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Tax Reform, Subsidies, and Labor Supply: Lessons from Türkiye

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Tax Reform, Subsidies, and Labor Supply: Lessons from Türkiye
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ABSTRACT: Despite recent progress, Türkiye's low labor force participation (LFP) rate is macrocritical and stands out internationally. This paper examines two channels through which fiscal policy can affect LFP. First, we estimate the impact of Türkiye's 2022 Minimum Living Allowance reform, which removed tax disadvantages faced by secondary earners. Second, we simulate the impact of conditional subsidies on Türkiye's LFP. The analysis was based on four empirical models estimated for Türkiye using labor force survey micro data. The results confirmed that: (i) Turkish secondary earners increased their labor supply by more than primary earners following the removal of tax disadvantages in the 2022 reform; (ii) conditional childcare subsidies lead to a large increase in LFP at relatively low fiscal costs; (iii) conditional subsidies can achieve better labor market outcomes and further reduce fiscal costs compared to direct transfers.

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Executive Summary

Türkiye's low labor force participation (LFP) is macro-critical and stands out internationally. At around 53 percent, LFP in Türkiye is considerably lower than in peer economies. This gap is driven by secondary earners' LFP, which is among the lowest in the G20 and across emerging markets. Closing this gap could generate sizeable labor supply and GDP gains.

While labor supply decisions are driven by several factors, fiscal policy can also play a role. Taxation of labor income is directly linked to labor supply decisions and the labor supply of secondary earners tends to be very responsive to changes in their net income. Expenditure policy, notably via the provision of childcare services, can also affect caregiver's disposable income and, as a result, their labor supply. Overall, the higher one's after-tax earnings and the lower their spending on childcare, the higher their incentives to work.

Fiscal policy can play an important role in boosting LFP in Türkiye. First, some features of Türkiye's PIT system exacerbated labor supply disadvantages for Turkish secondary earners until recently. Second, while childcare provision remains primarily driven by the public sector in Türkiye, childcare affordability remains an important challenge, particularly in households where secondary earner's LFP is the lowest.

This paper analyzes two channels through which fiscal policy can affect labor supply in Türkiye: removing tax disadvantages faced by Turkish secondary earners and reducing their childcare spending. In 2022, a reform removed pre-existing tax disadvantages faced by secondary earners. This paper estimates men and women's labor supply response to that reform. The paper then proposes the introduction of a conditional childcare subsidy in Türkiye, estimates its impact on Türkiye's LFP, and computes its fiscal cost.

The analysis relied on a set of models based on household survey data. We built four models for Türkiye: (i) a version of the IMF's TaxFit microsimulation model; (ii) a Heckman selection model; (iii) a two-way fixed effects model; and (iv) a discrete choice model. The first two models are used to calculate the effective income tax rate faced by Turkish individuals upon entering work— capturing specific features of Türkiye's tax and benefits frameworks— and how those tax rates affect men and women's work incentives given their individual characteristics. The remaining models are used to estimate the labor supply response to a given change in net income, following either a change in the effective tax rate — induced by the 2022 reform— or the introduction of a childcare subsidy.

The results confirm that the labor supply of secondary earners responded to the removal of implicit tax disadvantages. Estimation results show that the reduction in effective tax rates induced by the 2022 reform did lead to an increase in total employment, driven by secondary earners, who are mostly women. The results also show that the probability of women working formally increased, while the probability that they chose to stay at home or work informally declined post reform.

Conditional childcare subsidies lead to a large increase in LFP, at relatively low fiscal costs. Our simulation results point to a 4 percentage point increase in total LFP in Türkiye from conditional childcare subsidies, which cost between 0.2 and 0.6 percent of GDP. Conditional subsidies achieve better labor market outcomes and further reduce fiscal costs compared to direct transfers.

A. Introduction

Türkiye's low labor force participation (LFP) rate stands out internationally. At around 53 percent, LFP in Türkiye is considerably lower than in peer economies (Figure 1). The shortfall is concentrated in women: Türkiye's female LFP rate is much lower than both male LFP and female LFP in other countries. The gap between female and male LFP in Türkiye is among the largest in the G20, and it is much bigger than in peer countries (Figure 2). Despite ongoing improvement, including a full recovery from the pandemic, almost two-thirds of working-age Turkish women still do not participate in the labor market (IMF, 2024A).

Figure 1: Labor Force Participation Rate, Total

Percent
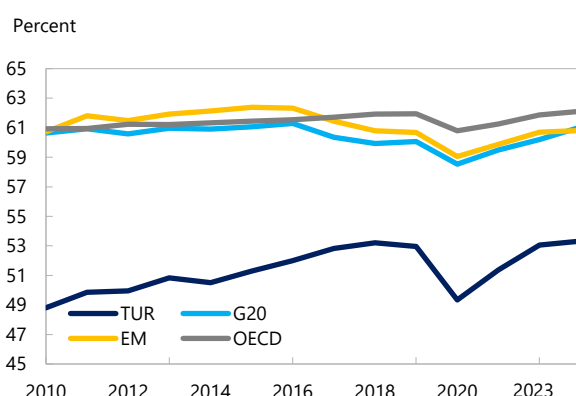
Sources: International Labor Organization and IMF staff calculations.

Figure 2: Labor Force Participation Rate, by Gender

Percent

Notes: Data as of 2023.
Sources: International Labor Organization and IMF staff calculations.

This is a macro-critical issue. Closing Türkiye's LFP gaps would significantly increase the size of its labor force, ultimately supporting livelihoods and growth. Recent research has shown that closing Türkiye's economic gaps between men and women, notably in the labor market, could have large GDP gains (IMF, 2017 and OECD, 2025).
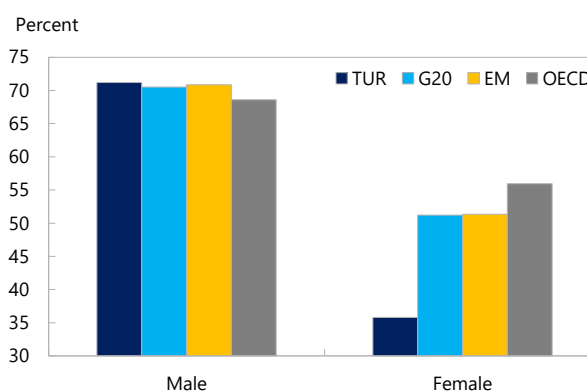
Fiscal policy can help reduce labor market participation gaps. While LFP can be driven by several factors, fiscal policy can also play a role in providing the right incentives (IMF 2020 and Coelho et al 2024). Channels include tax policy (e.g.: PIT exemptions, tax credits and allowances, and unit of taxation), expenditure policy (e.g.: childcare and other social protection services and education spending), and public financial management (e.g.: gender budgeting). Personal income taxation and childcare provision are key channels through which fiscal policy can affect labor market outcomes in Türkiye (IMF 2024A).

This paper analyzes two channels through which fiscal policy can affect labor market gaps: childcare subsidies and personal income tax (PIT) policies. Labor supply decisions of all individuals are directly linked to the taxation of their labor income. However, the labor supply of secondary earners, who are typically women, tends to be more responsive to changes in their net income.[1] For women, an important additional consideration when deciding whether to work is if their income will cover childcare costs. Overall, the higher a woman's after-tax earnings and the lower their spending with childcare, the higher their willingness to work.[2]

**Childcare affordability is an important challenge, particularly in households where LFP gaps are the highest.** The gap between male and female LFP in Türkiye is particularly large among low-income and low-

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[1] See, for example: Evers., De Mooij and Van Vuuren (2008), Meghir and Philips (2010) and Ashenfelter (1978).
[2] See, for example: Connelly (1992), IMF (2020), and Morrissey (2016).

skilled individuals (Figure 3). It also stands out among married individuals and mothers (IMF, 2024A). Childcare affordability is an important challenge in Türkiye, particularly among low-income households (Figure 4), as evidenced by the fact that attendance of pre-school or childcare facilities is widespread for households in the top-income decile, but very limited for households in the bottom-income decile (World Bank, 2015).

