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Abstract

Persistent gender economic differences have led to an extensive amount of literature devoted to study the gender wage gap. However, wages are only one component of income for women and men, and self-employment income, non-labor income, taxes, pensions, and benefits are mostly omitted from the analysis. In this paper we contribute to the small but growing literature of gendered fiscal incidence by studying the effect of taxes, social insurance contributions and fiscal benefits on the gender income gaps in five countries: El Salvador, Costa Rica, Guatemala, Panama, and Dominican Republic. Our analysis uses tax-benefit microsimulation models based on representative household surveys for each country. Several findings are worth highlighting. On average, the tax-benefit systems in the countries under analysis do not have a significant effect on reducing gender income gaps, except in Guatemala. This finding did not change much in the midst or the aftermath of the pandemic. In Guatemala and Panama, fiscal instruments significantly reduce the gender income gaps at lower deciles of income, mainly government cash transfers targeted to women. In El Salvador and Dominican Republic, other income components seem to have a greater effect in closing the gender gap than fiscal policy, namely, remittances. Differences in labor income are by far the biggest contributor to the gender gap, but employment gaps are also important. Therefore, policies to encourage an inclusive growth, enhance female labor force participation but also the insertion of women in quality jobs and in sectors that are traditionally male dominated, could meaningfully reduce prevailing gender disparities.

JEL codes: J16, D63, J78

Keywords: Tax-benefit microsimulation, Gender inequalities, Central American countries

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1. Introduction

Worldwide, women have made great strides in labor market participation during the last 50 years due to increases in human capital investment, the diversification of their work across economic sectors, among other factors (Goldin, 2006)[2]. Moreover, scholars have studied and empirically tested the positive effects of increasing women's participation in the labor market (UN Women, 2011). Besides, the literature also highlights that greater gender equality is positively correlated with higher per capita Gross National Product across 134 countries around the world (UN Women, 2011). According to McKinsey (2015), closing the labor participation gaps between men and women are equivalent approximately to a 26 percent gain in global GDP. Conversely, incomplete actions to level labor opportunities disempowers women in ways that deprive them of their basic human rights and entails large economic costs not only for them but also for their households and countries (Wodon and Dela Briere, 2018).

Gender differences in wage, participation, and employment levels, as well as in the types of activities remain more evident in developing countries (Klasen, 2018). In Latin America's labor markets, women participate less than men, and when employed, are more likely to be in informal, part-time and lower-productivity, lower-paying jobs, and are underrepresented in managerial and executive positions (Marchionni et al., 2018). In Central America, scholars have studied gender employment gaps (Gasparini and Marchionni, 2017, Tejada et al., 2021) and wage gaps in Costa Rica, Honduras, Nicaragua, El Salvador, Dominican Republic, and Guatemala (Enamorado et al., 2009; and Davila and Pagan, 1999; Navarro, 2015; Ñopo and Gonzales, 2008).

Fiscal policies are known to have the potential to mitigate existing gender income gaps in the region, if well designed. However, the literature of the impact gendered fiscal incidence in Central American countries is, in general, scarce[3]. This paper aims to empirically address the effect of taxes, social insurance contributions and benefits on the gender gap in disposable income for five Central American countries. We estimate the gendered impacts of fiscal policy for El Salvador, Costa Rica, Guatemala, Panamá, and Dominican Republic. We seek to address the following question: to what extent the tax-benefit system in Central American countries contribute to decreasing the gender income gap? Our research makes use of a novel set of tax-benefit microsimulation models based on household surveys and purposedly built for this study. The models cover these five Central American countries for the year 2019 and for a later year for each country to determine if there are differences due to the COVID-19 pandemic. The countries have been chosen considering data availability for the microsimulation models and their regional importance.

Our analysis provides several interesting findings. We find that, on average, the tax-benefit systems in the countries under analysis do not have a (statistically) significant effect on reducing gender income gaps, except in Guatemala. This finding did not change much in the midst or the aftermath of the pandemic. However, averages mask significant differences among fiscal instruments across the income distribution in some countries. In Guatemala and, to a lesser extent, Panama, fiscal instruments significantly reduce the gender income gaps at lower deciles of income, mainly government cash transfers targeted to women. In El Salvador

[2] Authors analyzing reduction in gender gaps in developed countries including Olivetti and Petrongolo (2016) find that increasing female participation and wage gap decreases was mainly a post WW II phenomena, with an acceleration around 1980, and are a result of increases in endowments and changes in skill requirements favoring women.

[3] The gendered effects of Conditional Cash Transfer programs in Chile, Costa Rica, and El Salvador are analyzed by Martinez and Voorend (2012) and Robayo et al. (2023) analyze fiscal policies for gender equity in El Salvador using the CEQ framework (Lustig and Higgins, 2018).

and Dominican Republic, other income components seem to have a greater effect in closing the gender gap than fiscal policy, namely, remittances, consistent with other analyses that find that remittances have a greater effect in reducing inequality and poverty than public policy in Central America. Finally, we introduce a three-way decomposition of the gender income gap to isolate the effect of employment gaps from the other elements. We find that differences in labor income are by far the biggest contributor to the gender gap, but employment gaps are also important. Therefore, policies to encourage an inclusive growth, enhance female labor force participation but also the insertion of women in quality jobs and in sectors that are traditionally male dominated, could meaningfully reduce prevailing gender disparities.

The paper is divided into five sections, including this introduction. The second section presents a review of the literature and recent trends on gender labor and income gaps as well as the effects of tax-benefit systems on gender disparities across the globe. In section three, we present the data and methodology used to identify the effect of fiscal policies on gender income gaps. Section four presents our main results. Section five concludes and discusses some policy implications.

2. Trends of gender gaps in participation, employment, wages, income, and tax-benefit systems

Despite the growing attention to gender disparities in the labor market, especially in developing countries, a comprehensive analysis of other sources of income other than labor is still missing. Moreover, the effect of tax-benefit systems on gender income gaps is still understudied in the literature. In this context, this section: (i) offers a general overview of trends around participation, employment, unemployment, and informality, (ii) summarizes the literature concerning employment disparities, (iii) delves into earnings and income gaps, and (iv) presents a review of the literature on tax and benefit systems and their effects on gender income differences.

Despite significant progress in reducing the gender employment and participation gaps in the last decades, important differences in labor force participation remain between men and women, oscillating between 20pp and 50pp in the LAC and CAPRD regions, as depicted in Figure A1 in the Appendix. Participation gaps in CAPRD range between 20pp in Panama and 45pp in Guatemala. Similarly, the unemployment gap favor lower unemployment rates for men in all CAPRD countries, except El Salvador. Additionally, when women work, they tend to be employed in the informal economy more than men in Costa Rica, El Salvador, and Guatemala. In these countries, female labor informality rate (as defined by ILO) is around 42.6, 69.5 and 78.25 percent, representing a gap favoring men of 10.1, 12.9 and 9.7pp, respectively.

Several studies tried to disentangle the causes, or the factors associated with participation and employment gaps. There is evidence that female labor participation increased in the 1990s explained by changes in education, marriage, fertility, and location, only to slow down in the 2000s (Gasparini and Marchionni, 2017). Central American countries were no exception to this trend but, their progress in closing labor market gaps still lags the LAC region. Female workers in Central America are characterized by higher informality rates than men (Lopez et al., 2021), while the prevalence of non-paid labor activities such as childcare and the lack of schooling opportunities for women might have prevented a higher insertion in the labor market, such as in the case of Costa Rica (Jiménez-Fontana, 2019) and Panama (Arends, 1992a, 1992b), respectively. Consequently, during the pandemic women were 44% more likely to lose their jobs, with high female participation sectors accounting for a significant portion of job losses (Cucagna and Romero, 2021).

Among the factors that can contribute to higher participation in the labor force are education, childcare provision or removing payroll taxes could induce higher female labor force participation (Yang, 1992; Tejada et al., 2021). However, the evidence on the effect of childcare programs is mixed, as reported in Guatemala, where programs for mothers in urban slums increased hours of work but not labor participation (Hallman et al., 2005).

Participation and employment gaps have led to persistent wage disparities, which seem to have decreased over time due to higher endowments of females in the workforce (Weichselbaumer and Winter-Ebmer, 2005). Gender wage differentials are far from being consistent across studies, depending on the country, source of information and the horizon of the analysis. Wage gaps estimated in different studies are reported in Table A.1 in the Appendix. Recent studies point out to an hourly wage gender gap between 5% and 48% in CAPRD (Urquidi and Chalup, 2021). Wage differentials tend to be associated with the sector of occupation, the type of employment (formal, informal, self-employed, among others), numbers of hours worked, civil status, the location in the income distribution (Enamorado et al, 2009), the economic and political context (Davila and Pagán, 2002) and unobservable factors linked in some cases to cultural and behavioral attributes, and discrimination factors that result in women receive lower payments for the same work performed (Yang, 1992; Gindling, 1992, Cedeño, González and Pizarro, 2015, Urquidi and Chalup, 2021; and Torres and Zaclicever, 2022).

Because of the prevailing gender income gaps, fiscal policy efforts through taxes and benefits are important to address disparities. Some exercises have been conducted to explore whether the tax and benefit systems help decrease gender gaps, focused on Europe (Avram and Popova, 2022; Doorley and Keane, 2023), Latin America (Dondo et al.,2024), as well as in Costa Rica, Chile, and El Salvador (Martínez and Voorend, 2012; Robayo et al., 2023; Alvarez, 2019). Many of these studies use microsimulation techniques and different income definitions to investigate how taxes and transfers impact the incomes of men and women.

The general finding in European countries is that on average, the gender gap in disposable income is lower than the gender gap in market income, meaning that the tax benefit system has a positive and significant effect in reducing gender income disparities. On the opposite side, in Latin America, differences are not statistically significant. Only in some countries benefits do reduce gender income disparities for those at the bottom of the distribution, mainly through the effect of social assistance benefits received by mothers in poor households. In fact, Condition Cash Transfer (CCT) programs in a select group of LAC countries seem to temporarily alleviate some of the effects in poverty, given that the support is often targeted to mothers (Martínez and Voorend, 2012). In terms of taxation, the high informality rate in LAC countries significantly reduces the ability of the tax system to act progressively and reduce gender gaps; actually, in some countries the VAT system is found to introduce implicit gender biases, as do not allow for differentiated rates on essential goods for women (Alvarez, 2019). Other studies focus on poverty gender gaps pre- and post-tax benefit system, finding that female-breadwinner households are negatively affected by fiscal policies, such as in the case of El Salvador (Robayo et al., 2023).

3. Data and methodology

In this section, we start by describing the data that serves as input for the tax-benefit microsimulation models with a special focus on income variables. Next, in Section 3.2 we briefly describe the tax-benefit modelling. Lastly, on Section 3.3 we present the decomposition techniques employed in the analysis.

3.1 Data

Our analysis uses official household survey data representative at the national level in each country under analysis. The data contain information about dwellings, households, and their members such as age, gender, education, location (e.g., province or region). More importantly, the surveys contain detailed labor market and income information, such as the type of work, industry, weekly hours of work, labor earnings from employment or self-employment, non-labor income, pensions, government cash transfers and other transfers to households. Table 1 provides information about the surveys used in the analysis.

Table 1. Data sources and microsimulation models

Country	Data Source	Year	Number of individuals	Number of households	Microsimulation model
Costa Rica	Encuesta Nacional de Hogares	2019	34,863	11,006	CRIMOD
		2022	31,012	10,336	
El Salvador	Encuesta de Hogares de Propósitos Múltiples	2019	74,448	21,331	SALVAMOD
		2021	64,524	19,627	
Guatemala	Encuesta Nacional de Empleo e Ingresos	2019	45,704	10,735	GUAMOD
		2021	24,319	5,790	
Panamá	Encuesta de Propósitos Múltiples	2019	42,925	12,031	PANAMOD
		2022	40,318	11,776	
Dominican Republic	Encuesta Nacional Continua de Fuerza de Trabajo	2019	20,965	6,764	DOMINMOD
		2020	17,314	5,793	

Source: Own elaboration

The analysis focuses on data covering 2019. Key results are also presented for a post-COVID year (2020, 2021 or 2022 depending on data-availability in each country) to explore changes that might have occurred due to the pandemic.

Departing from the traditional wage gap analysis to focus on a disposable income gender gap, the sample population analyzed is composed of all man and women aged 18 or more regardless of their labor market status (unless otherwise stated). Therefore, our gender income gap estimates differ from those in the gender wage gap literature in the sense that we do not condition on salaried work (i.e., self-employed workers and individuals out of work are also considered). The purpose of this approach is to be able to isolate the effect of the differences in employment levels and differences in income levels, as detailed later in this section. This decomposition is relevant from a policy perspective.

