow) nch(0 2 4)
gender(M) gendersp(F) earningsfile(`wfile') progloc(`ploc')
```

Console Output

```
Note: No survey data is specified. TaxFit will use function arguments to generate results.
Note: No output file location or name specified. Data will be output but not saved. Check the options
outloc() and outname()

Building data from function arguments...

Computing AGO-2022 ...

Country computation completed.
Output displayed in the data browser.
```

Example 4—Adding Countries and Wages

This example expands on Example 4 by adding two countries (DRC and Indonesia) to the simulation and including a specification to include additional wages. Changes from the previous example are highlighted in red. The specification of earnings is a condensed syntax that is equivalent to entering "0AW 20AW 40AW 60AW 80AW 100AW."

This syntax results in 108 lines of output: 36 lines for each country which present the six scenarios from Example 4 for each of the six principal-earner wages specified.

Code

```
local wfile     = "C:\Location\of\Earnings\file\EarningsFile.dta"
local ploc      = "C:\Location\of\PARM\and\PROG\files"


taxfit, year(2022) country(AGO COD IDN) spouse(yes no) earn(0(20)100AW) earnsp(0AW) emp(emp) emps(oow) nch(0 2 4) gender(M) gendersp(F) earningsfile(`wfile') progloc(`ploc')
```

Console Output

```
Note: No survey data is specified. TaxFit will use function arguments to generate results.
Note: No output file location or name specified. Data will be output but not saved. Check the options outloc() and outname()

Building data from function arguments...

Computing AGO-2022 ...
Computing COD-2022 ...
Computing IDN-2022 ...

Country computation completed.
Output displayed in the data browser.
```

Example 5—Loading Survey Data

In the final example, the user specifies survey data relating to Türkiye for the year 2021. The function arguments still specify that the model will run 2022 modules for Angola, DRC, and Indonesia. However, the model reads the survey data and overrides this specification. Other function arguments are used to impute missing values in the survey data, if present.

This syntax results in a number of rows equal to the row count of the uploaded survey data.

Code

```
local wfile     = "C:\Location\of\Earnings\file\EarningsFile.dta"
local ploc      = "C:\Location\of\PARM\and\PROG\files"
local surveyloc = "C:\Location\of\Survey\Data\TUR_2021_survey.dta "


taxfit, year(2022) country(AGO COD IDN) spouse(yes no) earn(0(20)100AW) earnsp(0AW) emp(emp) emps(oow) nch(0 2 4) gender(M) gendersp(F) earnloc(`wageloc') earningsfile(`wfile') progloc(`ploc') surveyfile(`surveyloc')
```

Console Output

```
Note: surveyfile() is specified as Stata database file. Country and Year parameters will be taken from the survey data and not function arguments.
Note: No output file location or name specified. Data will be output but not saved. Check the options outloc() and outname()
Loading survey data...

Computing TUR-2021 ...