Figure 3: LFP Rate by Education Level (2023)
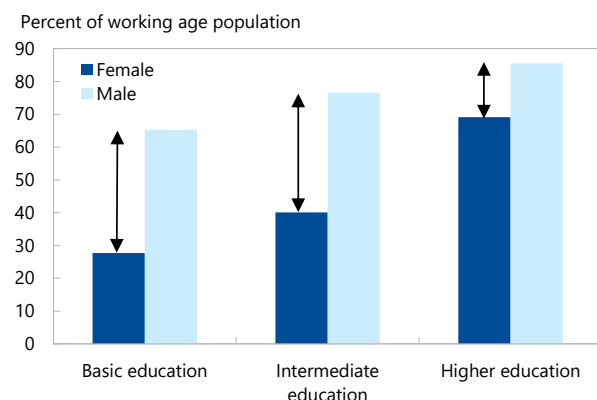
Source: World Bank's World Development Indicators.

Figure 4: Monthly Net Income, Women (2022)
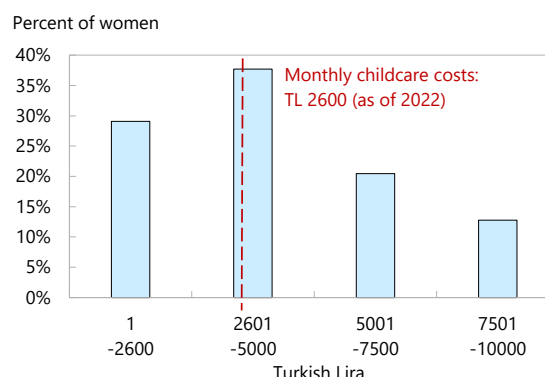
Source: Turkstat, World Bank, and IMF staff calculations.

Until recently, some features of Türkiye's PIT system exacerbated labor supply disadvantages for secondary earners. Türkiye's Minimum Living Allowance (MLA) system, while designed to support lower income families with PIT credits, also exacerbated labor supply disadvantages for married secondary earners, who are typically women.[3] A reform in 2022 improved work incentives for all earners, but especially for married secondary earners, by enhancing the progressivity of the tax system and removing family-based tax provisions.[4] Everything else equal, this reform should have boosted total labor supply, driven by women.

This paper estimates the labor supply response from removing PIT disadvantages faced by secondary earners and of introducing childcare subsidies in Türkiye. First, we estimate the labor supply response of Turkish individuals to changes to their after-tax income following the 2022 MLA reform. Second, we propose the introduction of conditional childcare subsidies in Türkiye, estimate their impact on female and male labor force participation, as well as their fiscal costs.

The paper is organized in six sections. Sections B and C describe the technical models and microdata, respectively, used for the analysis in the entire paper. Section D studies the MLA reform and estimates its impact on labor supply. Section E proposes the introduction of conditional childcare subsidy policies in Türkiye, estimates its impact on Türkiye's LFP, and computes its fiscal cost. Section F concludes.

B. The Toolkit

This paper uses four models to assess the impact of policy changes on individual's net income and their corresponding labor supply response. The models are: (i) the IMF's TaxFit microsimulation model for Türkiye;

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[3] The Turkish name for minimum living allowance is *Asgari Geçim İndirimi*.
[4] See Coelho et al (2024) for an explanation.

and three empirical models estimated for Türkiye: (ii) a Heckman selection model; (iii) a two-way fixed effects econometric model; and (iv) a discrete choice model.

The first two models are used to calculate the effective income tax rate faced by Turkish individuals upon entering work—capturing specific features of Türkiye's tax and benefits frameworks—and how those tax rates affect men and women's work incentives given their individual characteristics. The remaining models are used to estimate the labor supply response to a change in net income following either a change in the effective tax rate—induced by the 2022 reform— or the introduction of a childcare subsidy. This section explains these models in detail.

B.1 IMF's TaxFit Simulation Model

The IMF's TaxFit model is a cross-country tax and benefit simulator that combines country-specific household survey microdata, and country-specific information on tax code, and benefit regulations to determine household net income once these rules are applied (IMF, 2024B).

Figure 5: TaxFit Model Schematic
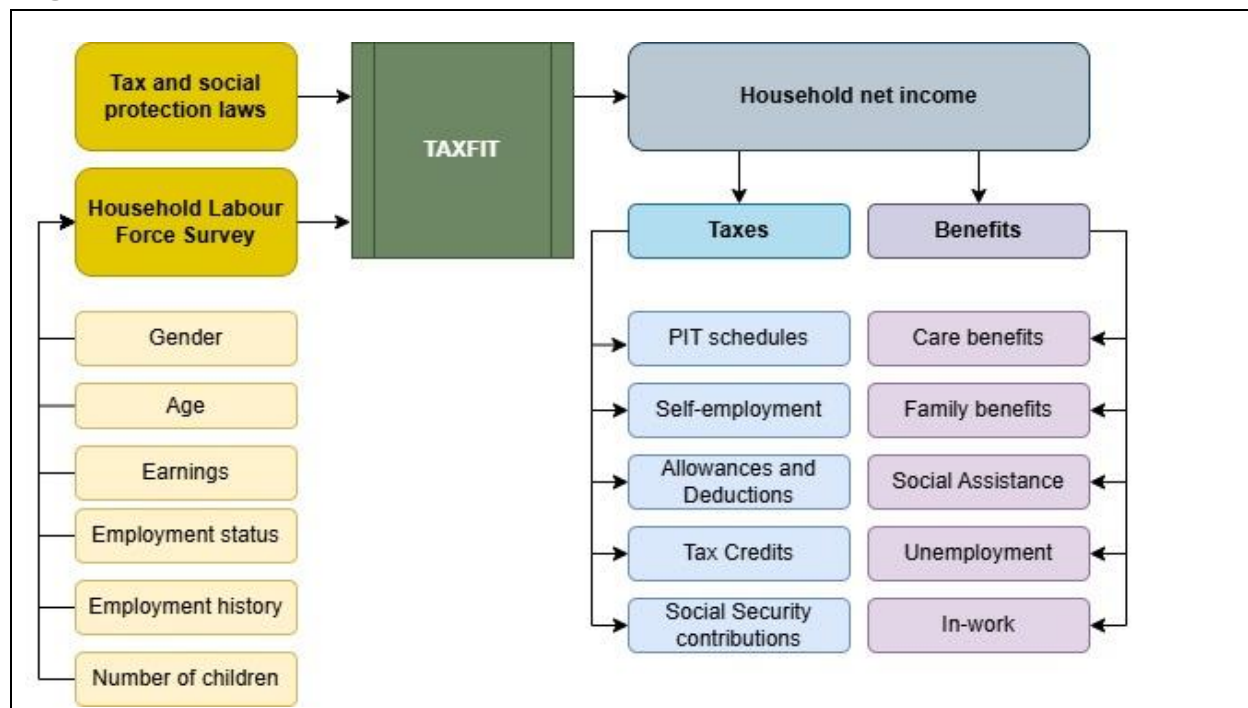
In the model, household net income is comprised of gross income as well as policy-driven components, including income taxes (it), social security contributions (ssc), social assistance (sa), family (fb) and care benefits (care), as well as in-work benefits (iw) and unemployment benefits (ub).

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

To build the TaxFit model for Türkiye, information from national rules and regulations are used, including the Income Tax Law no. 193, the Social Insurance and General Health Insurance Law no. 5510, the Labor Law no. 4857, and the Unemployment Insurance Law no. 4447. We also used Turkstat's Labor Force micro data on household characteristics (e.g.: age, gender, earnings, social security contributions) and the characteristics of dependent children (Figure 5).

B.2 Heckman Selection Model

A Heckman selection model (Heckman, 1976; Heckman, 1979) was estimated for Türkiye and used to simulate potential earnings for non-working individuals should they start to work. The model consists of two equations. The first is a selection equation that estimates the probability of working as a function of observable characteristics. The second is a regression relationship between gross income and individual characteristics.