3.2 Tax-benefit Microsimulation

To analyze the potential of taxes and benefits in reducing the gender income gap, we use purposedly built harmonized tax-benefit microsimulation models for the five countries under study. The models have been implemented in the EUROMOD software and follow a series of

common protocols for data harmonization and policy simulations to allow cross-country comparability (Sutherland and Figari 2013, Decoster et al. 2019, UNU-WIDER, 2021).[4]

Formally, tax-benefit microsimulation models represent arithmetic functions that transform individual market income, i.e., labor (ω_i) and non-labor (μ_i), into disposable income (Y_i) by simulating, for each individual in the data, tax liabilities T_I and benefit entitlements I following equation 1 below:

$$Y_i = I_i + \mu_i + B_i(X_i) - T_I(I, I_i, X_i), \quad (1)$$

Labor income, ω_i, is taken directly from the data and is made of earnings from employment and self-employment as well as any work-related bonuses and in-kind benefits. Non-labor income, μ_i, is also taken from the data and includes property and investment income, private pensions, private transfers, and remittances.

Benefits, $I(X_i)$, are made of two components: contributory public pensions and government cash transfers. Contributory pensions are taken directly from the data as they cannot be simulated due to the lack of information on contribution histories in the surveys. Government cash transfers include the main cash transfer programs in each country: *régimen no contributivos de pensiones* and *Avancemos/Crecemos* in Costa Rica; *Pensión Básica Universal, Bono Comunidades Solidarias* and *Asignación Familiar (Estrategia de Erradicación de la Pobreza)* in El Salvador; *Aporte Económico del Adulto Mayor, Bono Social, Bolsa Social* and *Beca Escolar* in Guatemala; *Programa 120 a los 65, Red de Oportunidades* and *Programa Angel Guardián* in Panama; *Pensiones Solidarias del Régimen Subsidiado, Supérate-Aliméntate, Supérate-Bono Gas* and *Bono Incentivo a la Asistencia Escolar* in the Dominican Republic.[5] In all countries under study, these government transfers are proxy means-tested, that is, eligibility for cash transfers does not depend directly on income but instead on a welfare index is based on characteristics of the dwelling and the household, X_i. In our simulations, we replicate the welfare index, based on the information available in the data, to assess eligibility to the benefits. For this, we follow as close as possible the criteria for eligibility according to the rules of each program.

Direct taxes, $T_I(I, I_i, X_i)$, include employee and self-employed social insurance contributions and personal income tax and depend on labor and non-labor income in addition to personal characteristics. To account for the presence of informal employment in the countries under analysis, we simulate social insurance contributions and personal income tax only for workers in formal employment, which we define as affiliation to social security as reported in the survey. It is important to bear in mind that our simulations of social insurance contributions and personal income tax rely on the information of labor income reported in the data. In this sense, our simulations might underestimate the incidence of this instruments due to the problems of top income under-coverage affecting household surveys (Burkhauser et al., 2012; Blanchet et al., 2022).

In our analysis, we measure individual disposable income by allocating different income sources among individuals in the household, following Dondo et al. (2024). Earnings and other

[4] EUROMOD is a software and a set of rules for modelling taxes and transfers based in household microdata. It was originally designed for the countries of the European Union and is financed by the European Commission. More recently, the EUROMOD platform has been used to create tax-benefit models for several Latin American countries (see Jara et al. 2023, Dondo et al. 2024).

[5] Some components of certain cash transfer programs could not be simulated due to the lack of information in the data to model eligibility. This was the case for some components of the *Supérate* program in Dominican Republic.

components of market income (e.g., property and capital income), as well as individual-level cash transfers (e.g., contributory, and non-contributory pensions), where entitlement is defined at the individual level, are assigned to the person reporting it in the data. Social insurance contributions and personal income tax are assessed at the individual level according to the legislation in the countries under study. Therefore, we assign these liabilities to each individual in the household who is subject to pay them according to the simulations. Finally, cash transfers assessed at the household level are paid to mothers if the legislation stipulates so. Otherwise, they are split equally among all household members. Table A2 in the appendix provides information on which cash transfers are paid to mothers.

3.3 Gender income gap decompositions

Throughout the document we use several gender income gap decompositions. First, we measure the contribution of each income component to the raw disposable income gender gap. Then, to differentiate the contribution of differences in endowments (explained gap) and non-observables (unexplained gap) to the raw disposable income gender gap, we use the traditional Oaxac– (1973) - Blinder (1973) decomposition. For robustness, we also apply the decomposition proposed by Ñopo and Gonzales (2008), which details can be found in the Appendix. Finally, to differentiate between the contribution of employment and income differences by gender we use a modified version of the decomposition proposed by Doorley y Keane (2023). We now turn to the mechanics of each decomposition.

Decomposition between income components

We begin with the disposable income definition of Equation 1 but for each gender (g): female (f) and males (m). In this case we have:

$$Y_i^g = \omega_i^g + \mu_i^g + B_i^g - T_i^g \text{ with } g = f, m \tag{2}$$

Averaging over all observations within each gender we have:

$$\overline{Y}_g = \overline{\omega}_g + \overline{\mu}_g + \overline{B}_g - \overline{T}_g \text{ with } g = f, m \tag{3}$$

Taking differences between the equation for males and for females we have:

$$\overline{Y}_m - \overline{Y}_f = (\overline{\omega}_m - \overline{\omega}_f) + (\overline{\mu}_m - \overline{\mu}_f) + (\overline{B}_m - \overline{B}_f) - (\overline{T}_m - \overline{T}_f) \tag{4}$$

Dividing both sides by $\overline{Y}_m$ we have the decomposition of the raw gender disposable income gap into its income components:

$$1 - \frac{\overline{Y}_f}{\overline{Y}_m} = \underbrace{\frac{\overline{\omega}_m - \overline{\omega}_f}{\overline{Y}_m}}_{\text{Earnings}} + \underbrace{\frac{\overline{\mu}_m - \overline{\mu}_f}{\overline{Y}_m}}_{\text{Non-labor}} + \underbrace{\frac{\overline{B}_m - \overline{B}_f}{\overline{Y}_m}}_{\text{Benefits}} - \underbrace{\frac{\overline{T}_m - \overline{T}_f}{\overline{Y}_m}}_{\text{Taxes}} \tag{5}$$

For our analysis, we further decompose benefits into pension and other benefits and taxes between social insurance contributions and income taxes.

Decomposition between endowments and other factors

Following Oaxaca (1973) and Blinder (1973) we start by defining the mean gender gap in terms of two OLS regressions evaluated at the mean of outcome and regressors, one for males (m) and one for females (f):

$$\overline{y}_m - \overline{y}_f = \hat{\beta}_m \overline{X}_m - \hat{\beta}_f \overline{X}_f \tag{6}$$

Where $\bar{y}_i$ is the mean of an income definition (disposable, market, earnings etc.) for group I and $\hat{\beta}_i$ is a vector of coefficients obtained from a regression of income on a vector of characteristics X_I for group i, the variables in this vector are presented below. Adding and subtracting the counterfactual mean income for females assuming their endowments are paid at the same rate as males ($\hat{\beta}_m X_f$) and rearranging we obtain the typical two-fold Oaxaca decomposition:

$$\bar{y}_m - \bar{y}_f = \underbrace{(\bar{X}_m - \bar{X}_f)\hat{\beta}_m}_{\text{Explained}} + \underbrace{(\hat{\beta}_m - \hat{\beta}_f)\bar{X}_f}_{\text{Unexplained}} \quad (7)$$

Where the explained part corresponds to differences in characteristics between males and females valued at males' returns, while the unexplained part corresponds to differences in the returns between males and females applied to females' characteristics.

For our analysis we express the gap as a percentage of males' incomes, thus dividing both sides by $\bar{y}_m$ we obtain:

$$1 - \frac{\bar{y}_f}{\bar{y}_m} = \underbrace{\frac{(\bar{X}_m - \bar{X}_f)\hat{\beta}_m}{\bar{y}_m}}_{\text{Explained}} + \underbrace{\frac{(\hat{\beta}_m - \hat{\beta}_f)\bar{X}_f}{\bar{y}_m}}_{\text{Unexplained}} \quad (8)$$

Decomposition between the contributions of employment and income differences

We aim to evaluate how much of the gender income gap of people aged 18 and more corresponds to differences in employment rates between males and females, and how much corresponds to differences in remunerations conditional on being employed. For this we create a counterfactual average income for women $\bar{y}_f^c$ if there were no employment gaps, that is, if there are the same proportion of men and women working, but earnings for women entering employment are similar to women already working. For this we proceed as follows:

1) We create groups/cells of men and women of similar characteristics in terms of education, age, and region.
2) We compute the total number of workers by gender in each possible group/cell.
3) If the number of women working in each group/cell is below the number of men working, we randomly move women not working to work until the two genders have the same number of workers within each group/cell.
4) Within each group/cell we divide the working women population in four additional subgroups: formal employees, informal employees, formal self-employed and informal self-employed.
5) The women transitioning to work in each group/cell are split at random between these four categories in the same proportions as observed for the working women.
6) The counterfactual labor earnings of the women transitioning to work is computed as the mean earnings of the women observed working within each group and subgroup.

The differences in average income between genders could then be decomposed into the contribution of differences in incomes and the contribution of differences in employment rates by adding and subtracting $\bar{y}_f^c$, as depicted in Equation 9.

$$\bar{y}_m - \bar{y}_f = \underbrace{\bar{y}_m - \bar{y}_f^c}_{\text{Dif in Income}} + \underbrace{\bar{y}_f^c - \bar{y}_f}_{\text{Dif in Employment}} \quad (9)$$

Following the other decompositions, we express the gap as a percentage of males' incomes, thus we divide both sides of Equation 9 by $\bar{y}_m$:

$$1 - \frac{\bar{y}_f}{\bar{y}_m} = \underbrace{\frac{\bar{y}_m - \bar{y}_f^c}{\bar{y}_m}}_{\text{Dif in Income}} + \underbrace{\frac{\bar{y}_f^c - \bar{y}_f}{\bar{y}_m}}_{\text{Dif in Employment}} \quad (10)$$

A three-way decomposition of the disposable income raw gender gap

We could further decompose the disposable income raw gender gap combining the three proposed decompositions as follows. Starting from Equation 4 we further divide the earnings gap ($\bar{\omega}_m - \bar{\omega}_f$) between an employment and an income component following section 3.3.3. To do so, suppose that $\bar{\omega}_f^e$ is the counterfactual labor earnings of all women aged 18 and more if we close the gender employment gap, that is, the same proportion of women and men are employed in the labor market. Adding and subtracting this component we have:

$$\bar{Y}_m - \bar{Y}_f = (\bar{\omega}_m - \bar{\omega}_f^e) + (\bar{\omega}_f^e - \bar{\omega}_f) + (\bar{\mu}_m - \bar{\mu}_f) + (\bar{B}_m - \bar{B}_f) - (\bar{T}_m - \bar{T}_f) \quad (11)$$

The component $\bar{\omega}_f^e - \bar{\omega}_f$ represents the contribution of differences in employment rates to the gender earnings gap. On the other hand, the component $\bar{\omega}_m - \bar{\omega}_f^e$ represents the contribution of differences in labor remuneration to the earnings gender gap assuming the same employment rates between men and women.