Country computation completed.
Output displayed in the data browser.
```

D. Stata Output

The TaxFit model supports four levels of output: a trimmed output consisting of key HH-level variables, a core output that is consistent across countries, an extended output that facilitates the calculation of key metrics, and a country-specific output that includes all the variables that are used in the calculation of taxes and benefits for a given country.

Trim Output

The trim output reports 14 variables for each HH and can be specified by adding the option *outvars(trim)* to the Stata command. Of these, eight are key indicators of the components of HH net income, and an eighth is net income itself (see Table 6.4). These core components are linked according to the following identity:

$$netinc = gross + sa + fb + care + ub + iw - it - ssc$$

The composition of each core component varies by country, with some components being computed at the HH level (for example, family benefits), and some being completed at the individual level and aggregated to the HH level (for example, SSC). The remaining primary output variables either identify the model specifications, identify the HH characteristics, provide decompositions of certain key indicators, or indicate reference amounts. These output variables are consistent across countries and facilitate cross-country comparisons.

Table 6.4. List of Trim Output Variables

Output Variable	Description	Notes
country	Country name	
iso3	Three-digit ISO3 country code	
year	Year	
gross	HH annual gross income	Key indicator
sa	HH social assistance	Key indicator
ub	Unemployment benefits	Key indicator
fb	Family benefits	Key indicator
care	Newborn care benefits	Key indicator
Iw	In-work benefits	Key indicator
It	Personal Income taxes	Key indicator
ssc	Employee and self-employed social security contributions	Key indicator
netinc	HH net income	Key indicator

Source: Authors.
Note: HH = household.

The run_id variable helps to identify the HH by concatenating HH characteristics into a single variable. The variable takes the following form:

[*iso*3] – [*year*] – [*spouse*] – [*nchild*] – [*ach*1] – [*ach*2] – [*ach*3] – [*ach*4] – [*ach*5] – [*ach*6] – [*ach*7] – [*ach*8] – [*ach*9] – [*ach*10] – [*gender_p*] – [*age_p*] – [*cont_hist_p*] – [*emp_p*] – [*earn_p_ref*] – [*binc_p_ref*] – [*gender_s*] – [*age_s*] – [*cont_hist_s*] – [*emp_s]* – [*earn_s_ref*] – [*binc_s_ref*] – [*time*] – [*udur_p*] – [*udur_s*] – [*pregnant*]

Core Output

The core output builds on the trim output and reports 35 variables for each HH and can be specified by adding the option *outvars(core)* to the Stata command. Additional indicators facilitate the calculation of various indicators and provide more information about the characteristics of each HH (Table 6.5). For example, information on a spouse's presence and the number of children is included in the core output and key reference values such as the average and minimum wages.

Table 6.5. List of Core Output Variables

Output Variable	Description	Notes
country	Country name	
iso3	Three-digit ISO3 country code	
year	Year	
gross	HH annual gross income	Key indicator
sa	HH social assistance	Key indicator
ub	Unemployment benefits	Key indicator
fb	Family benefits	Key indicator
care	Care benefits	Key indicator
Iw	In-work benefits	Key indicator
It	Personal IT	Key indicator
ssc	Employee and self-employed social security contributions	Key indicator
netinc	HH net income	Key indicator
sscr	Employer social security contributions	
aw	Reference: National annual AW	
min	Reference: Annual minimum wage	
spouse	Indicator: presence of spouse in HH	
nchild	Number of children in the HH	
earn_p	Principal: Employment earnings	
earn_s	Spouse: Employment earnings	
binc_p	Principal: Business earnings	
binc_s	Spouse: Business earnings	
emp_p	Principal: Employment status	
emp_s	Spouse: Employment status	
sscee	Employee social security contributions	
sscse	Self-employed social security contributions	
pearn_p	Principal: Previous employment earnings	For unemployment benefits
pearn_s	Spouse: Previous employment earnings	For unemployment benefits
earn_p_ref	Reference: Principal: Employment earnings	In terms of reference wages
earn_s_ref	Reference: Spouse: Employment earnings	In terms of reference wages
binc_p_ref	Reference: Principal: Business earnings	In terms of reference wages
binc_s_ref	Reference: Spouse: Business earnings	In terms of reference wages
inctax_p	Principal: IT	
inctax_s	Spouse: Income taxes	
udur_p	Principal: Unemployment duration	Reported in months
udur_s	Spouse: Unemployment duration	Reported in months
run_id	Unique run identifier	

Source: Authors.

Note: AW = average wage; HH = household; IT = income taxes.

Extended Output

The extended output builds on the core output by providing a decomposition of the inputs into each high-level component of net income. For example, individual care benefits are reported separately as maternity and paternity benefits, where applicable, and various social assistance and family benefits are reported separately. Individual components are reported using a standard naming convention of:

[*core benefit*]_[*individual benefit*]

For instance, maternity benefits are reported as "care_mat_ben," whereas paternity benefits are reported as "care_pat_ben." Extended benefits can be specified by adding the option *outvars(extended)* to the Stata command.

Country-Specific Output

Users can specify that the TaxFit model provides the complete list of variables used to compute the components of net income by specifying the *outvars(all)* function argument. This argument retains all variables used in the calculations. Users should note that although labels are attached to some variables, they are not attached to all variables. Generally, only those variables that are common to most country modules have labels. Despite this, the option can be a useful feature for exploring individual programs or HH members.[12]

