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# Taxing Labor Income in an Economy with High Employment Informality

**ABSTRACT** This paper develops a static general equilibrium model of occupational choice with heterogeneity in both labor and entrepreneurial skills that generates high levels of employment informality. The model uses a detailed structure of personal income taxes (PITs) and subsidies to formal workers to capture the labor wedges present in many countries. These features enable the model to assess how changes in PITs and subsidies affect labor market outcomes and the government's fiscal accounts. The model is calibrated for Mexico, which, like many developing countries, has high levels of labor informality. The model's simulations shed light on the impact of a series of reforms to PITs and subsidy schemes aimed at increasing labor formality among low-income workers. The results suggest that adjusting the current structure of the formal employment subsidy combined with PIT exemptions for low-income workers could reduce informality while marginally improving the government's fiscal balance.

*JEL Codes:* H24, H30, J24, J46, O17

*Keywords:* Informal employment, personal income tax, employment subsidy, fiscal accounts

High levels of informal employment are common in developing countries. Worldwide, almost 70 percent of employment in emerging and developing countries is estimated to be informal, compared with less than 20 percent in advanced economies (ILO, 2018). Numerous studies suggest that high labor taxes may be partially responsible for high levels of informal employment (see, for example, Albrecht, Navarro, and Vroman, 2009; Bosch and Esteban-Pretel, 2012, 2015; Fortin, Marceau, and Savard, 1997; Galiani

**ACKNOWLEDGMENTS** Antón acknowledges financial support from the Inter-American Development Bank. We thank the editor, Julián Messina; two anonymous referees; and Gabriela Calderón, David Kaplan, Carola Pessino, and Rodrigo Suescún for their valuable comments. We also thank Carlos Puertas and Rodrigo Salinas for outstanding research assistance. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of Bank of Mexico, the Inter-American Development Bank, its Board of Directors, or the countries they represent.

and Weinschelbaum, 2012; Levy, 2008; Saracoglu, 2008; and Ulyssea, 2018).[1] A study by the Organization for Economic Cooperation and Development, the Inter-American Development Bank, and the Inter-American Center of Tax Administrations (OECD/IDB/CIAT, 2016) estimates that labor taxes in Latin America and the Caribbean are equivalent to 21.7 percent of workers' average incomes. Though below the OECD average of 35.9 percent, the substantial share of labor taxes in average income, especially among low-income workers, may encourage informal employment.

This paper uses a static general equilibrium model with heterogeneous taxes and subsidies to analyze how changes in the labor taxation profile affect informal employment and government finances. The model includes fixed shares of entrepreneurs and workers, who behave rationally. Entrepreneurs and workers are endowed with heterogeneous managerial and labor skills, respectively (compare with Allub and Erosa, 2019; Jovanovic, 1994). Heterogeneous labor skills are treated as the basis for income distribution. The latter property is important, as the distribution of labor taxes and subsidies across formal workers is largely determined by their income level.

To quantitatively assess the role of heterogeneous taxes and subsidies in accounting for informality, the model is calibrated for Mexico, which exhibits the high levels of informal employment typical of many developing countries. According to the International Labour Organization (ILO, 2018), 53.4 percent of total employment in Mexico is informal. However, unlike in many other developing countries, low-income formal workers in Mexico are entitled to a government subsidy that may be credited against their income tax liability. This subsidy is based on income level and is progressive. Understanding how changes in the subsidy affect informal employment and the fiscal accounts in Mexico may offer relevant insights for policymakers in other developing countries.

After calibrating the model, we analyze a series of changes to the personal income tax (PIT) and to the subsidy for formal employment (SUFE). These changes are intended to increase labor formality, especially among low-income workers, without imposing a major fiscal cost. The model suggests that changes to the SUFE and PIT may have large positive effects on labor formalization. Specifically, redesigning the SUFE and including PIT exemptions for low-income workers may boost the rate of labor formality by between 7.0 and

1. Throughout this paper, the term labor taxation is used in a broad sense to refer not only to taxes on personal income but also to mandatory social security contributions.

11.9 percentage points. Moreover, rather than entailing a fiscal cost, these measures improve the government's fiscal balance by 0.34 percent of GDP via their effect on economic formalization. Various sensitivity exercises using alternative values for the model's parameters indicate that these results are robust.

In the model, each entrepreneur receives a managerial ability endowment and runs a single firm. Entrepreneurs use their skills and effective labor to produce a homogeneous good in a competitive context. They must pay a corporate income tax (CIT) and cover the social security contributions (SSCs) of their workers. The CIT is paid in full, and thus these firms are labeled as formal. However, the entrepreneur can hire a wage worker either formally (that is, paying the mandatory SSCs and fringe benefits established by law) or informally (that is, evading such payments). If a worker is hired informally, the entrepreneur faces a probability of being detected and fined by the authorities. This probability is modeled as an increasing function of the firm's size. Therefore, small firms facing a low probability of being fined mostly hire informal workers. For midsize firms, labor is optimally composed of both formal and informal workers. This feature of the model gives rise to an intensive margin of informality, as in Ulyssea (2018). As detailed below, the intensity of labor informality within a firm depends on the level of managerial ability and on the relative costs of formal and informal labor.

The model's workers receive a labor ability endowment and must choose to work on their own or as formal or informal wage employees.[2] Both own-account and informal wage workers pay no taxes on their income and do not contribute to social security, but they receive lump sum transfers from the government. Own-account workers run their own firm without hiring wage workers. Because these firms do not pay taxes, they are classified as informal.[3] By contrast, all formal wage workers pay income taxes and contribute to social

2. Bobba, Flabbi, and Levy (2022) and Narita (2020) also make a distinction between self-employed/own-account and informal wage workers. Self-employment is an important feature of the workforce in developing countries (Gollin, 2008; Perry and others, 2007). In Latin America, it accounts for more than 30 percent of the workforce.

3. Accordingly, formal firms require managerial skills as an input, but informal firms do not. The model structure implies that no entrepreneur operates an informal firm. As a result, there are no informal firms hiring informal wage workers. Evidence from Mexico and Brazil indicates that between 40 and 44 percent of informal employees work for a formal firm, and the remaining work for an informal firm (Samaniego de la Parra, 2017; Ulyssea, 2018). In this regard, the model implies that the intensive margin accounts for 100 percent of informal wage workers, which is at odds with data.

security. If they are low-income earners, they also receive a government subsidy that they can credit against their income tax liability. This scheme of taxes, subsidies, and transfers determines net earnings for workers in each occupation. Given their ability and assessment of the social security services to which they are entitled, workers optimally choose the occupation that yields the highest total earnings.

The large effects on labor formalization found in the quantitative exercises are explained by changes in the net earnings profile of low-income formal workers as a result of variations in the tax and subsidy code. The simulated reform to the SUFE scheme effectively increases the subsidy for formal workers earning between 1.3 and 2.1 times the minimum wage. Meanwhile, the simulated PIT reform provides a tax exemption for formal workers earning up to 1.8 times the minimum wage. In Mexico, approximately 50 percent of employees in the private sector earn up to 2.0 times the minimum wage, and nearly 75 percent of these workers are informal. Therefore, a reform to the tax and subsidy code that increases the earnings of low-income formal workers would significantly alter incentives to formalize.