We additionally decompose this second term into an explained gap (differences in endowments) and an unexplained gap (differences in returns to the same endowments) using the Oaxaca-Blinder or the Ñopo decompositions. Let's assume an Oaxaca-type decomposition for which we define the counterfactual term $\bar{\omega}_f^i = \bar{X}_f \hat{\beta}_m$ as the counterfactual labor earnings of women if their endowments were paid at the same level as men. Notice that at this step we are decomposing the earnings differences between males and counterfactual women (i.e. $\bar{\omega}_m - \bar{\omega}_f^e$), the $\bar{\omega}_f^i$ is thus computed for those women observed but also simulated in employment. The decompositions use as regressors dummies for education, age groups and geographical location. Adding and subtracting this term from Equation 11 and rearranging, we have:

$$\bar{Y}_m - \bar{Y}_f = (\bar{\omega}_m - \bar{\omega}_f^i) + (\bar{\omega}_f^i - \bar{\omega}_f^e) + (\bar{\omega}_f^e - \bar{\omega}_f) + (\bar{\mu}_m - \bar{\mu}_f) + (\bar{B}_m - \bar{B}_f) - (\bar{T}_m - \bar{T}_f) \quad (12)$$

Following the other decompositions, we express the gap as a percentage of males' disposable income, thus we divide both sides of Equation 12 by $\bar{Y}_m$:

$$1 - \frac{\bar{Y}_f}{\bar{Y}_m} = \underbrace{\frac{\bar{\omega}_m - \bar{\omega}_f^i}{\bar{Y}_m}}_{\text{Explained}} + \underbrace{\frac{\bar{\omega}_f^i - \bar{\omega}_f^e}{\bar{Y}_m}}_{\text{Unexplained}} + \underbrace{\frac{\bar{\omega}_f^e - \bar{\omega}_f}{\bar{Y}_m}}_{\text{Employment}} + \underbrace{\frac{\bar{\mu}_m - \bar{\mu}_f}{\bar{Y}_m}}_{\text{Non-labor}} + \underbrace{\frac{\bar{B}_m - \bar{B}_f}{\bar{Y}_m}}_{\text{Benefits}} - \underbrace{\frac{\bar{T}_m - \bar{T}_f}{\bar{Y}_m}}_{\text{Taxes}} \quad (13)$$

4. Results

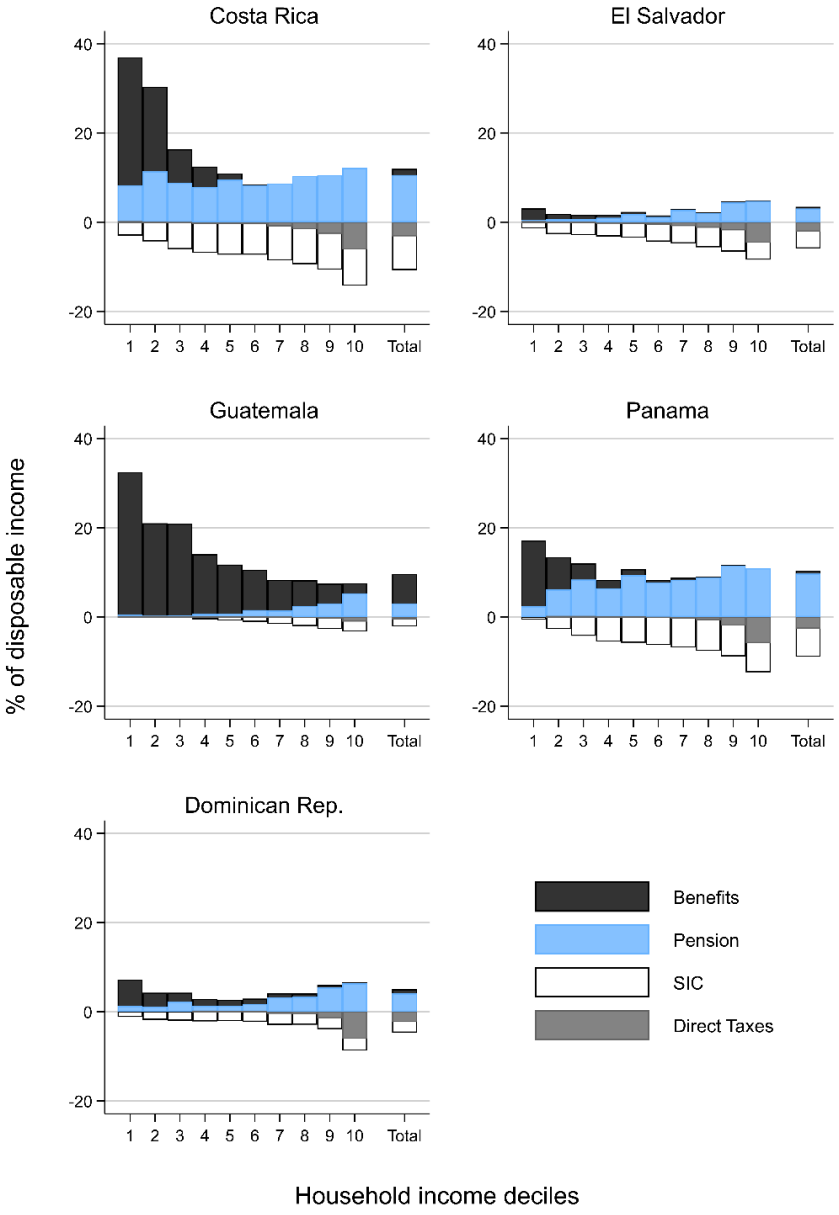
4.1 Relative size of tax-benefit components

Figure 1 presents the components of the tax-benefit system as a percentage of disposable income for each country in 2019. The results are divided by deciles of per capita household disposable income. Negative bars indicate that the components are subtracted for the calculation of disposable income.

The figure shows heterogeneity in the relative size of tax-benefit instruments across countries. In all cases, government cash transfers (excluding contributory pensions) are targeted at the bottom of distribution (black bars). However, their relative size varies widely, representing around 30 percent of household disposable income in Costa Rica and Guatemala in the first decile, but less than 5 percent in El Salvador. The relative size of contributory pensions (light blue) exceeds, on average, that of cash transfers in all countries, except Guatemala. However, the relative importance of pensions increases with income. The latter is due to the formal-informal divide characterizing labor markets in the region, and the fact that pensions depend on past contributions to social security, i.e., current pensioners are those that were formal workers during their working life.

In the case of social contributions (SIC in the graph), they mostly increase with income because formal workers, that is, those who contribute to social security, typically have higher earnings and are in the upper part of the distribution. Finally, income taxes affect only the top of the distribution (last three deciles) and even in the case of Costa Rica, the most redistributive country, they represent only 5% of disposable income for the last decile. The limited incidence of income taxes is also a feature of other Latin American countries and is related to the high exempted tax thresholds and the presence of generous deductions (Jara et al. 2023).

Figure 1. Relative size of tax-benefit components by income deciles, 2019



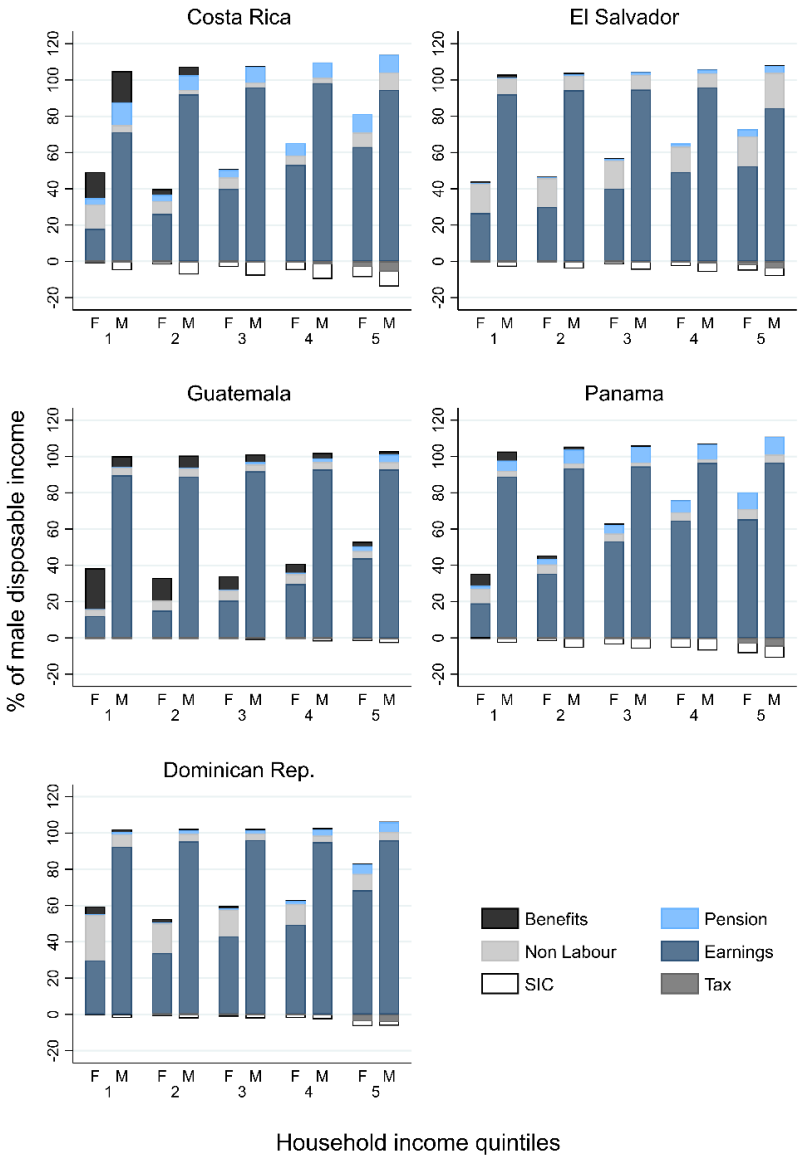
Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation model, population aged 18 and more

The composition of household disposable income (including earnings, non-labor income and tax-benefit components) by gender and income quintiles is presented in Figure 2. Income quintiles are based on per-capita household disposable income.[6] Each bar represents the mean share of the income component relative to the mean disposable income for men in that quintile. Dividing each component by the mean disposable income of males allows us to analyze the gap and at the same time the income components' distribution inside disposable income. As before, taxes and social insurance contributions are shown as negative bars. The

[6] We opt for using household per-capita income quintiles because using individual income quintiles would overrepresent women at the bottom of the income distribution. We find that within each per-capita household income quintile women and men are more equally distributed.

total height of male's bars (considering taxes are negative) is 100%. For women, the height of the bar represents the ratio of their mean disposable income relative to mean disposable income for men in that quintile.

Figure 2. Income components by gender and household income quintiles, 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation model. Note: Population aged 18 and more, M=Male F=Female

We find that, in every country and in every income quintile, disposable income for women is lower than for men. However, as we move up on the income distribution, the ratio of female to male disposable income increases (i.e., the income gap reduces). Women's disposable income ranges from 35% of male's disposable income in the first quintile in Panama to 80% of male's disposable income in the last quintile in Costa Rica. We also find that the contribution of earnings to disposable income is lower for women than for men across the income distribution, and especially so in the first quintiles. The gender income differential is partially mitigated by other income sources, such as non-labor income, government benefits, and to lesser extent, pension payments. However, the higher we move in the income distribution the

higher the contribution of earnings to disposable income for women. For instance, in Costa Rica and Panama women's earnings as a share of male's disposable income moves from 17.9% and 19.8% respectively in the first income quintile to 63.1% and 62.5% respectively for the last quintile.

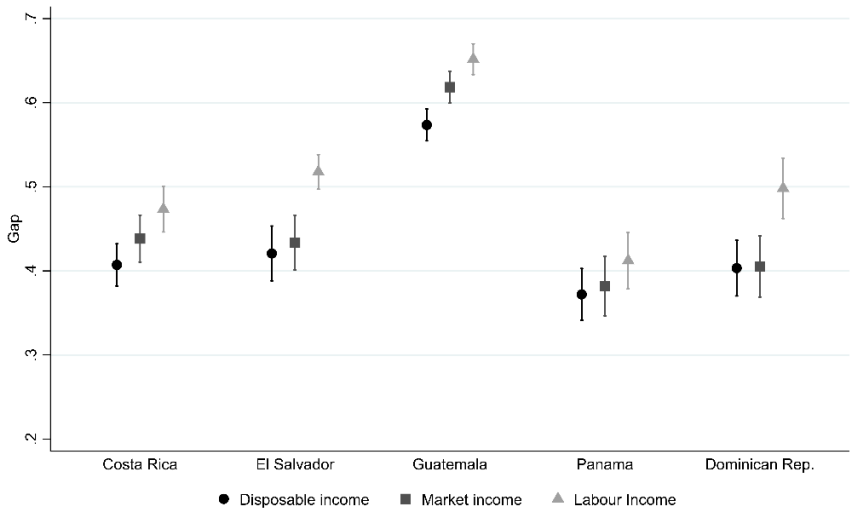
It worth noticing that at the bottom of the distribution, non-labor income represents a bigger share of disposable income for women than for men. Remittances seem to support women's income to an important extent in the poorest quintiles in Guatemala, El Salvador, and Dominican Republic. In countries such as El Salvador and Guatemala almost half of the contribution of non-labor income is represented remittances declared to be received by women.

In terms of fiscal instruments, in Costa Rica, Guatemala, and to some extent Panama and Dominican Republic, cash transfers also represent a larger share of disposable income for women compared to men, which might be related to transfers being targeted to mothers. The share of social insurance contributions is smaller for women than men, partly because of the higher prevalence of informal employment among women. This feature would tend to decrease the disposable income gender gap. However, for both genders, and for all countries, social insurance contributions are no larger than 5% of disposable income. Finally, income taxes have a higher incidence among men but they their size is small overall and affects mostly those in the top quintile.

4.2 Raw gender gaps in incomes and the effect of fiscal instruments

Figure 3 presents raw gender gaps in incomes for 2019. Gaps are defined as on the left-hand side of Equation 5; that is, the difference in mean income between males and females as a percentage of mean income for males. The gaps are computed for the population aged 18 and more. The figure considers three income definitions, labor income (including wages, self-employed earnings, and any other labor related income such as bonuses or extra pays), market income (which includes labor and non-labor income such as income from house property, dividends, or private transfers such as remittances) and disposable income as defined in Equation 6. For each income definition we also present a 95% confidence interval to better understand the uncertainty surrounding the point-estimate.

Figure 3. Raw Income gender gaps 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation model. Note: Population aged 18 and more. 95% confidence intervals.