In the <u>selection equation,</u> the probability of employment is assumed to depend on individual characteristics, such as educational attainment, gender, potential experience and its square, marital status, the number of young children (aged 0 to 3 years), the number of older children (aged 4 to 18 years), and region of residence:[5]

$$P(working_i) = P(\rho_0 + \rho_1 \cdot education_i + \rho_2 \cdot gender_i + \rho_3 \cdot experience_i + \rho_4 \cdot experience_i^2 + \rho_5 \cdot married_i$$
$$+ \rho_6 \cdot region_i + \rho_7 \cdot youngkids_i + \rho_8 \cdot oldkids_i + \rho_9 \cdot year + \varepsilon_i > 0)$$

In the<u> regression equation</u> the gross income of working individuals is estimated based on a modified Mincer equation, which includes education attainment, gender, work experience (and its square) and year dummies (or time fixed effects) regressed on log earnings (Mincer, 1958).[6,7] It also includes the results of the selection equation, to account for possible systematic differences between individuals who work and those who do not. The resulting equation is then used to simulate the gross income of individuals who currently do not work, if they started to work. The equation has the following specification:

$$\ln(earn_i) = \beta_0 + \beta_1 \cdot education_i + \beta_2 \cdot gender_i + \beta_3 \cdot experience_i + \beta_4 \cdot experience_i^2 + \beta_5 \cdot year$$
$$+ E(u_i \,|\, sample\ selection\ rule)$$

Where: $\ln(earn_i)$ is the natural log of annualized employment earnings, $education_i$ is an indicator of highest level of educational attainment using the International Standard Classification of Education (ISCED) 1-digit classification, $gender_i$ is a binary indicator of gender, and $experience_i$ is a calculation of potential years of work experience net of any years the individual might have spent unemployed, based on available data. $E(u_i \,|\, sample\ selection\ rule)$ is the expected value of the selection equation error terms given the relationship between a person's decisions to take up work and their earning potential.[8]

B.3 Two-way fixed effects model

To explore the impact of income tax policy changes from the MLA reform on female employment in Türkiye, we estimated a two-way fixed effects model.[9] As the reform had two major policy changes, this specification (rather than a standard difference-in-differences set up) allows us to disentangle the impact of each policy change.[10] Married women constitute the treatment group while single women are the control group.[11] Since the presence of children in a household may affect women's labor supply decisions, we also estimated the model under three

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[5] The variable "region" is included as a proxy for local economic conditions. The variable "experience" is defined as the number of working-age years above the age of 16 net of any years the individual might have spent unemployed, based on available data.

[6] The standard Mincer equation relates wages to education and experience (Mincer 1958).

[7] The regression equation was simulated on a sample of full-time formal workers of working age who are not currently studying.

[8] This expected value is determined by the Inverse Mills Ratio and the variance of the error term in the earnings equation.

[9] The estimation focuses on women because the reform disproportionately affected secondary earners and those are typically women.

[10] See Angrist and Pischke (2009) for a discussion of two-way fixed effects models.

[11] We compare the results between married and single women pre- and post-reform (rather than between married women pre- and post-reform and single women pre- and post-reform) because married women pre- and post-reform have different policies applied to them in the survey data. In 2021 their household received a spousal allowance and in 2022 it did not. Single women did not receive a spousal allowance in 2021 or 2022. Comparing married and single women pre- and post-reform therefore allows us to isolate the impact of the policy change introduced by the reform.

sample variations: i) all working-age women, ii) those with no minor children living at home, and iii) those women with minor children living at home. The model was estimated using Turkstat's labor force micro data for 2021 and 2022. This estimated model was then used again—in section E of this paper—to predict the labor supply responses of men and women to the introduction of childcare subsidies (modelled as a change in effective net tax burden).

The two-way fixed effects model is specified as follows:

$$y_{it} = \beta_0 + \beta_1 \cdot treatment_i + \beta_2 \cdot time_t + \beta_3 \cdot (time_t \cdot \theta_i^{DSA}) + \beta_4 \cdot (time_t \cdot \theta_i^{NTA}) + \varepsilon_{it}$$

Where: y_{it} represents a binary indicator of whether a woman is working or not, $treatment_i$ identifies if a woman is in the treatment group that benefits from the dependent spouse allowance—because she is married rather than single, $time_t$ equals zero in 2021 and one in 2022, θ_i^{DSA} is the change in the tax burden resulting from the removal of the dependent spouse allowance, and θ_i^{NTA} is the change in the overall tax burden excluding the dependent spouse allowance. Finally, ε_{it} are independent and uncorrelated idiosyncratic errors, which are clustered by cohort status, defined by age group, gender, family status, education, geographic region, and earnings decile of the spouse.

Both tax burden indicators (θ_i^{DSA} and θ_i^{NTA}) are reported in terms of percentage point changes in an individuals' effective net tax rates. These indicators are negative, reflecting the reduction in tax-induced work disadvantages, following the reform (as reported in Table 3 of Annex I).[12] The coefficients of interest correspond to those on the interaction terms between time and the tax burden variables (β_3 and β_4), because they measure the expected change in employment between the treatment and control groups pre- and post-reform.

B.4 Discrete Choice Model

To assess the impact of the reform on informal work, we estimate a discrete choice model for Türkiye which computes the probability of not working, working formally, or working informally for each woman based on the utility they derive from each of these three options. The model is based on a random utility framework (McFadden 2001; Ben-Akiva, & Lerman, 1985; Chen et al., 2016).

The econometric specification assumes that the utility derived from each labor market choice (work formally, work informally, or not work) depends on the gross income level, benefits (social assistance) and costs (income taxes and stamp duty) associated with that choice. In this set up, if an individual chooses to work formally, she will be liable for taxes and will forgo social assistance benefits, whereas if she chooses to work informally, she receives cash transfers and does not pay taxes (Table A).[13]

Table A: Labor Market Choices and Utility Drivers Assumed in the Discrete Choice Model

Labor market choice	Income	Benefits	Costs
Work formally	Yes	No	Yes
Work informally	Yes	Yes	No
Not work	No	No	No

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[12] The change in the effective tax burden of the spousal benefit is expected to be negative as it captures the removal of a benefit for not working, while the change in the effective tax burden of the Minimum Living Allowance is expected to be negative as the policy change increased the tax allowance provided to workers.

[13] Our modeling assumption was that formal workers' pay taxes and forgo benefits, while informal workers receive benefits. In practice, benefits are targeted to very low-income families regardless of formal or informal employment status. However, LFS data for 2021-2022 show that few formally-employed households qualify, making benefit receipt predominantly observed among informal workers. Formal workers lose eligibility for benefits upon employment if they previously met the income criteria, while informal workers receive benefits only if their earnings remain low enough to qualify.

The estimated random utility function has the following specification:

$$U_{itj} = V_{itj} + \varepsilon_{itj} \quad \text{where} \quad V_{itj} = x_{itj}\beta$$

Where j denotes the choices available to an individual (not working, working formally or working informally), U_{itj} represents the total utility that individual i derives from choosing option j at time t which depends on V_{itj}. The latter is a function of a vector of regressors (x_{itj}), which includes individual-specific characteristics—such as education, number of children, region of residence—and variables with values that depends on the individual's choice—such as taxes, benefits, and income levels. β is the vector of coefficients associated with the variables in x_{itj}[14]. Estimated utilities associated with each labor market choice are then used to predict women's probability of not working, working formally or working informally before and after the reform, using a conditional logit framework (McFadden, 1972).

The dataset used to estimate the random utility function above includes observed and simulated data. Labor market outcomes are observed in the 2021-2022 Turkstat LFS household surveys. Tax liabilities and benefit entitlements for those who work (formally or informally) are simulated with the TaxFit microsimulation model. For each non-working individual, counterfactual incomes are predicted using the Heckman model, and the associated taxes and benefits of those incomes are calculated with TaxFit.