This paper relates to two broad branches of the literature. The first involves the family of occupational choice models, which has a long tradition in economics (see, for example, Allub and Erosa, 2019; Gollin 2008; Jovanovic, 1994; Lucas, 1978). These models have been used to study how economic agents move between the formal and informal sectors (for example, de Paula and Scheinkman, 2010; Leal, 2014; López, 2017; Pratap and Quintin, 2008; Rauch, 1991). The second branch explores the effects of labor market institutions on informal employment (for example, Albrecht, Navarro, and Vroman, 2009; Bosch and Esteban-Pretel, 2012, 2015; Galiani and Weinschelbaum, 2012; Margolis, Navarro, and Robalino, 2014; Meghir, Narita, and Robin, 2015; Ulyssea, 2010, 2018; Zenou, 2008).

Our model differs from those used in the literature in two important respects. First, we consider heterogeneity in terms of both entrepreneurial and labor abilities. All the works on occupational choice and informality cited above include either heterogeneous entrepreneurial or labor skills, but not both.[4] In our model, the heterogenous distribution of labor skills allows us to build a heterogenous income distribution, which enables us to simulate tax and

4. Jovanovic (1994) and Allub and Erosa (2019) present frameworks with heterogeneity in both managerial and labor skills, and Poschke (2013) uses a model in which both individual ability and firm productivity are heterogenous. However, none of these models incorporates informality.

subsidy policies that depend on workers' income levels. Similarly, heterogeneous entrepreneurial ability plays a key role in determining the intensity of informality within firms in developing countries (Leal, 2014). Our model's second distinguishing feature is its focus on how PIT and subsidy policies for formal workers affect informal employment. The studies cited above examine how labor market policies such as SSCs, unemployment benefits, and restrictions on hiring and firing contribute to informal employment, but none examines how PITs and subsidies for formal workers affect informality.

The rest of the paper is organized as follows. We first describe the model, the data used, and the calibration of the model's parameters. We then use comparative statics to illustrate how changes in tax and subsidy schemes affect labor markets and the public finances. The sensitivity analysis corroborates the robustness of the results. The final section concludes the paper with a brief summary and suggestions for future research.

## The Model

The analytical framework is a static general equilibrium model of occupational choice with heterogeneous agents. The economy is composed of two types of agents, entrepreneurs and workers, both of which are independently distributed in fixed proportions. A continuum of managerial and labor abilities is represented by a probability distribution. At the beginning of the period, each entrepreneur is assigned exogenous managerial ability $z$, which affects the productivity of the firm, while each worker is assigned exogenous labor ability $e$, which affects her labor earnings. The cumulative distributions of managerial and labor abilities are represented by $\Phi_z(z)$ and $\Phi_e(e)$, respectively.

Each entrepreneur owns a firm that aims to maximize profits based on technology and the structure of taxes and transfers. Firms produce a single good in a competitive context, and each employer hires both formal and informal wage workers in a competitive labor market. When a worker is hired formally, the firm must pay all nonwage labor costs. Alternatively, the firm may avoid these costs by hiring a worker informally. Firms that hire informal workers face a size-dependent probability of being detected and fined by the authorities. All firms pay a corporate income tax (CIT) at a flat rate, which cannot be avoided.

Based on their ability level, workers must select among three possible occupation types: own-account, informal wage employment, or formal wage

employment. Workers in the first two occupation types are informal because they pay no taxes or social security contributions (SSCs), and they receive lump sum transfers from the government. Workers in the third occupation type, formal wage employment, must pay personal income taxes (PITs), but they receive social security benefits and, depending on their income level, may receive a government subsidy (namely, the subsidy for formal employment, SUFE). When selecting an occupation, workers compare the amount of labor income they would receive in each of the three occupation types given their skill level, the equilibrium wage, and the structure of taxes and transfers.

Our model distinguishes between formal firms and formal workers: a firm is formal if it pays the CIT, whereas a worker is formal if the employer covers the SSCs. In our model, all entrepreneurs operate formal firms, but own-account workers run informal firms that pay no CIT. They are also informal workers because they do not pay SSCs. All other informal workers are employed by formal firms that do not cover their SSCs. This oversimplification does not allow for informal firms hiring wage workers.

### *The Entrepreneur's Problem*

To produce goods, an employer with ability $z$ must hire wage workers either formally or informally. The relevant input for the firm is effective labor. Let $l_F$ and $l_I$ represent the number of formal and informal workers, respectively. Recalling that $e$ denotes the worker's level of ability, $h_F \equiv el_F$ and $h_I \equiv el_I$ represent the effective labor of formal and informal workers, respectively.

Sorting between employers and wage workers is represented by the function $e = \upsilon(z)$, indicating which employer of ability $z$ is matched with which worker of ability $e$. We assume positive assortative matching between employers and workers, namely $\upsilon'(z) > 0$. This assumption implies that high-skill employers are matched with high-skill workers, while low-skill employers are matched with low-skill workers.

Technology is represented by the following production function:

$$Y(z) = AzH(z)^{\gamma}, \tag{1}$$

where $A$ is a technology parameter and $\gamma \in (0,1)$ is the Lucas (1978) "span-of-control" parameter. In equation 1, the scale of production (and thus the firm size) increases in relation to managerial ability $z$. Similarly, $H(z)$ represents

the total units of effective labor, as determined according to the following constant elasticity of substitution (CES) function:[5]

$$H(z) = \left\{ q(z) h_F^{\psi} + \left[ 1 - q(z) \right] h_I^{\psi} \right\}^{1/\psi}. \tag{2}$$

In equation 2, the term $q(z)$ determines the relative importance of formal labor in the production process for a given level of managerial ability $z$. To capture the empirical fact that larger firms in developing countries demand more formal workers (Leal, 2014), we assume that the function $q(z)$ satisfies $q'(z) > 0$. The elasticity of substitution between formal and informal labor in equation 2 is given by $1/(1 - \psi)$, with $\psi < 1$.

Entrepreneurs must pay an output tax at the flat rate $\tau_Y$. They must also cover the wage rate $w_F$ and the corresponding nonwage cost $\tau(z)$ of their formal workers, expressed as a share of the wage cost. Nonwage costs include SSCs, state-level payroll taxes, and fringe benefits. Employers may also receive a tax deduction $D(z)$ per formal worker hired that is proportional to the wage cost.[6] Therefore, $\tau_L(z) \equiv \tau(z) - D(z)$ denotes the cost of hiring a formal worker net of deductions, and the net cost of hiring an effective unit of formal labor may be expressed as $C_F(z) \equiv [1 + \tau_L(z)]w_F$. Alternatively, entrepreneurs may hire workers informally at the wage rate $w_I$. If the authorities discover that an entrepreneur is hiring workers informally, there is a penalty $\sigma > 1$ on the evaded labor taxes, with no possibility of deduction. Let $V(m) \in [0,1]$ represent the probability of a firm of size $m$ being caught hiring an informal worker with $V'(m) > 0$. This property captures the idea that larger firms face a higher probability of being audited and thus fined by the authorities. Accordingly, the expected cost of hiring an effective unit of informal labor is $C_I(z) \equiv [1 + \sigma V(m)\tau(z)]w_I$.