We observe that there is a sizeable gender income gap regardless of income definition. The gap is between 35% and 55% for all countries except Guatemala, where it is above 60% (except in the case of disposable income). Of note, we observe that when we move from labor income to market income the gap is reduced for each country. This difference is statistically significant for El Salvador, and Dominican Republic, potentially due to the role of remittances in supporting women's income in these countries. Moreover, when we move from market income to disposable income the gender gap is also reduced in each country, albeit the difference is statistically significant only in Guatemala. This implies that cash transfers, pensions, social insurance contributions and taxes reduce income differences between genders, but not significantly, as opposed to the evidence for European countries (Fuenmayor et al., 2020; or Avram and Popova, 2022). In Guatemala, fiscal policy instruments reduce the gender disposable income gap in 4.5pp, while in the rest of countries the reduction is less than 3pp.

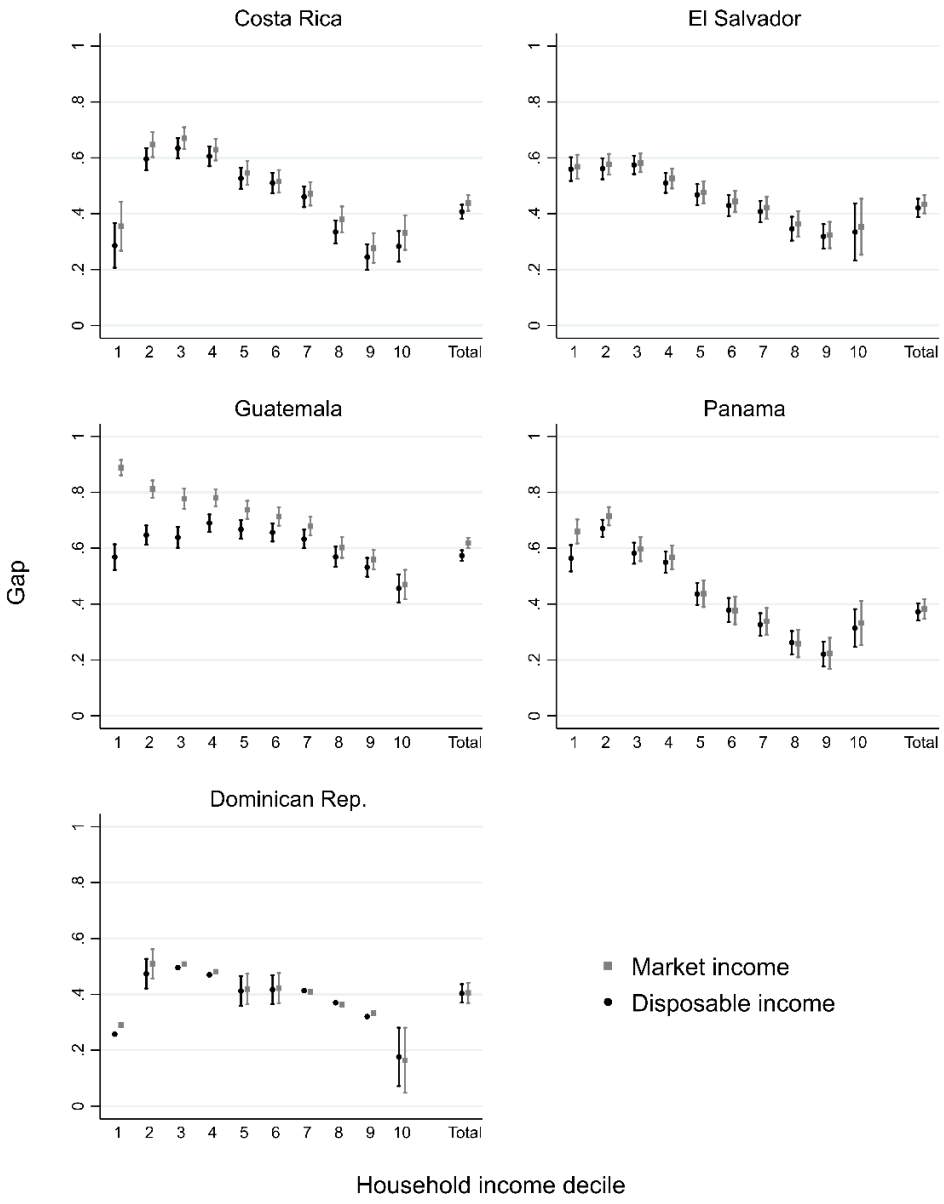
Raw income gaps by income deciles

While fiscal instruments have, on average, a non-significant effect on the raw gap across countries and the income distribution, differences across the income distribution are worth highlighting. Figure 4 presents the same results by household disposable income deciles. We observe that only at the very bottom of the income distribution in Guatemala and, to lesser extent, Panama and Dominican Republic, there is a statistically significant difference between the gap in market income and the gap in disposable income. For all other income deciles, and the rest of the countries, differences are not statistically significant. As we will see, the results for some countries and deciles arise because women are typically the recipients of the cash transfer intended for other household members as depicted in Table A2 in the Appendix, but also probably because female headed households are recipients of cash transfers and are at the bottom of the income distribution.[7] The case of Guatemala is particularly interesting because the cash transfer Bono Social allows to reduce significantly the large gap in market incomes at the bottom of the distribution.

For Costa Rica, Panama, and Guatemala (in the case of disposable income) we observe an inverse-u shaped pattern of the gap and income deciles, meaning that the gap is lower at the bottom of the income distribution, then it increases and later it drops again. For the other countries the gap is almost always decreasing on disposable income, except for some countries at the top decile. This behavior could be explained by education: educated people are typically at the top of the income distribution and the gender gap is lower for them because of narrower labor income differences (we return to this education result later).

[7] For example, in Panama the cash transfer program *Red de Oportunidades* is observed to be paid largely to women according to the survey, in which case, we have also allocated the transfer to women in our simulations although there is no clear reference to priority payment to women in the legislation. The same applies to school attendance programmes in Dominican Republic, which are part of *Supérate* and to Bono Social in Guatemala.

Figure 4. Raw Income gender gaps by household income decile 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation model: Note: population aged 18 and more. 95% confidence intervals. In some cases, it is not possible to estimate the standard error of the ratio.

Raw income gaps by population subgroups

We now turn to the discussion of results by some demographic groups for which tables and figures are shown in the Appendix. Table A3 presents the gender income gap with a breakdown between urban-rural areas and for market and disposable income. The gender gaps in disposable and market income are always higher in rural areas than in urban areas, regardless of country. The difference between areas is in most cases statistically significant. For instance, women in rural areas face a disposable income gap above 50% in all countries, while in urban areas the figure is below 40% in all countries except in Guatemala where this

gap reaches 56.6%[8]. Lastly, within urban or within rural areas there are no statistically significant differences between gender gaps in market income and gender gaps in disposable income, confirming a marginal effect of fiscal policy instruments in both areas.

Figure A2 in the appendix presents income gaps considering whether the person aged 18 or more finished any formal post-secondary education (i.e., is qualified) or not. As expected, the gender income gap is always larger for those without qualifications than for those with qualifications, regardless of country or income concept analyzed[9]. For those with qualifications, the income gender gap is between 20% and 45% percent in all countries. For those without qualifications the gender income gaps are always above 45% and in some cases such as Guatemala, above 60%. Again, the gender income gap in disposable income is almost always lower than the income gap in market income (except for qualified people in Dominican Republic) although, the differences are not statistically significant (except for non-qualified people in Costa Rica and Guatemala).

We also notice the difference between market and disposable income gaps is higher for people without qualifications than for people with qualifications: for those with qualifications the disposable income gap is no more than 5pp below the market income gap. Finally, we observe a much higher dispersion of income gaps for those with qualifications, relative to those without qualifications. For instance, the 95% confidence interval is never higher than 5pp for those without qualifications while is above 5pp and in some cases close to 10pp for those with qualifications. This could be a result of a higher variance of labor incomes for those with qualifications relative to those without qualifications as it is typically found in the literature, but also because the former group has fewer observations and fewer individuals at the population level.

Lastly, in Figure A3 we present market and disposable income gender gaps for workers only, and for the employment groups resulting from dividing the worker population between employment and self-employment status and between formal and informal. For the latter, we define a formal worker as contributing to social insurance. Conditioning on employment status, the gaps ranges between 5% for Guatemala to 19% in Dominican Republic. We also observe that formal employees have the lowest gender gap in market and disposable income in all countries but Guatemala, ranging from -8% for formal self-employed workers in Guatemala to 25% in Dominican Republic. Informal workers face positive gender gaps ranging from 5% for employees to 55% for self-employed workers in Panama. As with previous results, we do not find statistically significant effects of fiscal instrument in gender income gaps in any type of employment.

4.3 Decomposition of gender gaps in incomes

Figure 5 presents the decomposition of the disposable income gender gap into its income components following Equation 5. We present the results at different deciles of the household per capita disposable income distribution.

As expected, the biggest positive contributor to the disposable income gender gap is labor income. In each country and at each quintile, it represents the most important component,

[8] Our results are in line with Enamorado et al. (2009) who found that the difference in wages between men and women in rural areas of Costa Rica, Honduras, and Nicaragua is greater than the difference in wages between men and women at the national level, even after accounting for factors such as education, experience, and occupation. However, the results differ from Urquidi and Chalup (2021), where the difference in hourly earnings between men and women in Costa Rica is greater in urban areas than in rural areas. In fact, in rural areas, women may even earn more than men.

[9] This result is statistically significant and in line with Gonzalez (2008) and Arends (1992b).

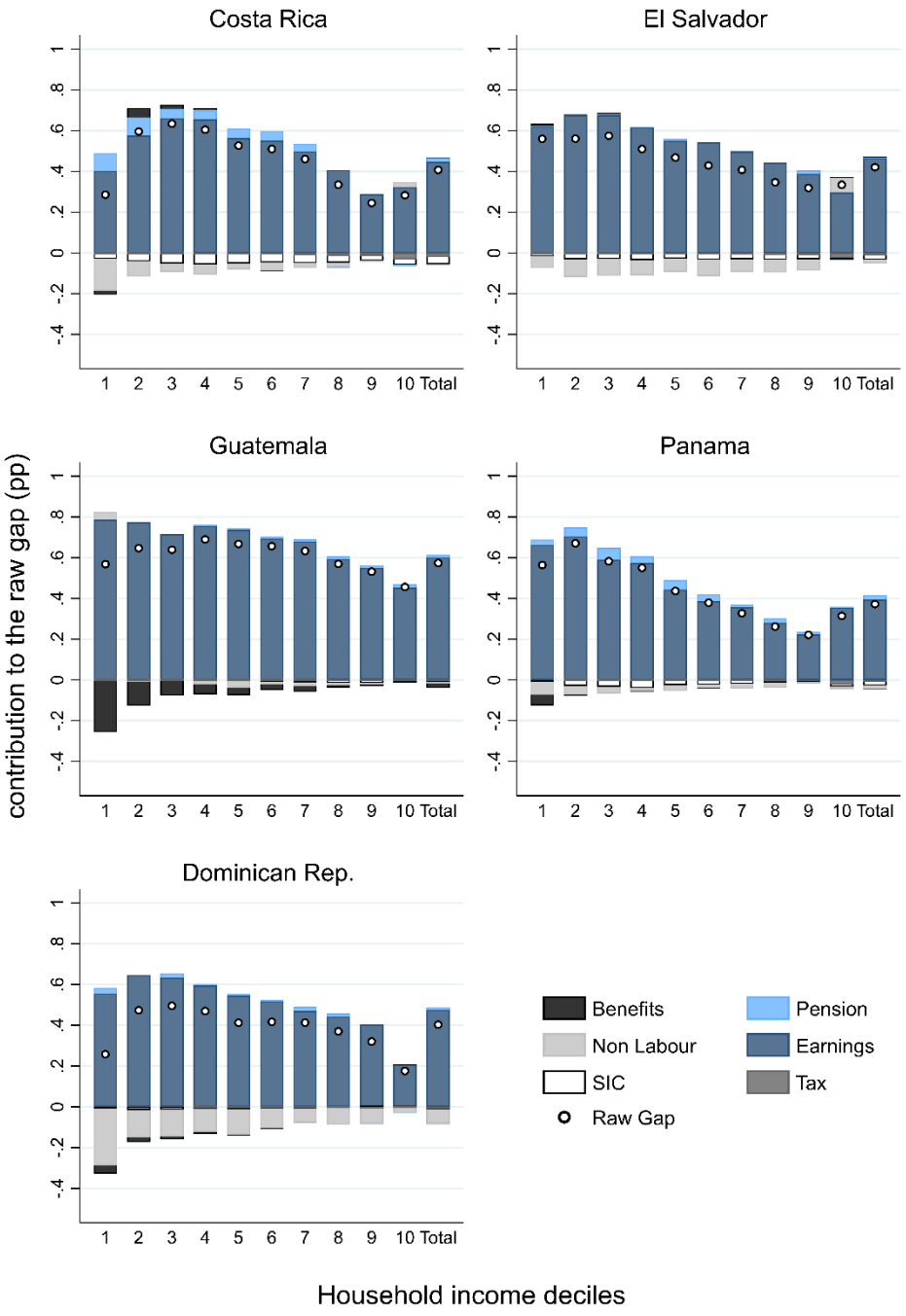
followed from a distance by non-labor income. Regarding the latter, it typically reduces the disposable income gap in every country and for most deciles, although at different magnitudes -with higher incidence at the lower deciles. Non-labor income includes remittances in some countries. We observe that remittances contribute with 5.4pp, 2.7pp and 2pp, in the reduction in the disposable income gender gap in El Salvador, Dominican Republic and Guatemala respectively.