C. Data

The analysis on this paper relied on Turkstat's Labor Force micro data (LFS). The raw dataset covers nearly 100 variables for around 360 thousand working-age individuals in 2021–2022.[15] Because TaxFit only simulates taxes and benefits for working-age single-mothers, single-fathers, and nuclear-family households (i.e., parents and their dependent children), LFS data for grandparents, unrelated roommates, children over 25 years old, households with multiple spouses and those with no identified household head are excluded from the analysis. The adjusted dataset includes observations for 250 thousand working-age individuals in each year (representing around 33.5 million individuals), 49 percent men and 51 percent women. Of these individuals, 37 percent are outside of the labor force, 5 percent are unemployed, 43 percent are employed formally, and 14 percent are employed informally. Around one third of working-age women in the sample were working (22 percent and 10 percent in the formal and informal sectors, respectively), 4 percent were unemployed, and 61 percent were outside of the labor force.

Most working-age women in the dataset were married and had lower employment rates. Among working-age women, approximately 82 percent were married and around 30 percent had children under the age of 5. Prior to the reform, the employment rate for single women stood at around 45 percent, whereas employment rates for married women ranged from 20 percent (for women with children and a spouse working informally) to 40 percent (for women without children and a spouse working formally). Post reform, employment rates increased across the board for women (Figure 6).

Most secondary earners are women. As in other countries, secondary earners among married couples in Türkiye tend to be women. Men are the primary earner in around 80 percent of households with at least one person working and in around 60 percent of two-earner households (Figure 7).

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[14]   Coefficients are constant across choices, for variables that vary across choices, such as net tax rates and incomes. The coefficient on choice-invariant variables, such as socio-demographic characteristics, is heterogenous across choices.

[15]   Working age defined as 16–58 years for women and 16–60 years for men.

Figure 6: Working-age Employment Rates, Women

Note: Working-age women are aged 16 to 58. The employment rate is the ratio of working-age employed to the working age population. Sample adjusted to Taxfit specifications.
Sources: Turkish Statistical Institute Labour Force Statistics Micro Data, 2021 and 2022, and IMF staff calculations.
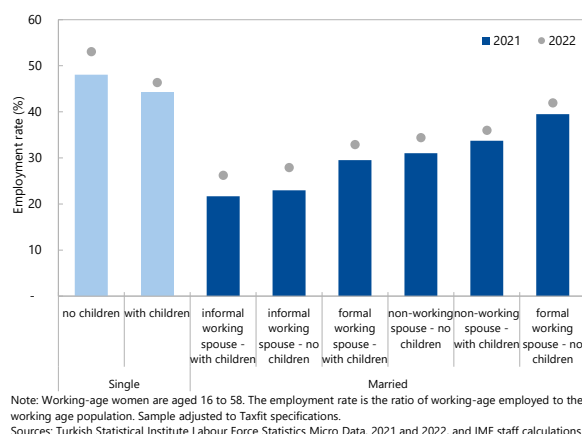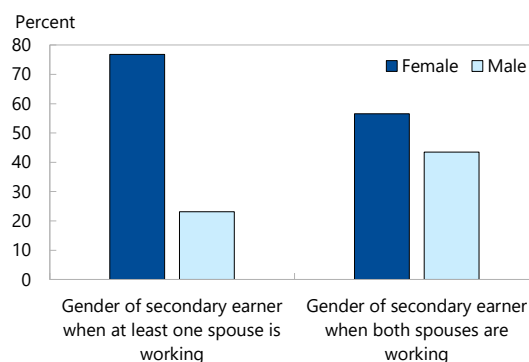
Figure 7: Gender of Secondary Earner

Sources: Turkish Statistical Institute Labour Force Statistics Micro Data, 2021 and 2022, and IMF staff calculations.

D. Case 1: Minimum Living Allowance Reform

D1. The Reform

Until recently, Türkiye's Minimum Living Allowance (MLA) system used to grant partial tax allowances on personal income—up to the minimum wage—for all workers and additional tax allowances depending on the family structure, such as the spouse's working status and the number of children in the household. [16]

In January 2022, following a recommendation from Türkiye's Minimum Wage Determination Committee, the Minimum Living Allowance (MLA) was abolished and replaced with a PIT exemption of all earnings up to the minimum wage, regardless of family structure.

While the reform improved work incentives for all workers, secondary earners—largely married women—benefitted the most:

▪ The increased incentive for all workers came from an ***increase in the basic non-taxable allowance*** (from between 50 and 85 percent of the minimum wage—depending on household composition—pre-reform, to 100 percent of the minimum wage post-reform), which made the tax system ***more progressive***.[17] This change, although equal for men and women, could entice larger effects among women, because their labor supply is more elastic to changes in net incomes (Evers et. al 2008), reflecting women's greater propensity to take on a larger share of home duties (Alesina et. al, 2011). Moreover, since women tend to be over-represented at the bottom of the income distribution, a more progressive tax system can be associated with increases in female labor supply (Coelho et al, 2024).

▪ The ***removal of the PIT allowance for non-working spouses ("dependent spouse allowance"),*** which reduced work disadvantages for secondary earners, primarily women. In Türkiye, prior to the reform, the household's net tax allowance would increase by 40 percent of the tax payable by a minimum wage worker

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[16] The MLA system provided a tax allowance as a percentage of the minimum wage tax obligations: 50% for the taxpayer; 10% for a non-working spouse; 7.5% for each of the first two children; 10% for a third child; 5% for each additional child (up to a maximum total allowance of 85% of the minimum wage). While the allowance was granted on an individual rather than household basis, only one spouse could claim the allowance related to children.

[17] Prior to the MLA reform, workers without a dependent spouse or dependent children would benefit from a basic non-taxable allowance equal to 50 percent of the minimum wage, while workers with dependent children would receive a larger allowance up to 85 percent of the minimum wage, depending on the number of dependent children.

if the non-working spouse decided to work,[18] compared to the 50 percent allowance if an unmarried woman decided to work. After the reform, the tax allowance from working was increased to 100pp for married and unmarried women, removing the discrepancy (Table B).
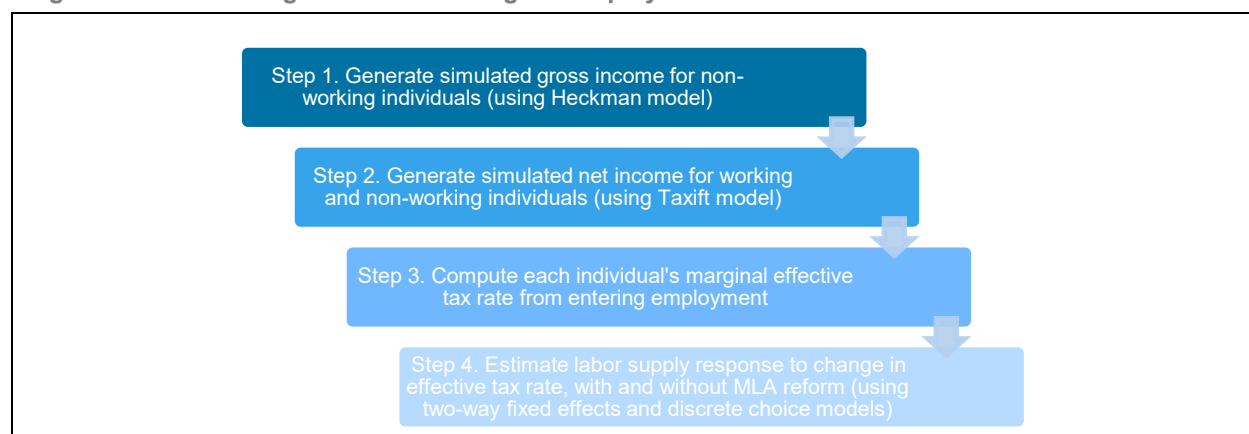
Table B: Tax Allowance per Household Type (Percent of Tax Liability of Minimum Wage Earner) – Example of households without children

Household type	Pre-reform	Post-Reform
(A) Non-working unmarried woman	0	0
(B) Working unmarried woman	50	100
(B)-(A) = Tax allowance gain from working (unmarried woman), p.p.	**50**	**100**
(C) Working married woman with non-working spouse	50 + 10 = 60	100
(D) Working married woman with working spouse	50 + 50 = 100	100 + 100 = 200
(D)-(C) = Tax allowance gain from working (married woman), p.p.	**40**	**100**

D2. Estimating Labor Supply Response to the MLA Reform

We used the four models described in section B and the data described in section C to estimate the effects of the MLA on the labor market. The estimation followed a multi-step process (Figure 8). Each step is outlined in greater detail below.