5. This CES specification is reminiscent of the canonical model of skill differentials developed by Acemoglu and Autor (2011), where a distinction is made between high- and low-skill workers. Equation 2 assumes that effective units of formal and informal labor are imperfect substitutes. Because expression 2 and the assumption $q'(z) > 0$ may be justified by a model where physical capital is more complementary to formal labor than to informal labor, the equation may be interpreted as a reduced-form expression consistent with a capital-skill complementarity model. We thank an anonymous referee for pointing out this interpretation.

6. Typically, nonwage costs and deductions faced by firms are determined as a function of workers' income. In the model, the income span to set taxes and deductions is generated by multiplying the vector of either managerial or labor skills by a scalar. To save on notation, these variables are expressed as a function of ability only. Given the sorting function $e = \upsilon(z)$ between employers and workers, nonwage costs and deductions faced by firms may be expressed in terms of ability $z$.

Given the above information, the expected net profits for an entrepreneur with ability $z$ may be expressed as:

$$\Pi(z) = (1 - \tau_Y) Y(z) - C_F(z) h_F - C_I(z) h_I. \tag{3}$$

Accordingly, employers must choose $\{h_F, h_I\}$ to maximize their expected net profits (equation 3) subject to the technologies represented by equations 1 and 2, taking wages and tax rates as given. After substituting first-order conditions into equation 2, units of effective labor are given by

$$H(z) = \left[(1 - \tau_Y) A\gamma z\right]^{\frac{1}{1-\gamma}} C(z)^{\frac{1-\psi}{\psi(1-\gamma)}}, \tag{4}$$

where

$$C(z) = \left[\frac{q(z)}{C_F(z)^{\psi}}\right]^{\frac{1}{1-\psi}} + \left[\frac{1-q(z)}{C_I(z)^{\psi}}\right]^{\frac{1}{1-\psi}}. \tag{5}$$

Adding equation 4 back into the first-order conditions yields the optimal demand for formal and informal labor:

$$h_F(z) = \left[(1 - \tau_Y) A\gamma z\right]^{\frac{1}{1-\gamma}} \left[\frac{q(z)}{C_F(z)}\right]^{\frac{1}{1-\psi}} C(z)^{\frac{\gamma-\psi}{\psi(1-\gamma)}}; \tag{6}$$

$$h_I(z) = \left[(1 - \tau_Y) A\gamma z\right]^{\frac{1}{1-\gamma}} \left[\frac{1-q(z)}{C_I(z)}\right]^{\frac{1}{1-\psi}} C(z)^{\frac{\gamma-\psi}{\psi(1-\gamma)}}. \tag{7}$$

Equations 6 and 7 yield the optimal $h_F/h_I$ ratio. Because the effective labor of formal and informal workers may be rewritten as $h_F \equiv el_F = \upsilon(z) l_F$ and $h_I \equiv el_I = \upsilon(z) l_I$, the ratio of formal to informal workers is given by

$$\frac{l_F}{l_I} = \left\{\left[\frac{q(z)}{1-q(z)}\right]\frac{\left[1 + \sigma V(m)\tau(z)\right] w_I}{\left[1 + \tau_L(z)\right] w_F}\right\}^{\frac{1}{1-\psi}},$$

which indicates that the ratio increases with firm size $m$, given the assumption $V'(m) > 0$. This pattern is consistent with data for developing countries, where smaller firms are more likely to hire informal workers relative to larger firms, but larger firms still employ a substantial share of all informal workers (Leal, 2014).

### *The Worker's Problem*

As described above, each worker is assigned exogenous labor ability $e$. When workers choose to become formal wage employees, they receive wage earnings represented by the function $W_F(w_F, e)$ and may be entitled to a subsidy $S(e)$ from the government. They must also pay PIT in the amount of $\tau_W(e)$. Accordingly, their after-tax income $I_F(e)$ is

$$I_F(e) = W_F(w_F, e) + S(e) - \tau_W(e). \tag{8}$$

Formal workers are automatically enrolled in the social security system. If $\tau_{SS}(e)$ denotes the tax rate on SSCs, the contribution paid by an employer for a worker with ability $e$ is $\tau_{SS}(e)W_F(w_F, e)$. Formal workers are entitled to receive social security services such as health care and pensions, but not all services may be fully valued by workers (see Summers, 1989). Let $\beta_F > 0$ denote the valuation made by formal workers of such services. Therefore, the monetized value of social services is expressed as $\beta_F\tau_{SS}(e)W_F(w_F, e)$.[7] Formal workers also receive fringe benefits, which are denoted as a fraction $\kappa$ of wage earnings $W_F(w_F, e)$. The workers' valuation of these benefits is expressed by parameter $\beta_S > 0$.

Based on the above specifications, the net earnings of formal wage employment for a worker with ability $e$ may be expressed as follows:

$$E_{W,F}(e) = I_F(e) + \left[\beta_F\tau_{SS}(e) + \beta_S\kappa\right]W_F(w_F, e), \tag{9}$$

where $I_F(e)$ is given by equation 8. Each worker must compare these earnings to those generated by other occupation types.

**INFORMAL WAGE WORKERS.** The wage earnings of an informal wage worker are represented by the function $W_I(w_I, e)$. As noted above, informal workers pay no PIT, receive no subsidy $S(e)$, and are not entitled to social security or

7. When $\beta_F < 1$, SSCs are a tax in net terms. See Summers (1989).

other nonwage employment benefits. However, they receive a noncontributory social security transfer $T_{NC}$ from the government. The valuation of such transfers by workers is captured by parameter $\beta_I > 0$.

Therefore, the total earnings of an informal worker $E_{W,I}(e)$ are given by

$$E_{W,I}(e) = W_I(w_I, e) + \beta_I T_{NC}. \tag{10}$$

Empirical evidence suggests that the returns to education are higher for formal workers than for informal workers (see, for example, Gong and van Soest, 2002; Günther and Launov, 2012). If education levels efficiently signal worker ability, the earnings function of formal workers should exhibit higher returns to scale in ability $e$ relative to the earnings function of informal workers. For simplicity, the earnings function $W_F(w_F, e)$ in equation 8 is set to exhibit constant returns to scale: $W_F(w_F, e) = w_F e$. Accordingly, the earnings function of informal workers in equation 10 is determined by $W_I(w_F, e) = w_I e^{\alpha}$ with parameter $\alpha \in (0,1)$.

**OWN-ACCOUNT WORKERS.** In our model, own-account workers produce the same goods as entrepreneurs but use slightly different technology, which is represented by the production function $Y_O = A_O h_O^{\gamma_O}$. In this equation, $A_O$ is a technology parameter, $\gamma_O \in (0,1)$ captures the returns to scale in production, and $h_O$ denotes effective units of labor given by $h_O \equiv el_O$. Because own-account workers pay no taxes and make no SSCs, profits $\Pi_O$ (before transfers) may be simply written as $\Pi_O(h_O) = A_O h_O^{\gamma_O}$.