Taxes and social insurance contribution decrease the disposable income gender gap. This is because these two payments are usually based on labor income, component that is higher for males. The effect of the latter is about 1.9pp, 2.2pp and 3.8pp, for Panama, El Salvador, and Costa Rica respectively, and relatively smaller for Guatemala and Dominican Republic (less than 1pp). The particularly low effect of taxes is attributed to the reduced weight of personal income taxes in Central America, and in LAC in general, relative to advanced countries[10], while the participation of social insurance contributions is associated to the levels of informality, which range from 24.5% in Costa Rica to 83.4% in Guatemala in 2022[11]. Pensions payments are gender gap increasing in all countries and at most places of the income distribution. This result is in line with Avram and Popova (2022) for Europe. The effect of government cash transfers (benefits) depends on the country. For instance, benefits reduce the disposable income gender gap at the bottom of the income distribution in Costa Rica, Panama, Dominican Republic and particularly so in Guatemala. In these case, governmental transfers reduce in one third the labor income gap in the first decile of income, and 15% in the second decile. However, on average, the contribution of fiscal instruments is small, being no larger than 5pp in most countries or deciles.

[10] Personal income tax represented one third or less of total tax revenues in Dominican Republic, El Salvador, Guatemala, Costa Rica, and Panama, and about 40% in advanced economies.

[11] Source: Household Surveys harmonized by the Interamerican Development Bank (IDB).

Figure 5. Decomposition of the raw gap between income components 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more. Components with positive bars increase the raw disposable income gap, while components with negative gaps decrease it. The white dots represent the raw gap which by construction is equal to the total height of the bar (considering the negative values).

Figure 6 presents the three-way decomposition of the disposable income gender gap. Panel A decomposes the contribution of labor earnings into the employment, explained and unexplained effects as described in Equation 13. It also presents the contribution of non-labor income, and for simplicity it collapses the (net) effect of the tax and benefit system. Panel B presents the contribution of each element of the tax and benefit system: pensions, benefits, taxes, and social insurance contributions. The estimated coefficients for the OLS regressions in the Oaxaca[12] decomposition is presented in Table A4 in the Appendix. The gaps and decomposition are computed for people aged 18 or over.

Panel A shows the total gap (white circle) which is around 40% for all countries except Guatemala where it is around 60%, as mentioned before. The contribution of the explained component (light blue bars) -the differences in endowments between males and women (simulated and observed)- to the overall gap is positive, indicating that endowments are on average higher for men than for women but varies considerably across countries. It ranges from 10.3pp in Panama and 30.1pp Guatemala, accounting for 40% of the gap on average. Regarding the unexplained component of the wage gap (gray bars), it is always positive and ranges from 7.9pp and 25.4pp in Guatemala and Dominican Republic respectively. Such unexplained component can be attributed to a partial consideration of observed factors, the role of unobserved factors, such as behavioral attitudes towards work, and popular in the literature, labor discrimination (Averkamp, Bredemeier and Juessen, 2020). Importantly, the gender income gap attributed to differences in employment rates (dark blue bars) is positive and between 10pp and 20pp, or 35% on average of the disposable gender income differential. which confirms that reducing mainly labor force participation gaps and employment gender differences will mitigate the labor earnings gap[13]. The contribution of this component is conditional on the assumptions of the exercise. Given that the counterfactual scenario assumes that women enter work at the same employment structure and wages of women currently at work, these figures can be considered a lower bound of the contribution of closing the participation and employment gender gaps.

The contribution of non-labor income (black bars) and tax-benefit components (white bars) is smaller. Non-labor income always reduces the gender income gap with the highest effect being for Dominican Republic (7.2pp decrease). The tax and benefit system reduced the gap between 0.7pp and 3.5pp in Panama and Costa Rica, respectively.

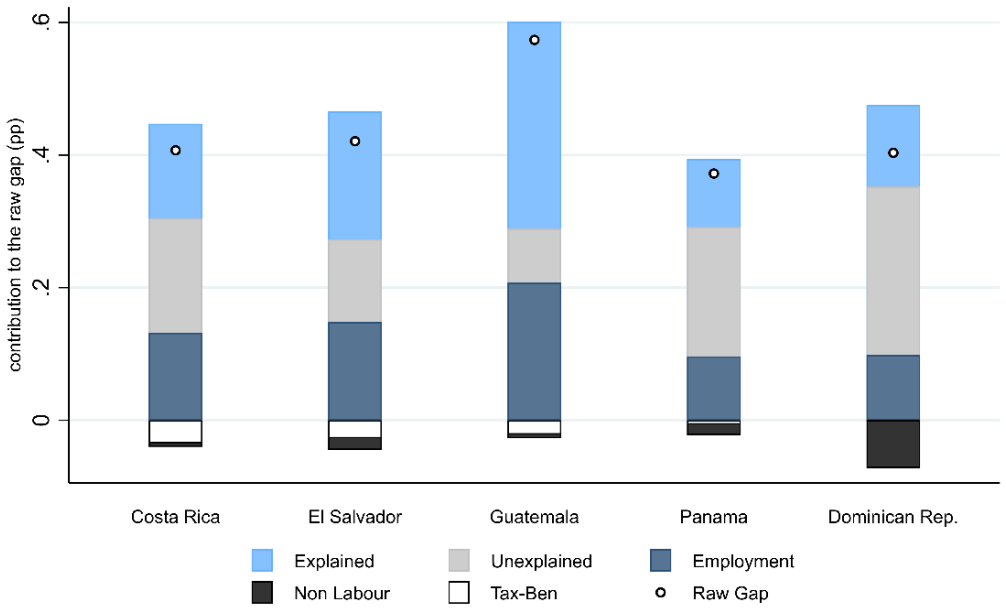
Panel B presents the contribution of each tax and benefit component. We observe that pensions (blue bars) always increase the gender gap, but the effect is always below 3 pp in any case. Government cash transfers (gray bars) reduce the disposable income gender gap in Dominican Republic, Panama, and particularly Guatemala (by 2.1 pp), whereas they increase income gender gap by less than 1pp in Costa Rica and El Salvador. Taxes (light blue bars) and social insurance contributions (black bars) always reduce the gender gap with the larger effect observed for Costa Rica (1.9pp and 3.6pp respectively). The effect of these two components is much lower in Guatemala and Dominican Republic where they do not reach 1pp.

[12] Results of a similar exercise using the Ñopo decomposition are explained and shown in Figure A4 in the Appendix. The contribution of the explained component under this technique increases in an important fashion and consequently the unexplained component becomes negative in some cases.

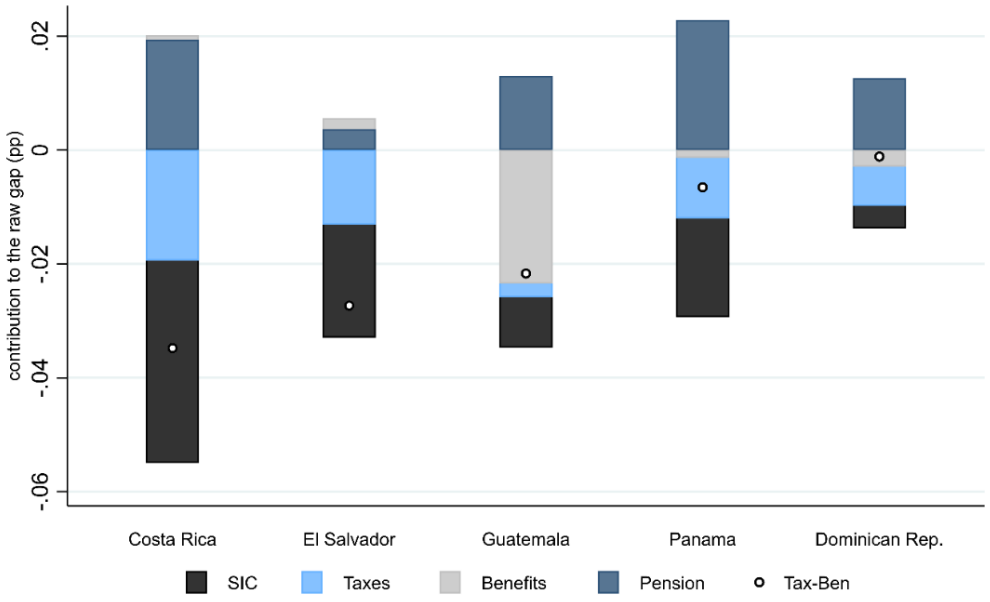
[13] In the exercise, depending on the country, between 86% and 93% of women that transition to employment come from inactivity.

Figure 6. Three-way decomposition of disposable income gender gap 2019.

A. Decomposition of general income components



B. Decomposition of tax-benefit instruments



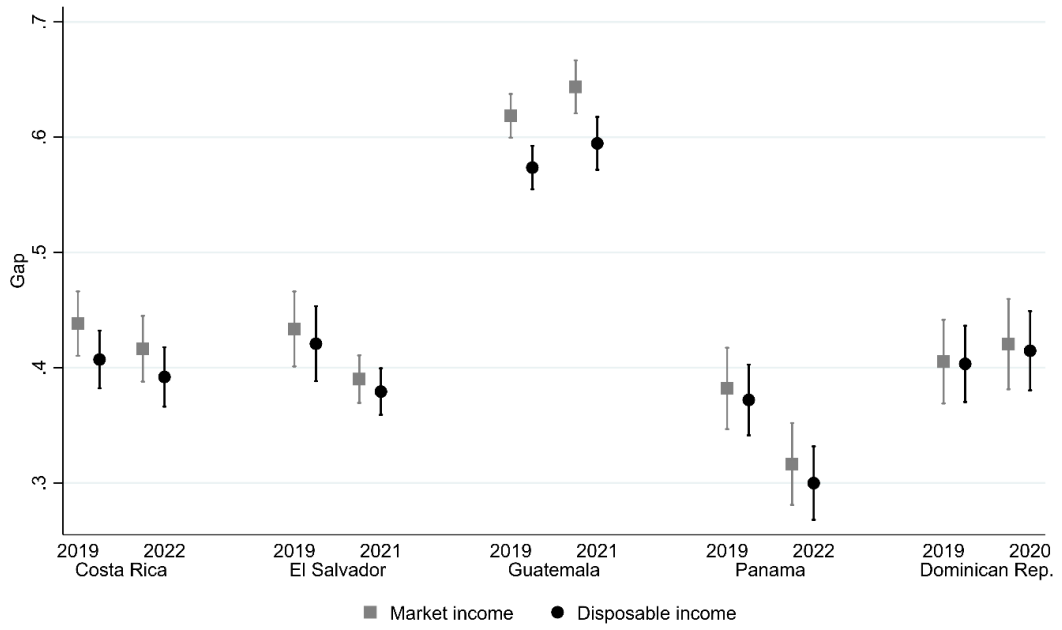
Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more.

4.4 Gender gap in incomes and the COVID-19 pandemic

In this section we compare the results for the gender income gaps before and during the pandemic years. The pandemic brought drastic changes in labor incomes, but also brought the introduction of emergency policies, both lasting up to recent years.

A comparison of raw market and disposable gender income gaps for the two years is depicted in Figure 7. The changes are not uniform across countries. For countries such as Dominican Republic, or Guatemala the disposable income gender gap increased. For countries such as El Salvador, Costa Rica, and Panama, we observe a reduction in the raw disposable income gap, with the effect on the latter being statistically significant. This finding can be, at least partly, attributed to more women leaving employment -and likely the workforce- at lower levels of income, while only those with formal jobs remaining employed during the pandemic. For instance, in Costa Rica, the gender unemployment gap widened in 5pp in the lowest decile of income, while it remained virtually unchanged in the top decile[14]. Also, the tax-benefit system did not seem to have an important effect on the income gender gaps during the pandemic. As in 2019, this difference between market and disposable income is not statistically significant, except for Guatemala.

Figure 7. Raw Income gender gaps pre pandemic and pandemic years



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more. 95% confidence intervals.