[12] Users should note that using the *outvars(all)* option when running multiple countries may cause Stata to throw an error because of too many output variables.

7. Uses of the Model

The TaxFit model has a range of uses, including facilitating cross-country comparisons of benefits and taxes, conducting reform analyses, and generating key indicators. In addition, the data used to build the model can be used to perform gender and fiscal policy analyses.

A. Cross-Country Comparisons

Cross-country comparisons are possible when users rebase all net income components from local currency to a common unit of comparison. This common unit can be the national average wage (AW), the annualized minimum wage, or some other basis.

B. Reform Analyses

An advanced use of the TaxFit model is to explore counterfactual reform scenarios by altering one of more aspects of the tax structure in a country by adjusting the structural components of the model. These reforms can either examine past reforms or consider future changes to the tax and benefit system, either planned or hypothetical.

Implementing reforms could be as simple as adjusting some existing parameters—such as tax rates of benefit amounts for pre-existing programs—or it could involve the introduction of structural policy changes which introduce new measures. The flexibility of the TaxFit model means that policymakers could consider packages of multiple reforms to gauge their overall effect on outcomes such as HH net income, labor tax wedges, marginal effective tax rates (METRs), fiscal costs, and revenue generation.

Recent uses of TaxFit in the context of assessments of reform or policy options have included the following:

- Childcare support for parents of young children in Türkiye.
- The introduction of progressive income taxation in Montenegro.

C. Key Indicators

The TaxFit model is equipped to generate a range of indicators. The tool can calculate common indicators such as the effective tax rate (ETR) and METRs, as well as some novel diagnostics capturing implicit biases in the law and policy-induced formal work disincentives (FWD). Some of these indicators are described in the following section.

Effective Tax Rates

A key indicator of interest to many researchers is the ETR, which calculates the effective tax that an individual or HH pays.[13] These ETRs can change as individuals either enter work or increase their work intensity (that is, increase either their wage or their hours) and the marginal change in the ETR resulting from this change is called the METR.

[13] Effective tax rates calculated at the household level are referred to as effective average household tax rates, which measures the tax burden to the household from the employment choices of all working-age members.

Users can compute METRs in the TaxFit model by taking the difference in ETR of two simulated households that differ in gross income. The formulas for ETRs and METRs are:

$$ETR = \frac{gross - netinc}{gross} = \frac{benefits - taxes}{gross}$$

$$METR = 1 - \frac{\Delta benefits - \Delta taxes}{\Delta gross}$$

Labor Tax Wedge

The labor tax wedge is the ratio between an employee's after-tax income and an employer's labor costs. This wedge consists of the employee's income taxes (it) and social security contributions (SSC) as well as the social security contributions of the employer (SSCR). The TaxFit model supports the calculation of this indicator at the HH level within the core model output and at the individual level using the more detailed country-specific output:

$$Tax\ wedge = \frac{it + SSC + SSCR}{gross + SSCR}$$

Marginal Participation Tax Rate of Secondary Earner

The marginal participation tax rate of secondary earner (MPTS) is an indicator capturing the additional tax liability from a secondary earner entering the labor force, as a share of the additional income that this decision brings to the HH. Because this is a marginal tax rate, the tax liability and income of a sole-earner HH, which is otherwise identical, serve as a benchmark. Let nt_{sp} denote the net tax liability of a HH where one person earns p and the spouse earns s. Then, the marginal rate is:

$$MPTS = \frac{nt_{sp} - nt_{s0}}{y_{sp} - y_{s0}} = \frac{nt_{sp} - nt_{s0}}{y_p}$$

Note that although joint gross income is equal to the sum of the incomes of both spouses, that is not the case with net tax liabilities. That is, $nt_{sp} \neq nt_s + nt_p$, the joint tax liability of spouses is not equivalent to the sum of tax they would be liable for if they were single. The reason, as discussed at length in Coelho and others (2022), is that where the tax filing unit or tax provisions are provided at the HH level, the decision to work by a secondary earner may entail losing tax or social benefits, as well as a higher marginal tax rate than a single, but otherwise similar, individual.

Cost of Jointness for Secondary Earners

Cost of jointness for secondary earners is a measure of implicit bias in the tax law (Coelho and others 2022), comparing the marginal PTR of a secondary earner entering the labor force with that of a single individual of the same characteristics:

$$CJS = \frac{nt_{sp} - nt_{s0}}{y_{sp} - y_{s0}} - \frac{nt_p}{y_p}$$

Although the output of the tool only produces MTPS and cost of jointness for secondary earners for taxes, in principle, users can easily compute similar indicators for employee SSC and benefits. Social Security combines tax and expenditure aspects, entailing complex interactions that require further work. Spouses make contributions to the social security system at the individual level, whereas certain benefits (notably