Own-account workers are also recipients of noncontributory social security transfers $T_{NC}$. Assuming that $\beta_I > 0$ captures the valuation of such transfers, own-account earnings are written as

$$E_O(e) = A_O h_O^{\gamma_O} + \beta_I T_{NC}. \tag{11}$$

**THE WORKER'S OCCUPATIONAL CHOICE PROBLEM.** Having explained the earnings of each type of worker, we now define the occupational choice problem of a worker with ability $e$. In general, this problem is written as

$$\max_c u(c)$$

subject to:

$$c = I(e),$$

where $c$ denotes consumption and $I(e)$ is the income of a worker with ability $e$, defined by the following equation:

$$I(e) = \max\left\{E_O(e), E_{W,I}(e), E_{W,F}(e)\right\}. \tag{12}$$

The terms shown on the right-hand side of equation 12 are specified by equations 9, 10, and 11. To simplify, the utility function $u(c)$ is assumed to be linear in consumption, and thus $u(c) = c$. As a result, the utility of each occupation is equivalent to the earnings received (compare with D'Erasmo, Moscoso, and Senkal, 2014; Galiani and Weinschelbaum, 2012).

Based on this framework, we define the sets of own-account ($\mathcal{A}$), informal wage ($\mathcal{B}$), and formal wage workers ($\mathcal{C}$) as follows:

$$\mathcal{A} = \left\{e \middle| I(e) = E_O(e)\right\}; \tag{13}$$

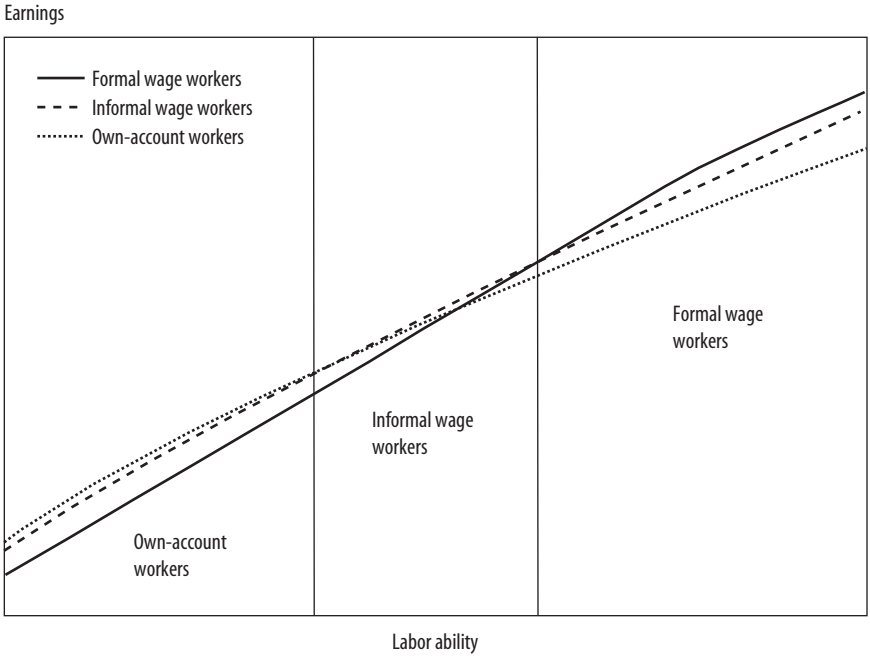
$$\mathcal{B} = \left\{e \middle| I(e) = E_{W,I}(e)\right\}; \tag{14}$$

$$\mathcal{C} = \left\{e \middle| I(e) = E_{W,F}(e)\right\}. \tag{15}$$

For illustrative purposes, figure 1 shows a hypothetical earnings profile for each type of worker and the corresponding occupational choice made as a function of labor ability $e$. In this case, own-account employment provides the highest earnings for less-skilled workers. At moderate levels of labor skills, the worker optimally chooses informal wage employment, and when labor skills are sufficiently high, the worker chooses formal wage employment. Equations 9, 10, and 11 show that changes in the structures of taxes, subsidies, and transfers may affect occupational choices.

The reform simulations presented later in the paper involve changes in the subsidy and income tax profiles $S(e)$ and $\tau_W(e)$ in equation 8, based on the distribution of managerial and labor abilities. Such changes affect after-tax income and thus the net earnings profile $E_{W,F}(e)$ of formal workers. Consequently, occupational choices may also change. For example, an increase in the subsidy $S(e)$ to low-income formal workers would cause a corresponding increase in net earnings $E_{W,F}(e)$, incentivizing those workers who were initially indifferent between formal and informal wage employment to prefer the former. As a result, the share of formal workers in the economy would

**FIGURE 1. Earnings and Occupational Choices**




Source: Authors' elaboration.

increase. Reducing income taxes on low-income workers would yield a similar outcome. While general equilibrium effects must also be incorporated into the analysis, changes in $S(e)$ or $\tau_W(e)$ or both will drive the results in the simulations below.

Now let $L_O = \int_A d\Phi_e(e)$, $L_I = \int_B d\Phi_e(e)$ and $L_F = \int_C d\Phi_e(e)$ denote the total number of own-account, informal wage workers, and formal wage workers, respectively. Given that the total number of workers $\overline{L}$ is fixed, the following must hold:

$$L_O + L_I + L_F = \overline{L}. \tag{16}$$

Equation 16 shows that changes to the fiscal structure do not alter the number of workers $\overline{L}$. However, such changes may affect the relative share of workers in each type of occupation.

### *Equilibrium*

In equilibrium, the demand for informal wage workers (measured in units of effective labor) must equal their supply. The same is true for formal wage workers. The labor supply of these two occupation types is determined by the occupational choice problem described above. Therefore, equilibrium conditions for formal and informal wage workers may be expressed as follows:

$$\int_z h_I\left(z, w_F^*, w_I^*\right) d\Phi_z\left(z\right) = \int_{\mathcal{B}} e d\Phi_e\left(e\right); \tag{17}$$

$$\int_z h_F\left(z, w_F^*, w_I^*\right) d\Phi_z\left(z\right) = \int_C e d\Phi_e\left(e\right). \tag{18}$$

Accordingly, equations 17 and 18 solve for equilibrium wages $\{w_F^*, w_I^*\}$.

## Calibration

In this section, we calibrate the model using data for Mexico to quantitatively assess how changes in PIT and subsidies to formal workers may affect formal employment and the government's budget balance. According to the ILO (2018), informal employment accounts for 53.4 percent of total employment in Mexico, broadly in line with the average for Latin American and Caribbean economies.

Our quantitative exercise incorporates detailed information on Mexico's PIT and SUFE schemes. The Mexican PIT is progressive, with statutory marginal tax rates starting at 1.92 percent and gradually increasing to a maximum rate of 35 percent. As noted in the introduction, the SUFE is a progressive subsidy provided to formal low-income workers to decrease their income tax burden. Further information on the PIT and SUFE schemes can be found in online appendix A.[8]

The data sources used to calibrate the model are detailed in online appendix B.[9] In 2017, CIT and PIT revenues each amounted to 3.1 percent of GDP, and transfers via the SUFE were equivalent to 0.2 percent of GDP. Between

8. Supplementary material for this paper is available online at http://economia.lacea.org/contents.htm. The model is also calibrated to replicate the Mexican SSC scheme, in which contributions are partially income-based and benefits include health care, pensions, life insurance, housing, and day care. For a thorough description of Mexico's SSC system, see Levy (2008).