Figure 8: Process diagram for estimating the employment effect from MLA reform

Step 1. Generate simulated gross income for non-working individuals (using Heckman model)

Step 2. Generate simulated net income for working and non-working individuals (using Taxift model)

Step 3. Compute each individual's marginal effective tax rate from entering employment

Step 4. Estimate labor supply response to change in effective tax rate, with and without MLA reform (using two-way fixed effects and discrete choice models)

Step 1. Generate simulated gross income for non-working individuals

Simulated gross income for non-working individuals was generated with the Heckman model described in section B2. Table C shows the observed gross income of working individuals and the (simulated) gross income that non-workers would earn if they started to work. The simulated gross income of non-working individuals is lower than the observed gross income of working individuals by about 15 percent on average. Women have lower gross income than men in both the observed and simulated data (Figure 9).

Step 2. Generating Simulated Net Income for Working and Non-Working Individuals

To generate simulated net income data for working and non-working individuals, first the observed gross income data for working individuals and the simulated gross income data for non-working individuals are input into the

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[18] The household would be subject to the 50 percent standard allowance but forgo the 10 percent top-up for a dependent spouse.

TaxFit model described in section B1 to obtain the tax liability paid and benefit eligibility for each individual, based on their (household) characteristics. Next, the net income of each adult household member is simulated under both a working and a non-working status, holding other household characteristics constant (Table C).[19]

Table C: Summary of Data Sources

	Gross Income	Net Taxes	Net Income
Current status			
Working individuals	Micro Data	Taxfit Model	Taxfit Model
Non-working individuals	Micro Data	Taxfit Model	Taxfit Model
Counterfactual status			
If working individuals did not work	Assumed zero	Taxfit Model	Taxfit Model
If non-working individuals worked	Heckman Model	Taxfit Model	Taxfit Model

Figure 9 – Observed and Simulated Gross annual income by gender, 2022
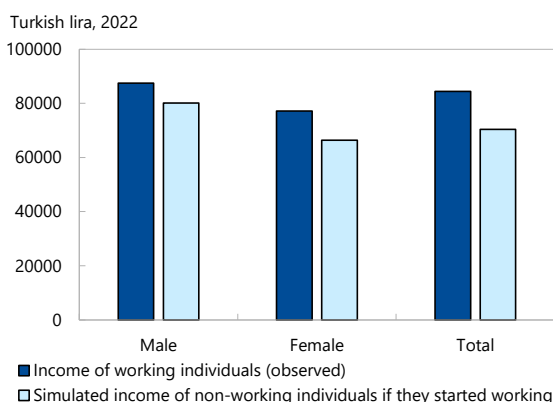
Figure 10: Estimated marginal effective tax rates (METR) when entering work, working-age women
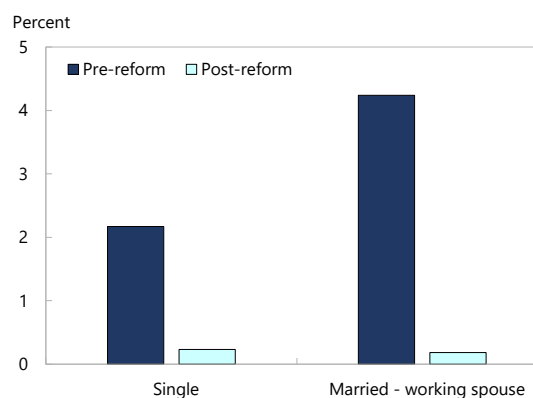
Note: Marginal effective tax rate calculation based on simulated earnings for non-workers.
Source: Turkstat's Household Labor Force Statistics, 2021 and 2022 and IMF staff calculations.

Step 3. Computing Individuals' Marginal Effective Tax Rate From Entering Employment

An individual's marginal effective tax rate (METR) upon entering employment corresponds to the additional net taxes incurred by moving from non-working to a working status, as a share of the additional income earned due to the change of status. Specifically:

$$METR_{i=} \left(\frac{net\ taxes_i^{working} - net\ taxes_i^{not\ working}}{earnings_i^{working} - earnings_i^{not\ working}} \right) = \left(\frac{\Delta taxes_i}{\Delta earnings_i} \right)$$

The METR is calculated pre- and post-reform. The post-reform scenario consists of the 2022 tax code and benefit policies, including the new policies that replaced the MLA system. To isolate the impact of the MLA reform, the pre-reform scenario also relies on the 2022 tax code and benefit policies, but the latter is adjusted to include the 2021 provisions of the MLA system.[20] With this setup, the reform to the MLA provisions is the only source of

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[19] Each adult in the dataset was simulated separately (by duplicating households with two adults and switching the indicators of the principal and secondary earners) to account for the labor market decisions of both adults.

[20] Other policy changes that occurred between 2021 and 2022 (notably inflation adjustments for various tax-benefit parameters and the introduction of the Türkiye Family Support Program six months after the MLA reform) are unrelated with the MLA reform.

differences in METRs between 2021 and 2022. As expected, the results show that, after the reform, the METR from entering work for married women decreased by more than for unmarried women (Figure 10).

Step 4. Estimate Labor Supply Response

Figure 11 and Annex I present the estimated labor supply elasticities using the two-way fixed effects model. These elasticities are comparable to other studies.[21] The results indicate that: (i) female labor supply was responsive to the reduction in effective tax rates caused by the increase of the basic non-taxable allowance (and more responsive than men's – Annex I); and (ii) women's labor supply was also responsive to the removal of the dependent spouse allowance, though to a lesser degree than the larger reform to the basic allowance.[22,23,] Overall, the estimation model suggests that, as a result of the overall MLA reform, female labor force participation and employment increased by 3 percentage points, while male labor force participation and employment increased by only 1.5 percentage points, implying a total labor force increase of around 2.5 percentage points. The results from the discrete choice model are broadly consistent, suggesting that the MLA reform increased women's probability of working in the formal sector, while lowering the probability staying at home or working informally (Figure 12 and Annex I).

Figure 11: Two-way Fixed Effects Model Results - Labor supply elasticity, women
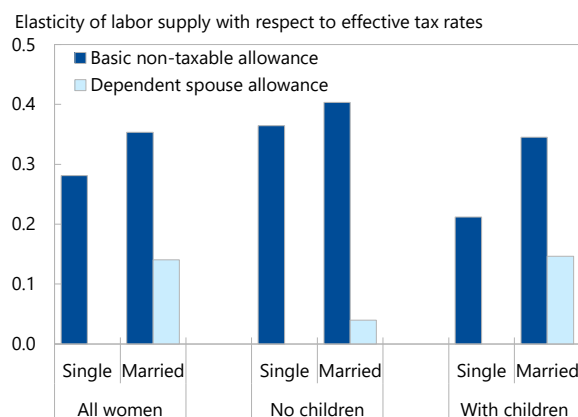
Figure 12: Probability of Women's Labor Market Choice
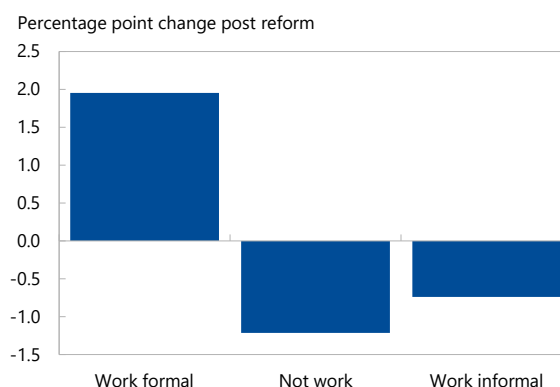
Source: Turkstat Labor Force Micro Data, IMF Taxfit model, and IMF staff calculations.