health insurance) are often provided at the HH level. Thus, for secondary earners, paying SSC generates additional obligations but only limited entitlements, thus weakening incentives to take up formal employment. Estimates of social security benefits are under development.

Formal Work Disincentives

The formal work disincentives (FWD) indicator measures the policy-induced cost of working formally (taxes and SSC) against the cost of working informally (foregone benefits). For a risk-neutral individual, a positive FWD value would provide an incentive to work in the formal sector, whereas a negative value would do the opposite, encouraging informality sector. This indicator can be computed individually or jointly for spouses. For single individuals:

$$FWD_p = \frac{nt_p + sscl_p - b_p}{y_p}$$

For the secondary earner in a married couple, FWD is defined as follows:

$$FWD_{sp} = \frac{nt_{sp} + sscl_{sp} - b_{sp} - \left(nt_{s0} + sscl_{s0} - b_{s0}\right)}{y_p}$$

Progressivity Indicators

Where household or revenue administration data are available, the tool can also produce indicators of progressivity of the tax and transfer system, such as the Kakwani index, which is the ratio between the Gini coefficient of net tax liabilities and the Gini coefficient of gross income. For this measure, higher values would represent higher degrees of progressivity.

D. Fiscal Policy Analyses

The TaxFit model can support fiscal policy analysis, including the development of analytical notes and policy reports focusing on the intricate effects of tax and benefit policies on gender disparities within the labor market. For instance, the model underpinned the work in the "The role of taxes and benefits to support female labor force participation in selected Latin American Countries IMF TaxFit box" (IMF 2024). This analysis illuminated the pivotal role that taxation, social assistance, and specific benefits such as unemployment and parental benefits play in addressing gender gaps in labor force participation and employment.

Furthermore, TaxFit has been used in conducting a comprehensive gender-related tax-benefit policy analysis for Greece. This deep dive explored the interplay between gender and cultural norms, parental and care policies, and, more generally, taxation and social spending, including the country's Guaranteed Minimum Income.

ANNEX A. Warnings and Error Codes

The output to the TaxFit Stata command produces a number of warnings and errors to help users understand the functioning of the model.

Warnings

The TaxFit model produces a warning when it encounters unexpected function arguments or inputs. Annex Table A.1 lists these warnings and their interpretation.

Annex Table A.1. List of Potential TaxFit Warning Messages

Message	Interpretation
Warning: surveyfile() is specified, but datalocation() is not. TaxFit cannot load in external data.	Survey data cannot be loaded, TaxFit will instead generate synthetic data from function arguments.
Warning: datalocation() is specified, but surveyfile() is not. TaxFit cannot load in external data.	Survey data cannot be loaded, TaxFit will instead generate synthetic data from function arguments.
Warning: surveyfile() is specified, but file type is not csv, xls, or xlsx. TaxFit cannot load in external data.	Survey data cannot be loaded, TaxFit will instead generate synthetic data from function arguments.
Warning: [ISO3 Code] is not currently a country included in the TaxFit model, it will be excluded from the results.	A country listed in the function arguments is not included in the list of modeled countries and will be excluded for the output. This may occur if an ISO3 country code was incorrectly specified (for example, DRC as opposed to COD).
Warning: [YEAR] is not currently a year included in the TaxFit model, it will be excluded from the results.	A year listed in the function arguments is not included in the list of modeled years and will be excluded from the output.
Warning: SPouse() provided a value other than 'yes' or 'no'. Incompatible value '[VALUE]' has been removed.	The spouse function argument contained values other than "yes" or "no" (for instance, it may have "y" or "n"). These unrecognized values are dropped from the function arguments, and if the resulting argument is then empty, then the argument reverts to its default value of "no."
Warning: SPouse() contained no valid values. SPouse() reset to default 'no' value.	If no value is provided in the spouse() argument, the model reverts to its default "no" value.
Warning: EMPp() contained values other than 'emp', 'unemp' 'oow' or 'inf'. Incompatible value '[VALUE]' has been removed.	The empp() function argument accepts only "emp," "unemp," "oow," or "inf" as valid inputs. All other values are ignored and empp() reverts to its default value of "emp."
Warning: emps() contained values other than 'emp', 'unemp' 'oow' or 'inf'. Incompatible value '[VALUE]' has been removed.	The emps() function argument accepts only "emp," "unemp," "oow," or "inf" as valid inputs. All other values are ignored and emps() reverts to its default value of "oow."
Warning: EMPp() contained no valid values. EMPp() reset to default 'emp' (employed) value.	If no valid values of empp() are provided, it reverts to its default value of "emp."
Warning: emps() contained no valid values and no earnings specified. emps() reset to default 'oow' (out-of-work) value.	If no valid values of emps() are provided, and the function arguments earnsp() and bincsp() did not indicate any earnings, the emps() argument reverts to its default value of "oow."