9. See IMSS (2018), INEGI (2013, 2014, 2017), and Ministry of Finance (2017a, 2017b, 2017c).

2003 and 2016, SSCs from workers and employers averaged 3.1 percent of GDP, but no data are available on their relative shares. The Mexican government also finances social security for formal workers, and in 2017 its contribution was valued at 0.53 percent of GDP. By law, only a fraction of SSCs must be allocated to health insurance, and in 2017 these contributions fell short of the government's total health expenditures. Therefore, potential increases in formal employment imply additional financial commitments by the government, which we estimate at 13,503 Mexican pesos (MXN) annually per formal worker, based on the official data. These commitments are referred to as extra operating expenditures in the analysis below.

Labor market information is provided by Mexico's National Occupation and Employment Survey (*Encuesta Nacional de Ocupación y Empleo*, ENOE). All calculations exclude public sector employment (encompassing employment by government agencies, state-owned enterprises, and public institutions) because government workers have their own social security scheme and receive benefits that are not comparable to those of private sector workers. The ENOE distinguishes between workers who are affiliated with the SSC scheme (that is, formal workers) and those who are not (that is, informal workers). Employers account for 4.8 percent of total employment, while own-account (26.3 percent), informal wage (39.5 percent), and formal wage (29.4 percent) workers make up the remaining 95.2 percent. Formal wage workers receive an average net wage of MXN 7,447 per month, and informal wage workers receive an average net wage of MXN 4,344 per month at 2018 prices. Though not required for the calibration process, the average earnings of entrepreneurs and own-account workers are also reported.

### *Functional Forms*

The model requires specifying the functional forms for the distribution of skills, the weight of formal workers in the production function, and the probability of detection by the authorities. For the first case, labor ability $e$ is described in terms of a truncated log-normal distribution with mean $\mu_E$, variance $\sigma_E^2$, and support $[\underline{e}, \overline{e}]$. Entrepreneurial ability $z$ is defined by a truncated log-normal distribution with support $[\underline{z}, \overline{z}]$, mean $\mu_Z$, and variance $\sigma_Z^2$.

For the function $q(z)$ included in equation 2, the following specification is adopted:

$$q(z) = 1 - \exp\left[-\left(\frac{z - \underline{z}}{\lambda}\right)^{\zeta}\right], \tag{19}$$

where $\lambda > 0$ is a scale parameter, while $\zeta > 0$ is a shape parameter. This expression is a variant of the Weibull cumulative distribution function and is sufficiently flexible depending on the values of $\lambda$ and $\zeta$. Assuming that firm size is proportional to $z$, the probability of detection $V(m)$ may be expressed as $V(m(z))$. For simplicity, the function $V(m(z))$ is set to depend linearly on $q(z)$.

### *Parameter Values*

The model uses three groups of parameters. The first group reflects the current structure of the PIT, SUFE, and SSC schemes, which are defined by 110 parameters set according to their 2018 values. The second group includes twelve parameters related to technology, preferences, transfers, and the distribution of labor ability. Several parameters within this group are selected to determine the earnings profile of own-account, informal wage, and formal wage workers. Others are fixed according to the available data or values used in the literature. Without further evidence from either the data or the literature, the remaining parameters are set a priori and are subjected to a sensitivity analysis described below.

For technology parameters belonging to the second group, returns to scale in the production function of the entrepreneur, $\gamma$, are set at 0.76 following Leal (2014). For simplicity, parameter $\gamma_O$ is also set at 0.76. The technology level of own-account workers, $A_0$, is set at 5,574, which yields a reasonable monthly earnings estimate for this occupation type.[10] A value of 0.86 is assigned to parameter $\alpha$, which measures returns to scale for the skill levels of informal wage workers. Fixing the values for these three technology parameters helps determine the earnings profile of the own-account and informal wage workers not related to lump sum transfers (see equations 10 and 11). The parameter linked to the elasticity of substitution between formal and informal effective labor ($\psi$) is set at 0.9, which implies a relatively high value for the elasticity of substitution. In the absence of further evidence on $\alpha$ and $\psi$, alternative values are considered in the sensitivity analysis. When the authorities discover that a firm has evaded SSCs, it is assumed that the firm must cover the evaded

10. In the data, own-account workers earn slightly more, on average, than informal wage earners (see table 4). The two revenues are difficult to replicate in the model simultaneously as the people with the lowest labor skills in the model (and thus with the lowest average earnings) are own-account workers, while those with moderate labor skills are informal wage workers (see figure 1). Therefore, the model is calibrated such that the average income of informal wage earners replicates the data (see table 2). In contrast, the value of parameter $A_0$ yields an average income of MXN 2,766 per month for own-account workers, which is a reasonable amount, though it falls significantly below the figure observed in the data (see table 4).

**TABLE 1. Parameter Values for the Second Group**

| *Parameter* | *Value* | *Parameter* | *Value* |
|---|---|---|---|
| $\gamma$ | 0.76 | $\beta_F$ | 0.30 |
| $\gamma_0$ | 0.76 | $\beta_S$ | 0.90 |
| $A_0$ | 5,574 | $\beta_I$ | 0.85 |
| $\alpha$ | 0.857 | $T_{NC}$ | 948 |
| $\psi$ | 0.90 | $\underline{e}$ | 0.14 |
| $\sigma$ | 1.50 | $\overline{e}$ | 12.00 |

Source: Authors' elaboration.

amount plus a fine equivalent to 50 percent of that amount.[11] Therefore, we set $\sigma = 1.5$.

Some preference parameters reflect workers' valuation of social security and fringe benefits. For formal employees, we assume that $\beta_F = 0.30$, meaning that workers value only 30 percent of the benefits associated with mandatory SSCs. Similarly, the valuation of fringe benefits, $\beta_S$, is fixed at 0.90. The valuation of lump sum transfers to informal workers, $\beta_I$, is set at 0.85. As the values for these parameters may be controversial, the sensitivity analysis uses alternative specifications.

The value of government transfers to informal workers, $T_{NC}$, is estimated at MXN 948 per month, based on Antón and Hernández (2017), and adjusted for inflation using 2018 prices. Compensation for labor ability is defined by $\underline{e} = 0.14$ and $\overline{e} = 12$. These values allow for gross labor incomes ranging from just over MXN 850 to MXN 73,500 per month. Parameter values of the second group are reported in table 1.[12]

The third group includes the remaining ten parameters, which are simultaneously calibrated and for which there are no direct references in the literature. These parameters are related to technology ($A$, $\lambda$, and $\zeta$), fiscal policy ($\tau_Y$), and the distribution of abilities ($\mu_E$, $\sigma_E^2$, $\mu_Z$, $\sigma_Z^2$, $\underline{z}$, and $\overline{z}$). Since we have ten unknowns, we set ten relevant moments from the theoretical model to match

11. Mexico's social security law establishes fines of between 40 and 100 percent of the amount evaded, based on the severity of the offense. Firms must also cover the evaded amount plus the forgone interest. See Levy (2008) for a discussion.

12. The model is also calibrated to replicate the ratio of fringe benefits over production reflected in the data. In addition, payroll taxes at the state level are set to 2 percent of the wage rate (compare with Antón, Hernández, and Levy, 2012). Recall that these two elements are part of a firm's formal nonwage costs $\tau(e)$. Finally, the model estimates are adjusted to replicate the government's fiscal accounts as a share of GDP and the employers' average earnings under the benchmark scenario.