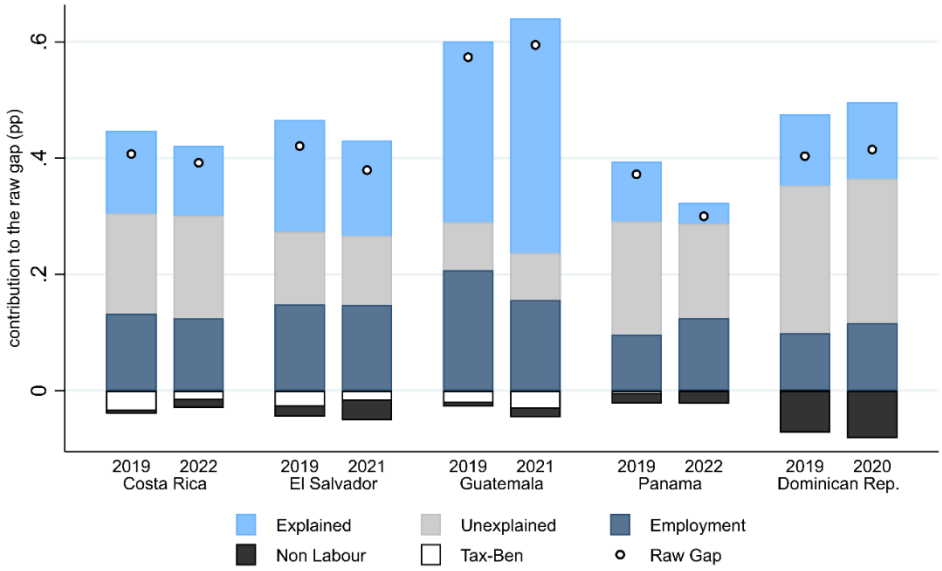
Figures 8 decomposes the disposable income gender gap into the contribution of its corresponding income and tax or benefit components following Equation 13. Panel A shows that, overall, we do not find a significant change in the contribution of each component to the gender gap between the two years analyzed.

[14] With information from the Household Surveys Harmonized by the IDB.

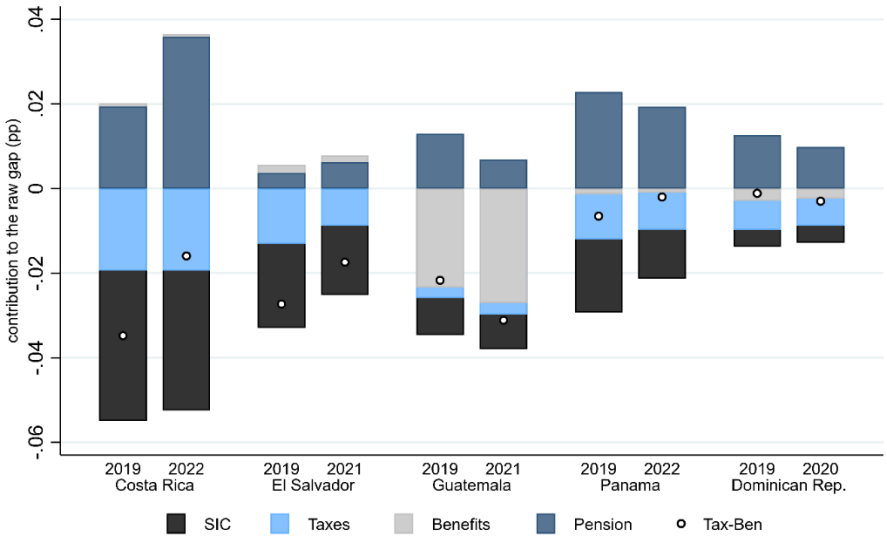
Zooming in by main tax benefit elements in Panel B, in Costa Rica, the contribution of pensions increases significantly, going from 1.9pp to 3.6pp. For El Salvador we observe a reduction in the equalizing effect of the tax-benefit system due to a lower contribution of the tax system and social insurance contributions in closing the gender gap. For Guatemala we observe a reduction in the contribution of pensions to the gender gap and a corresponding increase in the contribution of fiscal benefits. In Panama, the role of social insurance contributions decreased in 2022, while in Dominican Republic, no noticeable changes are detected.

Figure 8 Three-way decomposition of the disposable income gender gap pre pandemic and pandemic years

A. Three-way decomposition of income components



B. Decomposition of tax-benefit instruments



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more.

5. Conclusions and policy implications

The literature on income inequalities between genders typically focuses on wage differences and their determinants. This analysis sought to study gender gaps in Central America using broader income definitions such as labor income, market income and disposable income, with special focus on this last concept to analyze how fiscal policies contribute to narrow gender income differences. Our focus is on the working-age population (those aged 18 and more) as a whole and not only on wage earners as it is typically done in the literature.

To analyze disposable income gaps between genders, we employ microsimulation models to construct taxes and benefits from household microdata to compute individual disposable income for women and men. As part of the microsimulation exercise, we harmonized household surveys for the pre-pandemic and pandemic years for five Central American countries: Costa Rica, El Salvador, Guatemala, Panama, and Dominican Republic to comparatively assess the effect of policies on the gender income gaps in the region.

Overall, we find that women had on average 40% less disposable income than men, in all countries except Guatemala where the gap stood at 60% in 2019. Fiscal policies contribute little to decrease this income gender gaps: comparing the market and disposable income gender gaps, we find that taxes and benefits decrease income differences by less than 4pp in all countries. Considering the uncertainty resulting from the surveys, these differences are not statistically significant. This finding is in line with the vast literature that do not find statistically significant effects of the fiscal policy on equity and poverty metrics in the LAC region (CEQ, 2016). The underlying causes are the low revenue collection ratios relative to advanced economies, which limits the space for social spending, and the reduced progressivity of the tax system. Guatemala is the only country where fiscal policy seems to reduce the gender income gap in a significant magnitude as a result of monetary transfers under the main social program targeted to women. Even in this case, a word of caution should be provided in that there is limited evidence of the impact of these programs in gender gaps and female labor force participation.

One important limitation of our work is that it only considers monetary transfers, excluding in-kind transfers as well as government spending in education and health, and other social expenditures that are being implemented in several countries and could have an important effect in closing the gender gap. Future extensions of this work can include a broader definition of tax and benefits.

It is important to note that other components of income, namely remittances, seem to have a more important role than the fiscal policy in closing the gender income gaps, especially in El Salvador and Dominican Republic. This is consistent with other analysis than point out to the greater contribution of private sector transfers -in the form of remittances- in reducing poverty relative to the size of the public social expenditure[15].

The results broadly replicate when the analysis looks across the income distribution. We only find a statistically significant fiscal effect at the very bottom of the income distribution in Guatemala, Dominican Republic, and Panama due to the role of government cash transfers targeted to mothers living in low-income households. In these countries, monetary support received by women supplements income and reduces, at least temporarily, the gender income gaps at the poorest segments of the population.

[15] https://blogs.iadb.org/migracion/es/el-papel-de-las-remesas-en-centroamerica-mexico-y-republica-dominicana-en-el-alivio-a-la-pobreza/ https://blogs.iadb.org/migracion/es/el-papel-de-las-remesas-en-centroamerica-mexico-y-republica-dominicana-en-el-alivio-a-la-pobreza/

However, gender differences in labor income remains as the biggest contributor to the gender disposable income gap. Therefore, policies to encourage female labor force participation should be at the forefront of the discussion on closing gender disparities. Literature identifying policy priorities to encourage women to be active in the labor market encourage to look at the roots of the gaps along the entire life cycle[16]. The provision of quality education in underserved areas coupled with educational programs on sexual and reproductive health, the promotion of vocational and technical training, the offering of subsidized childcare services to lower income households, labor regulatory changes to promote paternity and maternity leave are quoted as key drivers.

Moreover, our analysis shows that, even in a scenario where female labor force participation increase to equalize employment rates, an important gender income gap persists if the structure of the female labor market does not change. Therefore, incentives to female labor force participation should be accompanied by structural policies that promote an inclusive growth, guaranteeing women's access to quality jobs, mitigating sectoral segregation, promoting behavioral changes, and combating any form of discrimination, including those that explicitly or implicitly exist in the labor and tax regulations.

[16] Lopez Marmolejo, Ruiz-Arranz, and Ochoa (2021).

REFERENCES

Alejos, L. A. (2003). Contribution of the Determinants of income inequality in Guatemala. University Library of Munich, Germany.

Álvarez, I. (2019). Aportes para el debate sobre la tributación para la equidad de género en El Salvador.

Araúz-Reyes, N. M., and Subinas, J. (2022). Jefas de hogar del sector informal de Panamá: el eslabón más frágil. *Investigación y Pensamiento Crítico*, 10(1).

Arends, M (1992a). Female Labor Force Participation and Wages: A Case Study of Panama. World Bank

Arends, M (1992b). Female Labor Force Participation and Earnings in Guatemala. World Bank

Avram, S., and Popova, D. (2022). Do taxes and transfers reduce gender income inequality? Evidence from eight European welfare states. *Social Science Research*, 102, 102644.

Berniell, I., Gasparini, L., Marchionni, M. et al. (2023). The role of children and work-from-home in gender labor market asymmetries: evidence from the COVID-19 pandemic in Latin America. *Review of Economics of the Household*. https://doi.org/10.1007/s11150-023-09648-8

Blanchet, T., Flores, I. & Morgan, M. (2022). "The weight of the rich: improving surveys using tax data". *Journal of Economic Inequality*, 20, 119–150. https://doi.org/10.1007/s10888-021-09509-3

Blau F. and L. Kahn. 2001. —Understanding International Difference in the Gender Pay Gap. National Bureau of Economic Research. Working paper 8200.

Blinder, A. S. (1973). Wage discrimination: reduced form and structural estimates. *The Journal of Human Resources*, 8(4), 436-455. https://doi.org/10.2307/144855.

Burkhauser, R. V., Feng, S., Jenkins, S. P. and Larrimore, J. (2012). "Recent trends in top income shares in the USA: reconciling estimates from March CPS and IRS tax return data". *Review of Economics and Statistics*, vol. 94, pp. 371–88.

Cabrera, M (2009). La tributación directa en América Latina: equidad y desafíos. El caso de Guatemala. División de Desarrollo Económico, CEPAL.

Cabrera, M., Lustig, N., and Morán, H. E. (2015). Fiscal policy, inequality, and the ethnic divide in Guatemala. World Development, 76, 263-279.

Castañón-Herrera, A., and Romero, W. (2012). A microsimulation model for Guatemala: the case of direct and indirect taxes. Fiscal Inclusive Development: Microsimulation Models for Latin America, 87.

Cedeño Rodríguez, J., González Méndez, A., and Pizarro Medina, K. P. (2015). Discriminación salarial por género en Costa Rica durante los ciclos económicos del período 1992-2013.

Cucagna, E., and Romero, J. (2021). The gendered impacts of covid-19 on labor markets in latin america and the caribbean.

Dávila, A., and Pagán, J. A. (1999). Gender Pay and Occupational-Attainment Gaps in Costa Rica and El Salvador: A Relative Comparison of the Late 1980s. Review of Development Economics, 3(2), 215-230.

Dondo, M., Rodríguez, D., Jara, X., Torres, J., and Deza, MC, (2024). Assessing the role of tax-benefit systems in reducing the gender income gap in Latin America. Mimeo, GDLAB-IADB.

Doorley, K., & Keane, C. (2023). Tax-benefit systems and the gender gap in income. *The Journal of Economic Inequality*, 1-25.

Enamorado, T., Izaguirre, A. C., and Ñopo, H. (2009). Gender wage gaps in Central American countries: Evidence from a non-parametric approach (No. IDB-WP-111). IDB Working Paper Series.

Firpo, S., Fortin, N. M., and Lemieux, T. (2009). Unconditional Quantile Regressions, *Econometrica*, vol. 77, no. 3, pp. 953-973. doi: https://doi.org/10.3982/ECTA6822

Fuenmayor, A., Granell, R., & Morera, T. S. (2020). Tax-benefit Systems and Gender Gap. An Across-Europe Study. *Hacienda Publica Espanol*a, (235), 87-118.

Gasparini, L., & Marchionni, M. (2017). Deceleration in female labor force participation in Latin America. *Economía*, *18*(1), 197-224.

Gindling, T.H. (1992). Why Women Earn Less Than Men in Costa Rica. World Bank

Goldin, C. (2006). The quiet revolution that transformed women's employment, education, and family. *American Economic Review*, 96(2), 1-21.

Hallman, K., Quisumbing, A. R., Ruel, M., & Brière, B. D. L. (2005). Mothers' work and childcare: findings from the urban slums of Guatemala City. *Economic Development and Cultural Change*, 53(4), 855-885.

INEC (2019). Base de datos de la encuesta de propósitos múltiples, marzo 2019

Iwasaki, I., and Satogami, M. (2023). Gender wage gap in European emerging markets: a meta-analytic perspective. *Journal for Labor Market Research*, 57(1), 9.