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[21] The estimated elasticities of 0.04-0.15 for the removal of the Dependent Spouse Allowance, and 0.21-0.40 for the wider MLA reform are slightly higher than the average extensive margin elasticity of 0.25 surveyed by Chetty et al. (2013), but smaller than the surveyed elasticities of between 0.5 and 1.0 for women and individuals with low educational attainment surveyed by Immervoll et al. (2007).

[22] The inclusion of simulated incomes in the estimation process adds uncertainty to the two-way fixed effects model. Sensitivity analysis using simulated incomes that were two standard errors higher and lower than those used in the primary analysis do not alter the magnitude or significance of the estimations.

[23] Men's labor force participation rates much higher than women's high in Türkiye. As most men participate in the labor market, it is possible that the reservation wage of non-participating men is notably higher than that of non-participating women such that the policy reforms examined here have a smaller impact on male participation.

E. Case 2: Childcare Subsidy Policies

This section analyses the impact of the introduction of a subsidy on childcare services to promote labor force participation in Türkiye. Childcare affordability is an important challenge in Türkiye, particularly for low-income households, among which female labor force participation is particularly low (Section A). In this section, we discuss a subsidy on childcare services that would fully cover childcare costs in households where both parents work. We estimate the impact of such subsidy on women's and men's labor supply response and estimate its fiscal costs.[24] Variations where the policy itself varies—and where the targeted group and size of the subsidy vary, are also presented. Other positive long-run effects from a subsidy on childcare services on productivity, human capital accumulation, and fiscal revenues have been documented in the literature, but are outside the scope of this paper.[25]

E1. Childcare Subsidy Options

The baseline policy proposal assumes a full direct universal subsidy of the total cost of private childcare services. All households where both parents work are assumed to receive TL 2,600 per child monthly, in line with estimated median costs for private childcare services as of 2022.[26] This assumption is made regardless of whether the children attend public or private facilities. Since most children attending childcare centers go to public rather than private facilities and the former tend to be cheaper than the latter, the final costs in our simulations likely provide an upper bound. On the other hand, the price differential between public and private sector services could already reflect a partial implicit or explicit subsidy. Thus, depending on supply constraints, the additional demand for childcare services created by the reform may need to be increasingly met by the private sector. Overall, our estimates could be seen as an upper bound of median costs. The childcare subsidy is assumed to be administered as a benefit to the household, but it could also be administered directly to childcare providers.

We also consider more targeted versions of the full subsidy. We examine a total of five subsidy reforms, all of which provide a full subsidy for each eligible child but differ on eligibility criteria (Table D). The *"baseline"* reform is the most generous, providing benefits to all childcare-aged children in households where both parents work, either formally or informally. The other four policies all vary from the baseline in one dimension at a time: i) the *"formal employment"* policy limits eligibility to parents with formal jobs; ii) the *"two-child maximum"* policy limits benefits to up to two children per household; iii) the *"income cap"* policy limits eligibility to households with collective annual earnings of less than TL 120,000, which corresponds to the 75th percentile of the household income distribution; iii) the *"ages below 3"* policy limits eligibility to children under the age of 3 years old, as in Türkiye participation in pre-primary education for those aged 3 and above is higher in Türkiye than participation in childcare for children under the age of three (World Bank, 2015).

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[24] Men and women are modelled in the same way, but the data show that there are very few men who are in a position to make an employment decision in response to the reform (i.e.: where they are not working and their spouse is, or where they are a single parent).

[25] Access to early childhood care and education can improve productivity and human capital accumulation that can persist throughout a child's career, particularly in low-income households (Heckman et al., 2010; van Huizen & Plantenga, 2018). Investment in these types of policies can pay for itself in the long-term through higher tax revenues and reduced transfers from increased employment (Hendren & Sprung-Keyser, 2020).

[26] Estimated monthly private sector childcare costs taken from World Bank estimates of median full-day public and private care providers for 2015 (World Bank Group 2015) and inflated to 2022 levels using the Consumer Price Index (CPI). These costs are interpreted as the unsubsidized cost of providing a child with childcare.
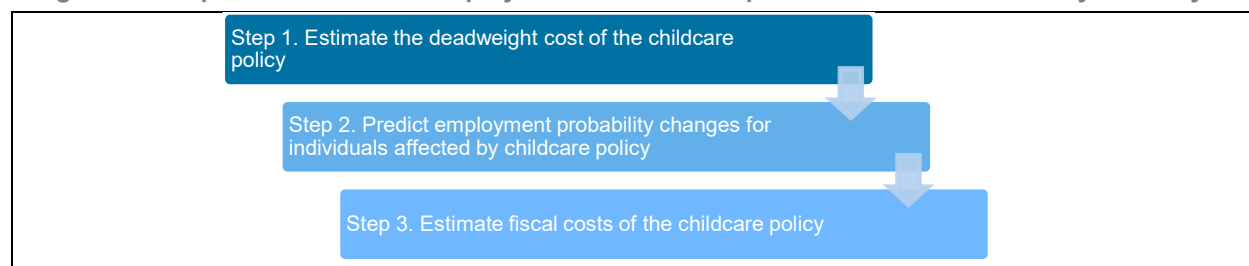
Table D: Childcare Subsidy Policy Options

Childcare subsidy	Policy Description
Baseline reform	Full direct universal cash subsidy is provided for each child of childcare age 0 to 5 (exclusive) conditional on both parents working (formally or informally) and the child being in childcare.
Formal employment	Baseline reform with eligibility limited to households where all parents are engaged in formal employment.
Two-child maximum	Baseline reform with additional limit of two eligible children per household
Income cap	Baseline reform with additional eligibility limit to households with annual earnings of TL120,000 of less.
Ages below 3 years	Baseline reform limited to children aged between 0 and 3 (exclusive).
Reference scenario 1: Unconditional direct transfer (ages below 5 years)	A direct cash transfer is paid to families for each child aged between 0 and 5 (exclusive). The transfer is not conditional on employment or earnings eligibility requirements.

E2. Simulation process

The simulation followed the three-step process outlined in Figure 13.

Figure 13: Steps to Estimate the Employment and Fiscal Impacts of a Childcare Subsidy in Türkiye

Step 1. Estimate the deadweight cost of the childcare policy

Step 2. Predict employment probability changes for individuals affected by childcare policy

Step 3. Estimate fiscal costs of the childcare policy

Step 1. Estimate the deadweight cost of the childcare policy

The purpose of the proposed policy is to increase the incentives for secondary earners (who are typically women) to choose to work by providing a childcare subsidy linked to both parents being employed. Because, in some households, both parents would already be employed prior to the introduction of the policy, providing them with a subsidy would not generate any change in employment, but it would have a cost.[27] This is a deadweight cost, computed as the difference in net taxes payable by households where all parents were working prior to the reform:

$$Deadweight\ Cost = \sum_{i \in \Pi} \tau_i^{post-reform} - \tau_i^{pre-reform}$$

Where:

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[27] The analysis focuses on the extensive margin (employment) and therefore excludes any intensive margin effects from any part-time workers who choose to increase their working hours as a result of the childcare subsidy. Since childcare represents fixed costs from entering employment, we expect their impact on the extensive margin to be larger than for the intensive margin.

Π is the set of households where all adults work (and therefore no parent can provide childcare services at home); $\tau_i^{post-reform}$ is the net taxes and benefits payable by household i after the implementation of the childcare reform; and $\tau_i^{pre-reform}$ are net taxes and benefits payable by household i prior to the reform.