**TABLE 2. Moments Reflected in the Data and Model**

| *Moment* | *Data* | *Model* |
|---|---|---|
| Share of own-account employment | 0.263 | 0.263 |
| Share of formal wage employment | 0.294 | 0.294 |
| Average income of formal wage workers (pesos per month) | 7,447 | 7,469 |
| Average income of informal wage workers (pesos per month) | 4,344 | 4,419 |
| Share of workers earning up to 1 minimum wage | 0.124 | 0.124 |
| Share of workers earning 1 to 2 times the minimum wage | 0.385 | 0.385 |
| Share of workers earning 5 to 10 times the minimum wage | 0.048 | 0.048 |
| Share of workers earning more than 10 times the minimum wage | 0.012 | 0.012 |
| Share of formal workers earning up to 1 minimum wage | 0.004 | 0.004 |
| Corporate income tax collection (% of GDP) | 3.100 | 3.110 |

Source: Authors' elaboration.

the data. Moments used for the calibration exercise are reported in table 2. The moments chosen are associated with the relative shares of occupation types, the average income of wage workers, the earnings distribution, and the tax revenue generated by CIT. Given that the earnings profiles of own-account and wage workers are previously determined, parameters within this group can be calibrated to match the share of each occupation type, the average income of wage workers, and the earnings distribution.

The calibration is performed simultaneously because a change in the value of a given parameter affects two or more moments in the model. Nevertheless, some parameters are more useful than others to match specific moments in the data. For example, the distribution parameters $\mu_E$ and $\mu_Z$ are particularly useful for matching the average income of formal and informal wage workers. Similarly, parameters, $\sigma_E^2$ and $\sigma_z^2$ are useful for replicating the shares of own-account and formal wage workers. Boundary parameters $\underline{z}$ and $\overline{z}$ are appropriate for matching the share of workers earning up to the minimum wage and more than ten times the minimum wage, respectively.[13] On the other hand, the share of workers earning one to two and five to ten times the minimum wage and the share of formal workers earning up to the minimum wage are matched with the scale and shape parameters, $\lambda$ and $\zeta$, and the technology parameter, $A$. Finally, the tax parameter $\tau_Y$ is calibrated to replicate CIT revenue as a share of GDP.

13. The difficulties of the log-normal distribution for replicating both the upper and lower tails of actual income distributions are well known (Dagum, 1977). Numerical simulations show that increasing the number of parameters in a generalized version of the log-normal distribution improves the fitness to the data (McDonald and Ransom, 2008). In our case, the truncation of the log-normal distribution allows for a better calibration of the model to the data in both tails.

Once all parameter values are set, equilibrium wages $w_F^*$ and $w_I^*$ solve for equilibrium conditions 17 and 18. Table 2 illustrates how well the model replicates the data.[14] Parameter values obtained under the benchmark calibration are as follows: $A = 27{,}448$, $\lambda = 7.14$, $\zeta = 0.15$, $\tau_Y = 0.08$, $\mu_E = -0.34$, $\sigma_E^2 = 0.25$, $\mu_Z = -1.12$, $\sigma_Z^2 = 0.26$, $\underline{z} = 0.21$, and $\overline{z} = 11.17$.

## Reform Simulations

Having calibrated the model to replicate key aspects of the Mexican economy, we now analyze how changes to the SUFE and PIT schemes would affect labor informality and the fiscal accounts.[15] This section presents a series of comparative static exercises designed to elucidate the relevant policies. It is especially critical to understand that the SUFE and PIT are not equivalent. As explained in online appendix A, the SUFE is a transfer to low-income formal workers based on their gross income. The SUFE does not affect the tax base for the workers' PIT, and workers can credit the SUFE against their tax liability. Consequently, the SUFE and PIT may have quantitatively different effects on workers' occupational decisions.

### *Simulations of an Alternative SUFE Policy*

The SUFE in Mexico is granted as a function of gross income to reduce low-income workers' personal income taxes. The scheme is progressive in that the subsidy increases as the worker's income decreases. For illustrative purposes, table 3 presents the SUFE scheme in place in 2018, with the lower and upper bounds of gross monthly income defined by law. For example, if a worker earns MXN 6,500 per month, the SUFE granted amounts to

14. From a technical view, the numerical solution to the nonlinear system above is generally non-unique. We therefore tried alternative initial parameter values to find the best fit to the data. However, the calibration of the income distribution is far from perfect. The fraction of workers earning between two and three times the minimum wage is underestimated by two percentage points, implying that the earnings distribution between three and five times the minimum wage is overestimated by the same amount.

15. The simulation exercises generate a change in the government's budget balance in all cases. To generate a policy that is balance neutral, the government could implement lump sum transfers (taxes) to all workers in the event of an increase (decrease) in the budget balance. Under such a policy, the set of occupational choice allocations described by equations 12–15 would not change because all workers would receive the same lump sum transfer (alternatively, pay the same lump sum tax). Of course, such a policy would change both workers' earnings and utilities.

**TABLE 3. SUFE Scheme, 2018**
Monthly income in pesos

| *Lower bound* | *Upper bound* | *Subsidy* |
|---|---|---|
| 0.01 | 1,768.96 | 407.02 |
| 1,768.97 | 2,653.38 | 406.83 |
| 2,653.39 | 3,472.84 | 406.62 |
| 3,472.85 | 3,537.87 | 392.77 |
| 3,537.88 | 4,446.15 | 382.46 |
| 4,446.16 | 4,717.18 | 354.23 |
| 4,717.19 | 5,335.42 | 324.87 |
| 5,335.43 | 6,224.67 | 294.63 |
| 6,224.68 | 7,113.90 | 253.54 |
| 7,113.91 | 7,382.33 | 217.61 |
| 7,382.34 | Onward | 0 |

Source: Ministry of Finance.

MXN 253.54. Workers who earn more than MXN 7,382.33 per month have no right to the SUFE. Further explanation of this scheme can be found in online appendix A.

This section analyzes three potential changes to the SUFE: (1) eliminating the policy; (2) switching to a uniform transfer of MXN 400 per month to all formal wage workers regardless of income level; and (3) altering the benefit amount and the eligibility threshold. As shown below in detail, our findings suggest that eliminating the SUFE would reduce the formality rate by six percentage points, with an adverse overall impact on the fiscal accounts owing to rising informality. By contrast, switching to a uniform MXN 400 transfer to all formal workers would increase the formality rate by nearly three percentage points, but this improvement would come at a significant fiscal cost. Finally, altering the benefit amount and the eligibility threshold would increase the formality rate by 2.4 percentage points while yielding a modest improvement in the fiscal accounts.

Table 4 illustrates the effects of changes to the SUFE scheme on labor market outcomes, net incomes, the fiscal accounts, and the burden of PIT and SSCs. The table shows the baseline calibration of the different variables of interest, which can be compared to the values in the data. The definition of the budget balance used in the section on fiscal accounts corresponds to the public revenues and expenditures included in the model, not to the government's actual fiscal balance, which encompasses all public revenues and expenditures. The section on the tax burden reports on how PIT and SSC revenues are distributed between wage workers and employers.