Jara, H. X., Deza, M. C., Oliva, N., and Torres, J. (2023). Financial Disincentives to Formal Employment and Tax-Benefit Systems in Latin America. *International Tax and Public Finance, 30, 69-113*, https://doi.org/10.1007/s10797-021-09724-8

Jiménez-Fontana, P. (2019). Gender gaps in Costa Rica: analysis of time use and labor income by education. Time Use and Transfers in the Americas: Producing, Consuming, and Sharing Time Across Generations and Genders, 77-96.

Klasen, S. (2018). The impact of gender inequality on economic performance in developing countries. *Annual Review of Resource Economics*, 10, 279-298.

Kleven, H., Landais, C. and Søgaard, J. E. (2019). Children and Gender Inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11(4): 181-209.

Lopez Marmolejo, A., Ruiz-Arranz, M., and Ochoa, E. (2021). Closing gender gaps in the world of work: Central America, Mexico, Panama, and the Dominican Republic.

Lustig, N., & Higgins, S. (2018). THE CEQ ASSESSMENT. Commitment to Equity Handbook: Estimating the Impact of Fiscal Policy on Inequality and Poverty, 1.

Marchionni, M., L. Gasparini, and M. Edo (2018). Gender gaps in Latin America. A Status Report. Caracas: CAF. http://scioteca.caf.com/handle/123456789/1401.

Martínez Franzoni, J., and Voorend, K. (2012). Blacks, whites, or grays? Conditional transfers and gender equality in Latin America. *Social Politics*, 19(3), 383-407.

McKinsey. (2015). The Power of Parity: How Advancing Women's Equality can add $12 Trillion to Global Growth. McKinsey & Company Publications.

Navarro, A. G. (2015). Gender Wage Gap and Education: Case in Dominican Republic.

Ñopo, H. (2008). An extension of the Blinder–Oaxaca decomposition to a continuum of comparison groups. *Economics Letters*, 100(2), 292-296.

Ñopo, H., and Gonzales, A. (2008). Gender and Ethnic Wage Gaps in Guatemala from a Matching Comparisons Perspective.

Ñopo, H., Daza, N., and Ramos, J. (2011). Gender earnings gaps in the world.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review*, 14(3), 693-709. https://doi.org/10.2307/2525981

Pacheco Medina, E. C. (2013). Gender wage gap in Urban Nicaragua: Evidence from decomposition analysis.

Olivetti, C., & Petrongolo, B. (2016). The evolution of gender gaps in industrialized countries. *Annual Review of Economics*, 8, 405-434.

Petts, R. J., Carlson, D. L., and Pepin, J. R. (2021). A gendered pandemic: Childcare, homeschooling, and parents' employment during COVID-19. *Gender, Work and Organization*, 28, 515-534.

Ramirez, F. A. (2012). Descomponiendo la Desigualdad Salarial en la República Dominicana: Análisis Empírico para el Periodo 2000-2011.

Rendall, M. (2013). Structural change in developing countries: Has it decreased gender inequality? *World Development*, 45, 1-16.

Robayo, M., Tribin Uribe, A. M., & Oliva Cepeda, J. A. (2023). Fiscal Policy as a Tool for Gender Equity in El Salvador (No. 10547). The World Bank.

Hausmann, R. Tyson and S. Zahidi. (2010). —The Global Gender Gap Report. World Economic Forum. Geneva, Switzerland.

Sutherland, H., & Figari, F. (2013). EUROMOD: the European Union Tax-benefit Microsimulation Model. *International Journal of Microsimulation*, 6(1), 4-26.

Tejada, M., Piras, C., Flabbi, L., & Bustelo, M. (2021). Gender gaps in latin american labor markets: Implications from an estimated search model. *Annals of Economics and Statistics*, (142), 111-178.

Torres, R., and Zaclicever, D. (2022). Brecha salarial de género en Costa Rica: una desigualdad persistente.

Urquidi M and Chalup M. (2021). Brecha de ingresos laborales por género en Costa Rica: un análisis de su evolución en el periodo 1990 a 2021

UNU-WIDER. (2021). SOUTHMOD Modelling Conventions. WIDER Technical Notes 2021. Helsinki: UNU-WIDER.

UN Women. (2011). Progress of the world´s women in pursuit of justice Available: https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2011/ProgressOfTheWorldsWomen-2011-en.pdf

Yang, G. (2004). Male-Female Wages Differentials in Guatemala: 1989-1998

Yang, H. (1992). Female Labor Force Participation and Earnings Differentials in Costa Rica. World Bank

Weichselbaumer, D., and Winter-Ebmer, R. (2005). A meta-analysis of the international gender wage gap. *Journal of economic surveys*, *19*(3), 479-511.

Wodon, Q., and De La Briere, B. (2018). Unrealized potential: the high cost of gender inequality in earnings. World Bank Group

APPENDIX

Table A1. Gender gaps in the literature

Authors (year)	Countries	Years analysed	Gap Type	Gap
Cucagna and Romero (2021)	13 countries in Latin America	2020	Employment	Men had a 44% less chance of losing employment than women in the pandemic
Gasparini and Marchionini (2017)	Latin America	1992-2012	Employment	The average employment rate men in Latin America are approximately 30 pp higher than that of their female counterparts.
Jiménez and Fontana (2019)	Costa Rica	1987-2017	Employment	The average unemployment rate of men between 18 and 24 years is 4.63 pp lower than women
Araúz-Reyes and Subinas (2022)	Panamá	2019	Informal Labour	In male-headed households, the percentage of participating in report working in domestic employment and/or as producers of goods for their own is 8.4 pp lower of households headed by a woman.
Tejada et al. (2021)	Argentina, Chile, Colombia, and Mexico	2014-2016	Employment	Men´s wages are approximately 10% higher than women´s wages.
Ganguli et al. (2014)	35 countries in Africa, Asia, Europe, and Latin America	1945-1975	Employment	In 22 of the countries male's labour force participation 15% higher than women's
Leythienne and Perez. (2021)	European Union	2018	Earnings	Men have11.2% earnings advantage over women
Enamorado et al. (2009)	Costa Rica, Honduras, Nicaragua, and El Salvador	1990-2000	Earnings	The unexplained gender wage gap is between 60%
Torres and Zaclicever (2022)	Costa Rica	2001-2019	Earnings	The explained earnings gap averaged -20% while the unexplained part accounted for 31%
Cedeño, González and Pizarro (2015)	Costa Rica	1992-2013	Earnings	Men earn 18.39% more than women
Gindling, T. (1992)	Costa Rica	1989	Earnings	Men's wages were on average, 3.5 percent higher than women's
Yang, H. (1991)	Costa Rica	1989	Earnings	The difference in earnings between working men and women is 19.2%.
Uridiqui and Chalup (2021)	Costa Rica	1990-2021	Earnings	The explained earnings gap averaged 8% while the unexplained part accounted for 22%
Navarro, A. (2015)	Dominican Republic	2013	Earnings	The wage difference in favour of men is approximately 17.7%.
Ñopo and Gonzales (2011)	Guatemala	2002-2006	Earnings	Gender wage gaps are on the order of 20 to 25 % of average female wages
Arends, M. (1992)	Guatemala	1989	Earnings	On average men earn 25% more of what women earn

Pacheco, E. (2013)	Nicaragua	2005-2009	Earnings	Males' wages represent 21% and 13% more of women wage rate in urban Nicaragua for 2005 and 2009, respectively
Davila and Pagán (2002)	El Salvador and Costa Rica	1980	Earnings	The gender wage gap in El Salvador is 30.4% and 23.6% in Costa Rica
Arends, M. (1992)	Panama	1980-1989	Earnings	From 14 to 15 % of the differential between male and female wages can be explained by endowments, while 85 to 86% are explained by the wage structure.
Alejos, L. (2003)	Guatemala	2002	Income	Decomposes income inequality in different factors following the proposed by Fields (2002). The contribution of the determinant of gender of income inequality for the whole sample is of 2,98%

Table A2. Gendered effects of fiscal policies

Country	Program	Received by the mother?
SV	Poverty Eradication Strategy	No
SV	Asignación familiar para reducción de brechas de derechos (salud, nutrición y educación)	No
SV	Basic pension for being an older adult (Pensión básica por ser adulto mayor)	No
SV	Solidarity Communities bonds (Bonos comunidades Solidarias)	Si
SV	Social assistance for the Covid-19 pandemic: One-time cash transfer	No
GT	Social Bonus Program (Programa Bono Social)	Si
GT	Social Bag Program (Programa Bolsa Social)	No
GT	Social Scholarship Program (Programa Beca Social)	No
GT	Life Program (Programa VIDA)	Si
GT	Program of the economic contribution of the older adult (Aporte Económico del Adulto Mayor)	No
GT	Family Bonus (COVID)	
PA	Special economic transfer program for older adults 120 at 65 (120 a los 65: Programa Especial de Transferencia Económica a los Adultos Mayores)	No
PA	Guardian Angel Program (Programa de Ángel Guardián)	Si
PA	Family voucher program for the purchase of food (Bonos Familiares para la Compra de Alimentos)	No
PA	Opportunities Network (Red de Oportunidades)	No
PA	Benefit food supplements (Beneficio suplementos alimenticios)	No
PA	Benefit - insumos agropecuarios	No
PA	Benefit-Pase U	No
PA	Panama Solidario	
RD	Solidarity Pensions of the Subsidized Regime (Pensiones Solidarias del Régimen Subsidiado)	No
RD	Eating First Program (Programa Comer es primero)	No

RD	Superate program (Programa Superate)	No
RD	Superate_Bono Luz	No
RD	Superate_Bonogas Program for Drivers (Programa Bonogas para conductores)	No
RD	Superate_Bonogas Homes program (Programa Bonogas para hogares)	No
RD	Alimentate	No
RD	Aprende	No
RD	Avanza	No
RD	Bono navideño	No
RD	Bono familia acompañada	No
RD	Bono de emergencia	No
RD	Tm Superate Mujer	Si
RD	School Bonus Studying Progress (Bono Escolar Progreso Estudiantil)	No
RD	School Attendance Incentive Bonus (Bono Incentivo a la Asistencia Escolar)	No
RD	Higher Education Incentive Bonus (Bono de Incentivo a la Educación Superior)	No
RD	Bonos Pograma Incentivo a la Policia Preventiva// Programa Incentivo Alistados Marina de Guerra	No
CR	Régimen no contributivo de pensiones por monto básico	No
CR	Pobreza y Discapacidad	Si
CR	Avancemos	No
CR	Crecemos	No
CR	Family housing voucher	No

Source: Own elaboration

Table A3. Raw Income gender gaps by urban-rural areas 2019

	Urban		**Rural**	
Country	**Market Income**	**Disposable Income**	**Market Income**	**Disposable Income**
Costa Rica	0.410 (0.017)	0.378 (0.015)	0.577 (0.019)	0.552 (0.017)
El Salvador	0.408 (0.023)	0.392 (0.023)	0.517 (0.01)	0.511 (0.01)
Guatemala	0.576 (0.013)	0.566 (0.012)	0.685 (0.014)	0.676 (0.013)
Panama	0.362 (0.021)	0.351 (0.018)	0.534 (0.02)	0.521 (0.019)
Dominican Republic	0.385 (0.022)	0.384 (0.02)	0.547 (0.019)	0.538 (0.018)

Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more. Standard errors in parenthesis. All gender gaps are statistically different from zero.