Step 2. Predict employment probability changes for individuals affected by childcare policy

We use the two-way fixed effects model described in section B3 and estimated in section D2 to predict the probability of individuals entering formal employment due to the childcare policy. The calculation multiplies the percent change in net income due to the childcare policy and the elasticity of employment with respect to the change in marginal effective tax rate for the dependents spouse allowance estimated in section D.[28,] The predicted probability of formal work is equal to one for anyone observed in the dataset as working, zero for non-working individuals who are not eligible for childcare subsidies (i.e., they do not have young children), and between zero and one for non-working individuals who are eligible for childcare subsidies (i.e., have young children). These estimated probabilities, once applied to the total sample of individuals, provide an overall estimate of the impact of the policy on total.[29]

Step 3. Estimate the fiscal costs of the childcare policy

First, we use the TaxFit model to simulate individuals' social assistance contributions, family benefits, and income taxes pre-reform.[30] Individuals taxes and benefits are simulated assuming employment post reform. The total fiscal cost is then computed as the deadweight cost (calculated in Step 1) plus individuals' change in taxes and benefits post reform, weighted by the change in their employment probability (calculated in Step 2):

$$Fiscal\ Cost = Deadweight\ Cost + \sum_i \rho_i \cdot (\Delta sa_i + \Delta fb_i + \Delta it_i)$$

Where ρ_i is the change in an individual i's employment probability post reform, Δsa_i, Δfb_i, and Δit_i are the change in social assistance benefits, family benefits, and income taxes as a result of the reform, assuming i becomes employed post reform.

E3. Simulation Results

The introduction of a conditional childcare subsidy in Türkiye could lead to a large increase in LFP.[31] The simulation results show a drastic decrease in the gap between male and female LFP in the targeted cohort (i.e. working-age parents with young children) from around 56pp to roughly 23pp under the baseline reform.[32] This decrease is large enough to also reduce the LFP gap for the entire population (which includes non-targeted individuals), from around 36 to roughly 30 percentage points (Figure 14A). Overall, our estimates suggest that introducing a conditional childcare subsidy could increase total LFP from 53 to 57 percent under the baseline, driven by an 8pp increase in female LFP, and a 1pp increase in male participation (Figure 14B).

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[28] We use this elasticity because the increase in the basic non-taxable allowance affects all workers, while the removal of the dependent spouse allowance impacts only secondary earners. The childcare reform is also focused on secondary earners as families are only eligible if both parents are working.

[29] The working assumption here is that individuals who were not working pre-reform also did not participate in the labor force.

[30] While social security contributions would also represent an offset to the fiscal cost, we assume these contributions are already ear marked for social security benefits and therefore do not improve the fiscal balance.

[31] Similar results are achieved if tax credits or expense deductions are used as policy tools instead of subsidies (Annex II).

[32] LFP gender gap defined as male participation rate minus female participation rate.

It is possible to achieve meaningful increases in LFP even with more targeted subsidies. While there is notable variation in the LFP impact depending on the policy design, all considered measures achieve notable increases in LFP (Figure 14B) and large decreases in the LFP gender gap (Figure 14A). The estimated number of affected children ranges from 3mn (Baseline reform) to 1mn (Ages 0-3 reform).

Figure 14: Simulated Labor Force Participation, Pre- and Post-Reforms
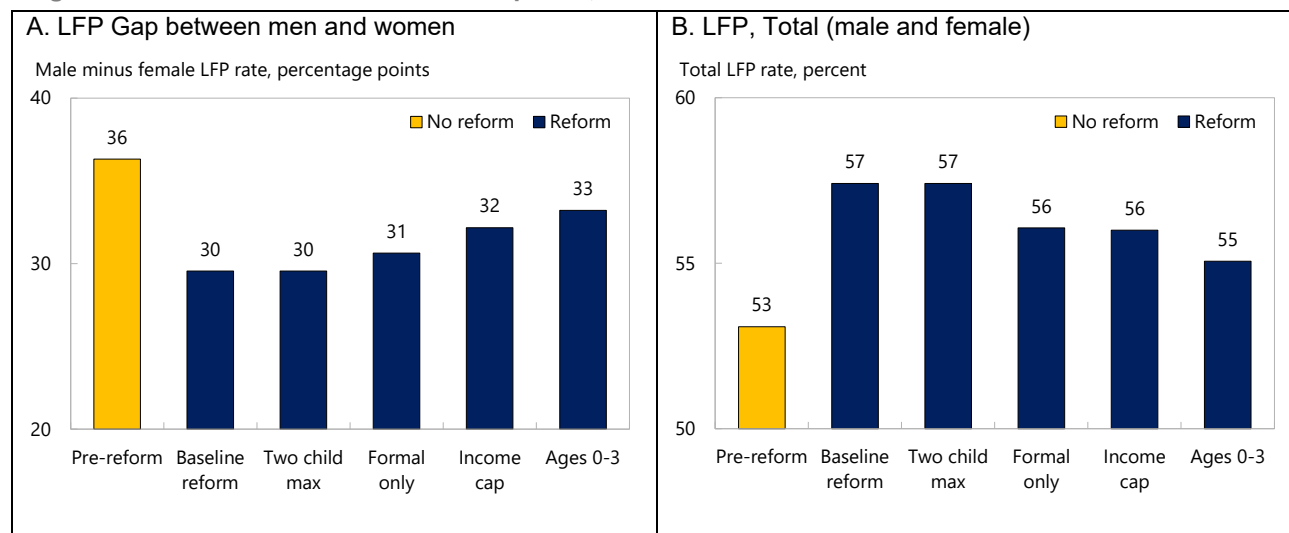

Note: Population aged 15 years and over.

Source: Turkstat Household Labor Force Survey, IMF Taxfit model, and IMF staff calculations.

These childcare subsidy policies are affordable. Figure 15 presents the fiscal cost of the various subsidy reforms considered, as a share of GDP. The subsidy with the highest impact on LFP costs 0.6 percent of GDP.[33] The targeted policies, which have a smaller impact on participation, cost between 0.2 and 0.6 percent of GDP. All these estimated costs are below the OECD average annual spending on early childhood care and education, of 0.8 percent of GDP (Figure 16). Türkiye's current annual spending on early childhood care and education is much lower, at around 0.3 percent of GDP.

Conditional subsidies cost less and are more effective than unconditional direct transfers. Figure 15 also compares the cost of the childcare subsidy options with a counterfactual case of unconditional direct transfers where TL 2,600 is paid to families for each child aged 0–5, regardless of parents' employment status or children's childcare attendance. This reference scenario illustrates the cost of an extreme policy which does not impact the employment responses of working parents and thus consists only of deadweight costs. In this case, the direct transfer represents a windfall gain that improves recipients' welfare but may not boost LFP. In fact, direct transfers could have an adverse effect on participation, if the income effect is large enough to make caregivers choose not to work. In contrast, conditional subsidies would not only improve caregivers' LFP, but their net fiscal cost would also be lower because, as more secondary earners start to work in response to the policy, fiscal spending on social security assistance falls, and PIT revenues rise.

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[33] We estimated that half of these total costs would be deadweight costs, half variable costs, both only partly offset by higher social security contributions resulting from the increase in employment brought about by the reform.

Figure 15: Simulated Fiscal Costs of Proposed Childcare Subsidy Reforms
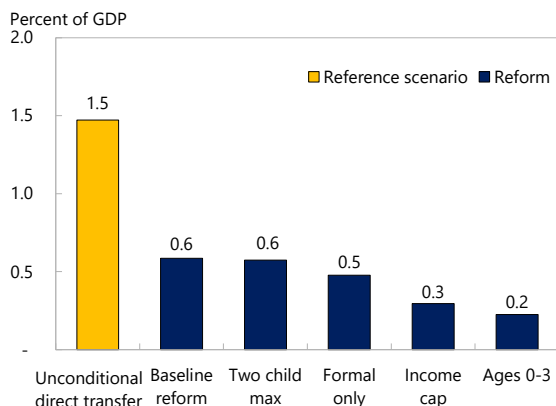
Figure 16: Public Spending on Early Childhood Education and Care, 2019 or Latest Year

Note: Direct transfers signify direct cash payments to children of childcare age of TL2600 per month (in 2022 terms).