**TABLE 4. Subsidy for Formal Employment (SUFE): Reform Simulations**

| | | | Reform model | | |
|---|---|---|---|---|---|
| *Variable* | *Data* | *Baseline model calibration* | *Elimination of subsidy to formal workers* | *Uniform subsidy of MXN 400 to all formal workers* | *Limited subsidy to formal workers* |
| *Occupation (as a share of employment)* | | | | | |
| Total informal | 0.658 | 0.658 | 0.720 | 0.630 | 0.634 |
| Own-account | 0.263 | 0.263 | 0.312 | 0.236 | 0.267 |
| Informal wage | 0.395 | 0.395 | 0.408 | 0.394 | 0.367 |
| Formal wage | 0.294 | 0.294 | 0.232 | 0.322 | 0.318 |
| Employers | 0.048 | 0.048 | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | | | |
| Total wage | 5,668 | 5,720 | 5,892 | 5,720 | 5,737 |
| Formal | 7,447 | 7,469 | 8,049 | 7,494 | 6,918 |
| Informal | 4,344 | 4,419 | 4,664 | 4,268 | 4,715 |
| Own-account | 4,762 | 2,766 | 2,887 | 2,695 | 2,778 |
| Employers | 12,817 | 12,817 | 12,407 | 12,995 | 12,805 |
| *Fiscal accounts (% of GDP)* | | | | | |
| Wage workers | | | | | |
| (A) Income tax | 3.10 | 3.10 | 3.07 | 2.11 | 3.49 |
| (B) SSC | n.a. | 0.29 | 0.24 | 0.31 | 0.32 |
| Employers | | | | | |
| (C) Income tax | 3.10 | 3.10 | 3.33 | 3.00 | 3.11 |
| (D) SSC | n.a. | 2.81 | 2.34 | 3.01 | 3.04 |
| Government: Contributory SS | | | | | |
| (E) SS revenue (B + D) | 3.10 | 3.10 | 2.59 | 3.32 | 3.36 |
| (F) SS expenditures | 0.53 | 0.53 | 0.44 | 0.57 | 0.57 |
| (G) Extra operating expenditures | . . . | . . . | –0.11 | 0.08 | 0.07 |
| (H) Balance (E – F – G) | 2.57 | 2.57 | 2.26 | 2.67 | 2.71 |
| Government: Other | | | | | |
| (I) Income tax revenues (A + C) | 6.20 | 6.20 | 6.40 | 5.10 | 6.60 |
| (J) Subsidy to formal employment | 0.20 | 0.20 | 0.00 | 0.59 | 0.19 |
| (K) Noncontributory SS | 1.70 | 1.70 | 1.92 | 1.61 | 1.64 |
| (L) Balance (I – J – K) | 4.30 | 4.30 | 4.48 | 2.91 | 4.78 |
| Government: Total | | | | | |
| (M) Revenue (E +I) | 9.30 | 9.30 | 8.99 | 8.42 | 9.96 |
| (N) Expenditures (F + G + J + K) | 2.43 | 2.43 | 2.25 | 2.85 | 2.47 |
| (O) Budget balance (M – N) | 6.87 | 6.87 | 6.74 | 5.58 | 7.49 |
| *Tax burden (%)* | | | | | |
| Income tax | | | | | |
| Wage workers | 50.0 | 50.0 | 48.0 | 41.2 | 52.8 |
| Employers | 50.0 | 50.0 | 52.0 | 58.8 | 47.2 |
| SSC | | | | | |
| Wage workers | n.a. | 9.4 | 9.5 | 9.4 | 9.4 |
| Employers | n.a. | 90.6 | 90.5 | 90.6 | 90.6 |

Source: Authors' elaboration.
. . . Not applicable.
n.a. Not available.

In the third column of table 4, the SUFE is eliminated for all formal wage workers, which causes the formality rate to drop from 29.4 to 23.2 percent, as some lower-income workers who currently benefit from the SUFE see their incentives shift in favor of informality. The exit of the lowest-skilled, lowest-paid workers from the formal sector increases the average wage for formal workers, $w_F^*$, to MXN 8,049 per month. Meanwhile, those previously formal workers become the most-skilled, highest-paid members of the informal workforce, which raises the average income of informal wage and own-account workers. However, the average earnings of employers decrease as average wages rise, suggesting that they benefit indirectly from the SUFE.

The decline in formality boosts CIT revenue because wages paid to formal workers are tax deductible for the employer, whereas the wages of informal workers are not.[16] Nevertheless, total fiscal revenue (row M) falls owing to the drop in both PIT (row A) and worker/employer SSCs (row E). Government spending decreases as the SUFE disappears (row J) and rising informality reduces contributory social security expenditures (row F), but the increase in informality also increases noncontributory social security expenditures (row K). In net terms, the budget balance deteriorates, falling from 6.87 to 6.74 percent of GDP. Overall, the elimination of the SUFE reduces the formality rate by six percentage points while marginally worsening the fiscal balance.

The fourth column in table 4 shows the effects of transforming the SUFE into a uniform transfer of MXN 400 per month to all formal workers. This change increases the formality rate by 2.8 percentage points to 32.2 percent of total employment. The uniform SUFE decreases the PIT liability of all formal workers, increasing their average net income while simultaneously reducing PIT revenue from 3.1 to 2.1 percent of GDP. As PIT revenue falls, the share of the CIT in total revenue rises from 50 to 58.8 percent, raising the tax burden on employers relative to workers. The increase in formalization has a positive fiscal impact, but the cost in forgone PIT revenue outweighs this effect. After the other fiscal implications have been accounted for, the budget balance deteriorates from 6.87 to 5.58 percent of GDP.

The last column in table 4 simulates changes to the SUFE designed to enhance its positive impact on both the formality rate and the fiscal balance. Under these changes, a uniform employment subsidy of MXN 400 per month

16. The elimination of the SUFE entails two conflicting effects on the total cost of hiring formal workers. On the one hand, lower earnings for formal workers cause the formal labor supply to fall and the equilibrium wage to increase. On the other hand, this causes the demand for formal work to decrease in equilibrium. In this specific case, the total cost decreases on average, which indicates that the fall in formal work is more significant than the wage increase.