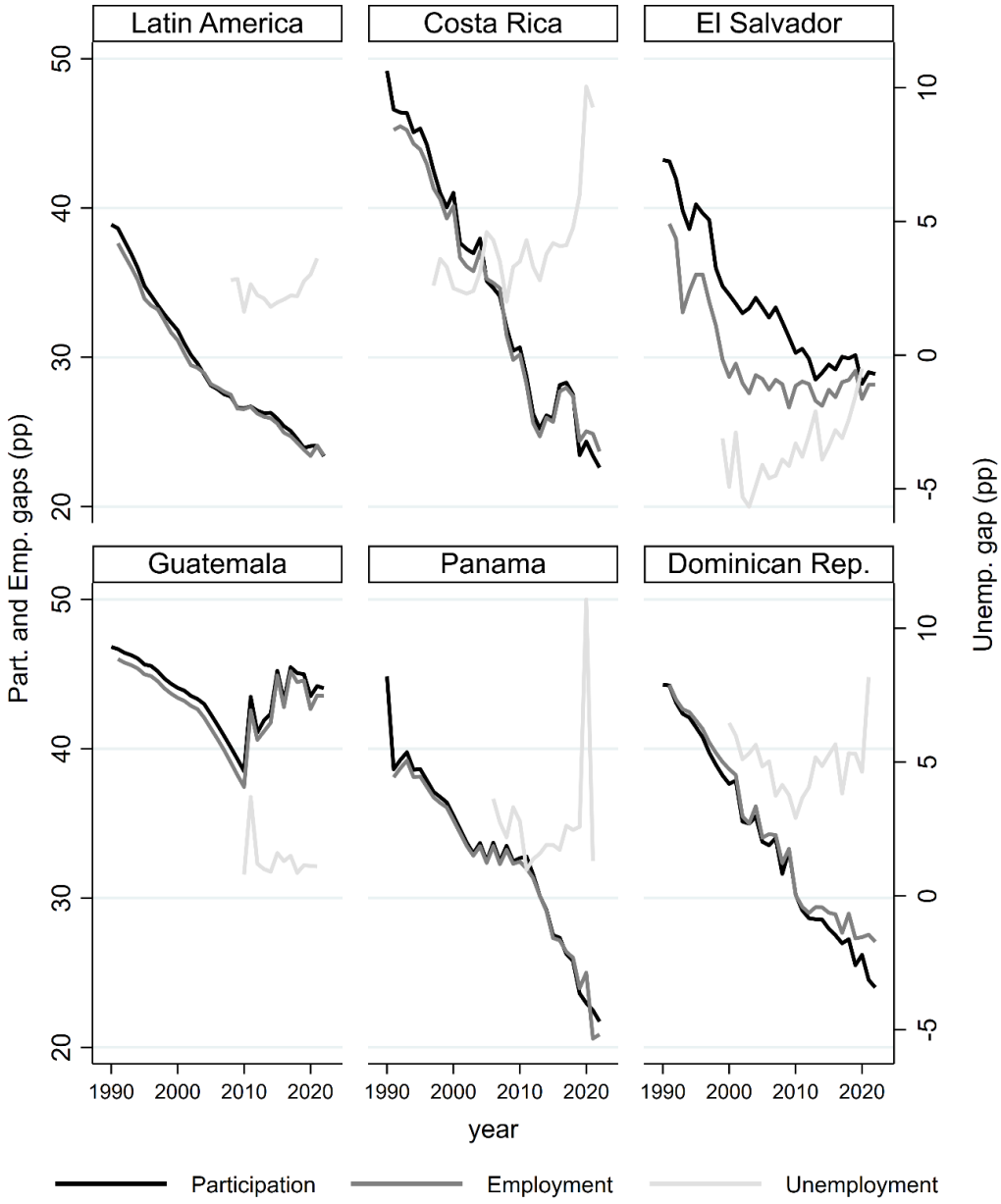
Table A4. OLS regression estimates for working men 2019

	CR	SV	GT	PA	RD
Age [31-45]	112,408.96	45.24	677.70	135.79	5,559.83
	(6.53)***	(5.81)***	(6.16)***	(4.09)***	(7.77)***
Age [46-60]	141,910.96	57.94	934.52	100.17	8,079.81
	(5.68)***	(5.46)***	(5.39)***	(2.66)***	(7.30)***
Age [60+]	50,671.97	6.48	146.57	168.35	65.98
	(1.23)	(0.32)	(0.79)	(2.02)**	(0.04)
Secondary Education	185,387.29	58.10	634.20	193.31	3,235.68
	(12.36)***	(8.90)***	(6.54)***	(7.40)***	(5.14)***
Tertiary Education	955,654.26	372.84	2,045.97	894.15	18,050.96
	(24.84)***	(15.79)***	(17.44)***	(15.68)***	(10.68)***
Formal	241,415.34	148.38	1,887.05	316.85	-301.62
	(12.51)***	(14.44)***	(22.02)***	(6.04)***	(0.28)
Employee	27,739.49	-119.74	-1,538.01	-53.26	-1,227.57
	(1.02)	(8.83)***	(8.06)***	(0.89)	(1.23)
Rural	-75,438.40	-54.85	-1,051.48	-79.09	-1,240.99
	(4.94)***	(8.95)***	(9.71)***	(3.35)***	(2.16)**
HoH	174,666.32	55.28	189.59	228.50	4,296.63
	(9.16)***	(7.66)***	(1.91)*	(8.93)***	(6.41)***
Married	121,268.99	41.33	128.88	293.69	7,831.15
	(5.38)***	(4.80)***	(1.00)	(7.36)***	(4.82)***
Separated	81,165.37	-13.48		68.04	-1,414.22
	(2.36)**	(1.26)		(0.84)	(1.91)*
Widowed	-96,161.85	-50.54	-177.71	91.89	-4,771.06
	(2.09)**	(2.29)**	(0.42)	(0.60)	(2.17)**
Constant	64,450.30	244.32	3,376.12	72.63	12,555.38
	(2.52)**	(20.77)***	(15.51)***	(1.54)	(7.90)***
R^2	0.26	0.18	0.15	0.16	0.15
N	8,595	17,419	9,885	11,465	5,788

Note: Income levels in LCU (rather than the logarithm of income) are used as dependent variables.

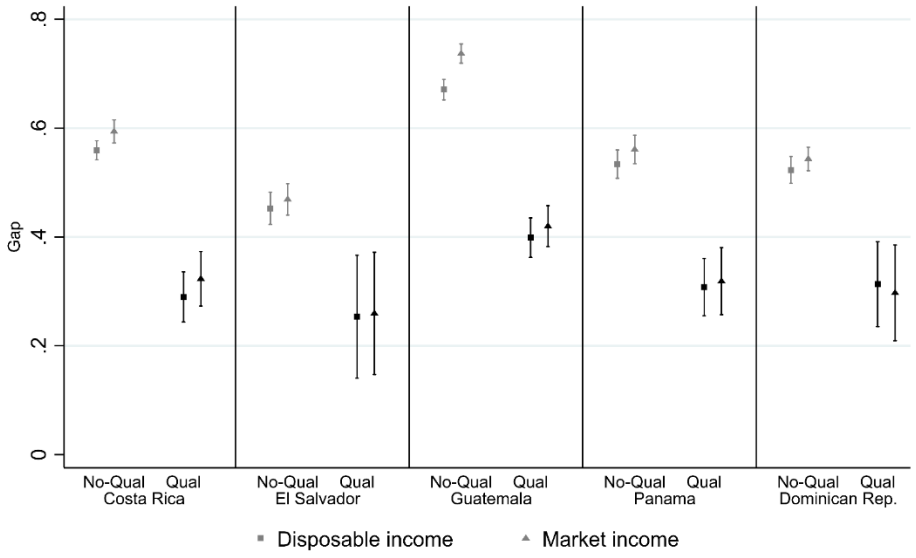
Source: Own elaboration

Figure A1. Employment, participation, and unemployment gender gaps



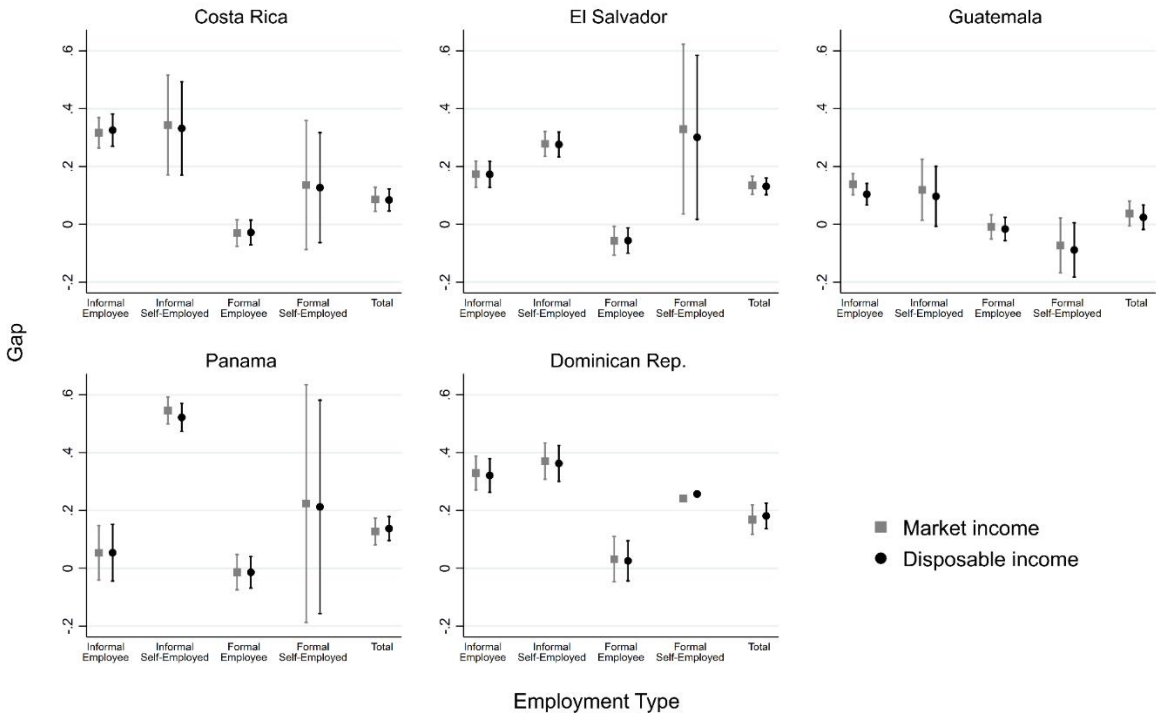
Source: Authors' elaboration based on CEPALSTAT and World Bank. **Note:** rates computed for people aged+15

Figure A2. Raw Income gender gaps by qualification 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more. 95% confidence intervals.

Figure A3. Raw Income gender gaps by employment type 2019



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: working population aged 18 and more. 95% confidence intervals

Ñopo decomposition

The Ñopo (2008) decomposition is a non-parametric decomposition that works by generating synthetic samples of individuals by matching men and women with the same observable characteristics. The matching characteristics are discrete variables, so the match is done perfectly. The basic form of the algorithm following Ñopo (2012) is:

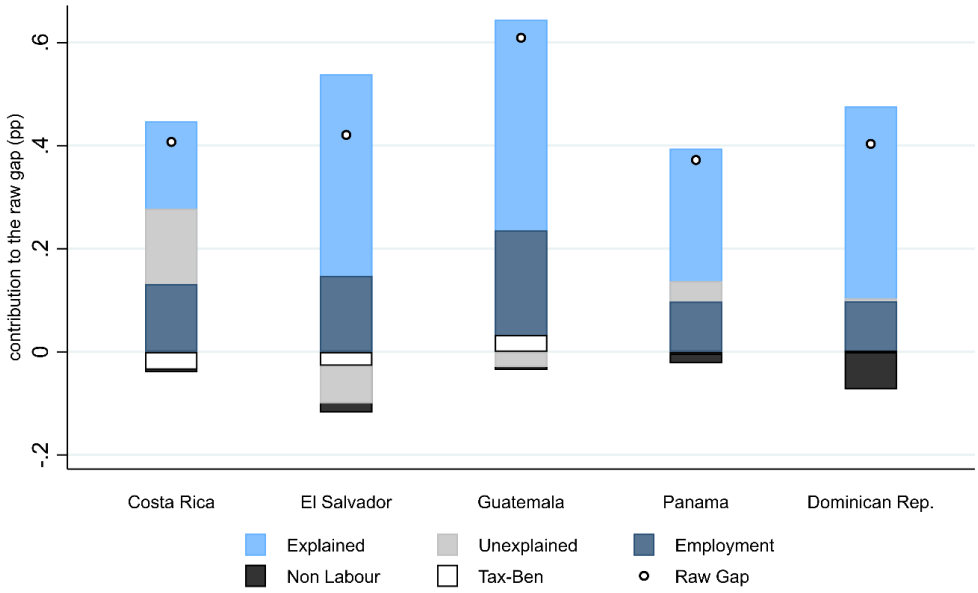
1. Select one woman from the sample.
2. Select all men who have the same characteristics as the woman selected.
3. Construct a synthetic man whose earnings are equal to the average of all of men selected in step 2 and "match" him to the original woman.
4. Put the observations of both individuals (the synthetic man and the woman) in the new (respective) samples of matched individuals.

Repeat steps 1–4 until it exhausts the original sample of women. The differences in average incomes between male and female could be decomposed in four additive terms:

$$\bar{y}_m - \bar{y}_f = \underbrace{\Delta X + \Delta M + \Delta F}_{\text{Explained}} + \underbrace{\Delta U}_{\text{Unexplained}}$$

The first three terms comprise the explained differences: ΔX are differences in characteristics between males and females in the common support, that is, those men and women that have matching combinations of characteristics. The ΔM and ΔF terms correspond to the males that do not have female counterparts and females that do not have male counterparts, respectively. Lastly, ΔU are differences that are not explained by the first three terms. For our analysis we focus only on the explained part as a whole and express all components relative to males' average income in a similar fashion as Equation 8. Figure A4 summarizes the results.

Figure A4. Three-way decomposition of the disposable income gender gap pre pandemic years Ñopo decomposition



Source: Own elaboration, based on each country's household survey and tax-benefit microsimulation models. Note: population aged 18 and more.