Source: OECD Family Database, Turkstat Household Labor Force Survey, IMF Taxfit model, and IMF staff calculations.
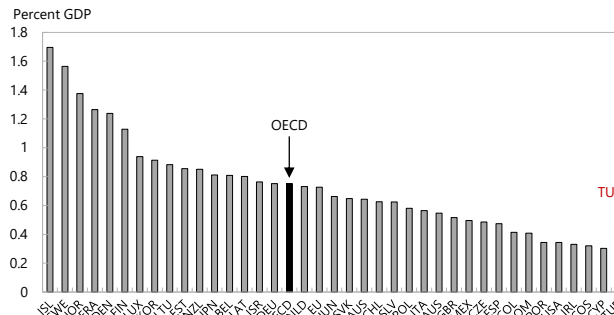
Conditional subsidies achieve better labor market outcomes and lower fiscal costs compared to direct transfers. Türkiye currently has family support programs equivalent to unconditional direct transfers. In particular, Türkiye's childbirth support program provides unconditional cash support in amounts varying depending on the number of children through a one-time payment of 5,000 lira for the first child, 1,500 lira per month for the second, 5,000 lira per month for the third and each subsequent child. Making unconditional direct transfers conditional on parents' employment and children's childcare attendance can provide welfare support to families while also supporting labor force participation and reducing fiscal costs (Figure 17).

Figure 17: LFP Impact and Fiscal Costs of Selected Policies

Source: Turkstat and IMF staff calculations.
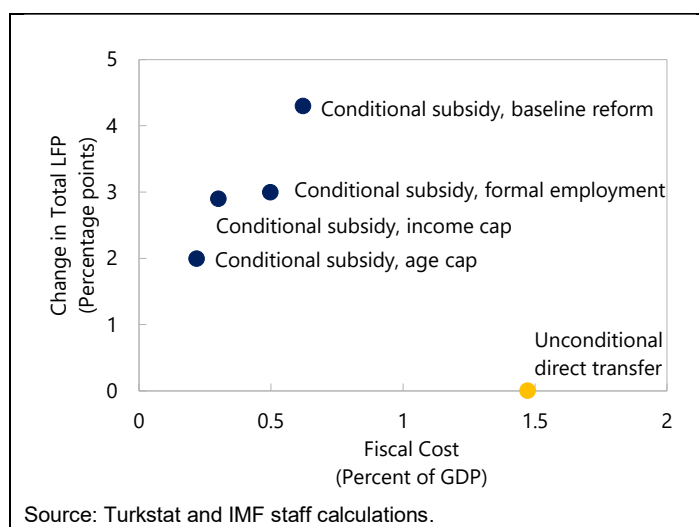
F. Conclusion

This paper provided empirical evidence that fiscal policy helped boost labor force participation by removing disadvantages faced by secondary earners in Türkiye. First, it showed that a 2022 reform which removed tax disadvantages for secondary earners and enhanced the progressivity of the tax system boosted total labor supply. Second, the paper showed that conditional childcare subsidies lead to a large increase in LFP at relatively low fiscal costs.

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Annex I. Estimation Results

Table 1: Two-way Fixed Effects Model - Regression Results

	(1)	(2)	(3)
Women	Single v Married	Single v Married (no children)	Single v Married (with children)
Dependent Spouse Allowance	-1.8976***	-0.7331	-1.9214***
	(0.2912)	(0.7607)	(0.2993)
Non-taxable allowance	-5.3064***	-5.2059***	-5.3126***
	(0.4478)	(0.7352)	(0.5495)
Time FEs	yes	yes	yes
Treatment FEs	yes	yes	yes
N	133694	29284	104410
RMSE	0.4634	0.4843	0.4591
Men	Single v Married	Single v Married (no children)	Single v Married (with children)
Dependent Spouse Allowance	1.0476**	0.8098	0.8789
	(0.5165)	(0.6985)	(0.5573)
Non-taxable allowance	1.9449***	1.9317***	1.7039***
	(0.3076)	(0.6218)	(0.3240)
Time FEs	yes	yes	yes
Treatment FEs	yes	yes	yes
N	52874	22144	30730
RMSE	0.3804	0.4435	0.361

Note: Standard errors in parenthesis.

Table 2: Discrete Choice Model - Regression Results

Predictive margins		Number of obs = 48,333,057				
2021						
Outcome	Margin	Delta-method Margin std. err.	z	P>|z|	[95% conf. interval]	
Not work	0.56	0.00	4502.37	0.00	0.56	0.56
Work formal	0.27	0.00	2434.06	0.00	0.27	0.27
Work informal	0.18	0.00	1859.32	0.00	0.18	0.18
2022						
Outcome	Margin	Delta-method Margin std. err.	z	P>|z|	[95% conf. interval]	
Not work	0.54	0.00	4400.1	0.00	0.54	0.55
Work formal	0.29	0.00	2550.72	0.00	0.29	0.29
Work informal	0.17	0.00	1810.27	0.00	0.17	0.17

Table 3: Mean percentage point change in individuals' effective net tax rates from the MLA reform

Sample	Theta DSA	Theta NTA (married)	Theta NTA (single)
All women	-2.50	-2.25	-2.47
Without children	-2.24	-3.20	-3.54
With children	-2.53	-2.15	-1.73

Figure A: Two-way Fixed Effects Model Results - Labor force participation elasticity, men

Note: Figure does not include time and treatment fixed effects.
Source: Turkstat Household Labor Force Survey, IMF Taxfit model, and IMF staff calculations.

Annex II. Alternative Childcare Policy Simulations

Childcare policy	Policy Description
Baseline reform	Full cash subsidy is provided for each child of childcare age (0 to 5) to households where all parents are working.
Half subsidy	Baseline scenario, with 50% of childcare expenses covered.
Expense deduction	The full amount of childcare expenses can be claimed as deductible expenses from personal income tax payable for each child of childcare age (0 to 5) to households where all parents are working.
Non-refundable tax credit	A non-refundable (wastable) tax credit equal to the full amount of childcare expenses is applied to income tax payable for each child of childcare age (0 to 5) to households where all parents are working.
Refundable tax credit	A refundable (non-wastable) tax credit equal to the full amount of childcare expenses is applied to income tax payable for each child of childcare age (0 to 5) to households where all parents are working.
Direct transfer (ages 0–5)	**Reference scenario**: A direct cash transfer is paid to families for each child aged between 0 and 5 (inclusive). There are no employment or earnings eligibility requirements.

Figure A: Simulated LFP gender gap pre- and post-reforms (male minus female LFP)
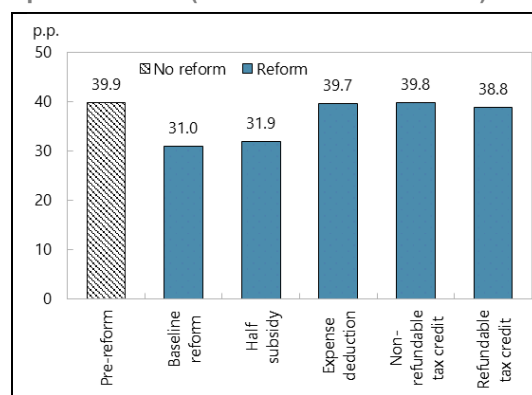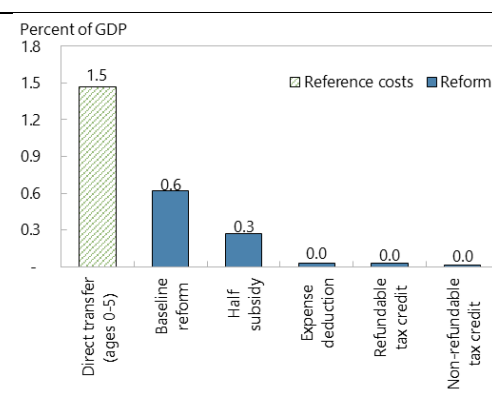
Figure B: Simulated fiscal costs of proposed reforms

Note: Direct transfers signify direct cash payments to children of childcare age of TL2600 per month (in 2022 terms). Early childhood educational development services (ECED) focus on children aged under 3 years.
Source: Turkstat Household Labor Force Survey, IMF Taxfit model, and IMF staff calculations.