Warning: emps() contained no valid values but earnings are specified. emps() reset to default 'emp' (employed) value.	If no valid values of emps() are provided, but the function arguments earnsp() or bincsp() indicate positive earnings, the emps() argument is changed to "emp," indicating that the spouse is employed.
Warning: emps() contained no valid values. emps() reset to default 'NA' (not applicable) value and any spousal earnings specified are not considered.	When the spouse() argument is not set to "yes" and emps() is also empty, then employment status is set to "NA" for not applicable.

Annex Table A.1. List of Potential TaxFit Warning Messages

Message	Interpretation
Warning: NCHildren() contained no valid values. NCHildren() reset to default value of '2'.	If no valid value is provided for nchildren(), then the model reverts to the default value of two children.
Warning: `gender_test_p' value(s) of principal gender (gender_p) missing or incorrectly specified. They have been set as 'M' for Male.	When survey data are used as an input and the gender is missing for the HH principal, these missing values are assigned a value of "M" indicating that they are assumed to be male.
Warning: `gender_test_s' value(s) of spouse gender (gender_s) missing or incorrectly specified. They have been set as 'F' for Female.	When survey data are used as an input and the gender is missing for the HH spouse, these missing values are assigned a value of "F" indicating that they are assumed to be female.
Warning: SPouse() contained no valid values. SPouse() reset to default 'no' value.	If no value is provided in the spouse() argument, the model reverts to its default "no" value.
Warning: EMPp() contained values other than 'emp', 'unemp' 'oow' or 'inf'. Incompatible value '[VALUE]' has been removed.	The empp() function argument accepts only "emp," "unemp," "oow," or "inf" as valid inputs. All other values are ignored and empp() reverts to its default value of "emp."
"Warning: emps() contained values other than 'emp', 'unemp' 'oow' or 'inf'. Incompatible value '[VALUE]' has been removed.	The emps() function argument accepts only "emp," "unemp," "oow," or "inf" as valid inputs. All other values are ignored and emps() reverts to its default value of "oow."
Warning: EMPp() contained no valid values. EMPp() reset to default 'emp' (employed) value.	If no valid values of empp() are provided, it reverts to its default value of "emp."
Warning: emps() contained no valid values and no earnings specified. emps() reset to default 'oow' (out-of-work) value.	If no valid values of emps() are provided, and the function arguments earnsp() and bincsp() did not indicate any earnings, the emps() argument reverts to its default value of "oow."
Warning: emps() contained no valid values but earnings are specified. emps() reset to default 'emp' (employed) value.	If no valid values of emps() are provided, but the function arguments earnsp() or bincsp() indicate positive earnings, the emps() argument is changed to "emp," indicating that the spouse is employed.

Source: Authors.

Note: DRC = Democratic Republic of the Congo; HH = household.

Error Codes

The TaxFit model produces a set of error codes for reference when the program encounters an insurmountable issue. These issues are documented in Annex Table A.2, along with suggested potential methods of resolving the error.

Annex Table A.2. Error Codes Produced by the TaxFit Model

Code Number	Issue	Potential Resolution
701	Survey data file type not specified	Provide a valid value to the surveyfile() function argument.
702	Valid year not specified and not viable alternatives available from survey data	If using survey data, ensure that there is a valid column titled "year" in the data set. Otherwise, enter a valid year value to the year() function argument (see Table 5.2 for valid years for each country).
703	Location of input wage file not specified	Verify the value provided to the earnloc() function argument.
704	Location of PARM and PROG files not specified	Verify the value provided to the progloc() function argument.
705	Could not find PARM file	Verify that the Parameter file for the modeled country and year is included in the file location specified in the progloc() function argument.

Annex Table A.2. Error Codes Produced by the TaxFit Model

Code Number	Issue	Potential Resolution
706	Could not find PROG file	Verify that the Program file for the modeled country and year is included in the file location specified in the progloc() function argument.
707	Error when running PARM file	There may be an error in the PARM file. Contact the maintainer of the TaxFit program or rerun the code after typing "set trace on" into the Stata command line to learn more about the location of the error.
708	Error when loading PROG file	There may be an error in the PROG file. Contact the maintainer of the TaxFit program or rerun the code after typing "set trace on" into the Stata command line to learn more about the location of the error.
709	Error with running the PROG file	There may be an error in the PROG file. Contact the maintainer of the TaxFit program or rerun the code after typing "set trace on" into the Stata command line to learn more about the location of the error.
710	Could not save output file to output location	The value specified to the outname() function argument may not represent a valid output name (for example, it may contain special characters). The location specified in outloc() may not be a valid location. A file with the same name and location may be open.
711	Net income validation error	Contact the TaxFit maintainer.

Source: Authors.

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