**TABLE 5. PIT Schemes**
Monthly income in pesos

| *Lower bound* | *Upper bound* | *Fixed amount* | *Rate (%)* |
|---|---|---|---|
| *A. 2018 PIT table* | | | |
| 0.01 | 578.52 | 0.00 | 1.92 |
| 578.53 | 4,910.18 | 11.11 | 6.40 |
| 4,910.19 | 8,629.20 | 288.33 | 10.88 |
| 8,629.21 | 10,031.07 | 692.96 | 16.00 |
| 10,031.08 | 12,009.94 | 917.26 | 17.92 |
| 12,009.95 | 24,222.31 | 1,271.87 | 21.36 |
| 24,222.32 | 38,177.69 | 3,880.44 | 23.52 |
| 38,177.70 | 72,887.50 | 7,162.74 | 30.00 |
| 72,887.51 | 97,183.33 | 17,575.69 | 32.00 |
| 97,183.34 | 291,550.00 | 25,350.35 | 34.00 |
| 291,550.01 | Onward | 91,435.02 | 35.00 |
| *B. PIT table under reforms* | | | |
| 0.01 | 4,910.18 | 0.00 | 0.00 |
| 4,910.19 | 8,629.20 | 0.00 | 10.88 |
| 8,629.21 | 10,031.07 | 404.63 | 16.00 |
| 10,031.08 | 12,009.94 | 628.93 | 17.92 |
| 12,009.95 | 24,222.31 | 983.54 | 21.36 |
| 24,222.32 | 38,177.69 | 3,592.10 | 23.52 |
| 38,177.70 | 72,887.50 | 6,874.40 | 30.00 |
| 72,887.51 | 97,183.33 | 17,287.34 | 32.00 |
| 97,183.34 | 291,550.00 | 25,062.00 | 34.00 |
| 291,550.01 | Onward | 91,146.67 | 35.00 |

Sources: Ministry of Finance and authors' elaboration.

is provided to all formal wage workers earning up to MXN 4,910 per month. The eligibility ceiling for the maximum subsidy corresponds to the current upper bound of the second income bracket of the PIT scheme (see table 5).[17] Among formal wage workers earning more than MXN 4,910 per month, the SUFE decreases linearly until it reaches zero for workers with incomes of MXN 7,410 per month.[18] Overall, these changes shift the distribution of SUFE benefits toward lower-income formal workers.

These changes increase the formality rate while improving the fiscal balances. The positive effect on formality is similar to that observed under the uniform SUFE transfer. However, the fiscal balance changes markedly.

17. This amount represents 1.8 times the minimum wage for 2018. According to the ENOE, approximately 50 percent of Mexican employees in the private sector earn up to twice the minimum wage.

18. The gradual reduction of the SUFE is designed to ameliorate disincentives to formality generated by an abrupt elimination of the subsidy.

On one hand, higher levels of formality boost the collection of PIT and SSCs while leaving CIT revenues broadly unchanged. On the other hand, the fiscal cost of the SUFE declines relative to the baseline, as does spending on noncontributory social security programs; in contrast, higher levels of formality increase the government's SSCs, leaving total expenditures virtually unchanged. Overall, these changes to the SUFE would increase the fiscal balance from 6.87 to 7.49 percent of GDP while substantially raising the formality rate.

### *Simulation of Changes to the PIT Scheme*

Table 5 presents the impact of simulated changes to the PIT scheme. Panel A shows the baseline, which reflects the conditions that were in place in 2018. The first reform scenario grants a 100 percent tax exemption to formal workers in the first two income brackets. This exemption is applied by setting a 0 percent tax rate and a fixed payment amount of MXN 0 for the first two brackets, while all other tax rates remain unchanged. To avoid creating a tax notch, the fixed amount for the third income bracket would also be MXN 0, and the fixed amounts for the remaining brackets would be adjusted according to the formula currently used by the Ministry of Finance. Panel B of table 5 shows the PIT table for the proposed reform after combining the first two income brackets in panel A. As described next, eliminating PIT for workers in the lowest income brackets could significantly increase employment formality with almost no effect on the fiscal balance.

Table 6 shows the impact of these changes to the PIT scheme. Exempting incomes of up to MXN 4,910 per month from PIT liability increases the net incomes of low-wage formal workers, encouraging high-skilled informal workers to formalize. As a result, the formality rate increases by almost ten percentage points. Formalization among high-skilled informal workers reduces the average net earnings of both formal and informal employees as workers who were previously the highest-paid employees in the informal sector become the lowest-paid employees in the formal sector, while the inflow of low-skill workers into the formal sector further reduces its equilibrium wage rate. Although the outflow of labor from the informal sector raises its equilibrium wage rate, this effect is more than offset by the exit of highly paid workers from the informal sector, combined with an influx of formerly own-account workers seeking higher incomes as informal wage employees.

These changes to the PIT entail multiple countervailing effects on the fiscal accounts. Eliminating the tax liability of low-income workers causes

**TABLE 6. Personal Income Tax (PIT) Reform Simulations**

| *Variable* | *Data* | *Baseline calibration* | *Income tax exemption up to MXN 4,910* |
|---|---|---|---|
| *Occupation (as a share of employment)* | | | |
| Total informal | 0.658 | 0.658 | 0.559 |
| Own-account | 0.263 | 0.263 | 0.183 |
| Informal wage | 0.395 | 0.395 | 0.376 |
| Formal wage | 0.294 | 0.294 | 0.393 |
| Employers | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | |
| Total wage | 5,668 | 5,720 | 5,549 |
| Formal | 7,447 | 7,469 | 6,978 |
| Informal | 4,344 | 4,419 | 4,054 |
| Own-account | 4,762 | 2,766 | 2,547 |
| Employers | 12,817 | 12,817 | 13,376 |
| *Fiscal accounts (% of GDP)* | | | |
| Wage workers | | | |
| (A) Income tax | 3.10 | 3.10 | 2.67 |
| (B) SSC | n.a. | 0.29 | 0.36 |
| Employers | | | |
| (C) Income tax | 3.10 | 3.10 | 2.80 |
| (D) SSC | n.a. | 2.81 | 3.51 |
| Government: Contributory SS | | | |
| (E) SS revenue (B + D) | 3.10 | 3.10 | 3.87 |
| (F) SS expenditures | 0.53 | 0.53 | 0.67 |
| (G) Extra operating expenditures | . . . | . . . | 0.24 |
| (H) Balance (E − F − G) | 2.57 | 2.57 | 2.96 |
| Government: Other | | | |
| (I) Income tax revenues (A + C) | 6.20 | 6.20 | 5.47 |
| (J) Subsidy to formal employment | 0.20 | 0.20 | 0.27 |
| (K) Noncontributory SS | 1.70 | 1.70 | 1.38 |
| (L) Balance (I − J − K) | 4.30 | 4.30 | 3.82 |
| Government: Total | | | |
| (M) Revenue (E + I) | 9.30 | 9.30 | 9.34 |
| (N) Expenditures (F + G + J + K) | 2.43 | 2.43 | 2.56 |
| (O) Budget balance (M − N) | 6.87 | 6.87 | 6.78 |
| *Tax burden (%)* | | | |
| Income tax | | | |
| Wage workers | 50.0 | 50.0 | 48.8 |
| Employers | 50.0 | 50.0 | 51.2 |
| SSC | | | |
| Wage workers | n.a. | 9.4 | 9.3 |
| Employers | n.a. | 90.6 | 90.7 |

Source: Authors' elaboration.
. . . Not applicable.
n.a. Not available.

PIT revenue to fall to 2.67 percent of GDP, while the rising formalization rate allows firms to increase their tax deductions, causing a slight drop in CIT revenue. Since the former effect is greater than the latter, the relative income tax burden on firms rises from 50 to 51.2 percent. While income tax revenue declines, formalization increases SSCs, leaving fiscal revenue largely unchanged. Meanwhile, total expenditures increase from 2.43 to 2.56 percent of GDP because of higher spending on SSC, the SUFE, and health care (row G, extra operating expenditures). Consequently, the budget balance deteriorates slightly relative to the baseline.

### *Simulation of Simultaneous Changes to the PIT and SUFE*

This section simulates the effects of modifying both the PIT and SUFE schemes, a scenario described in the tables as the full reform. The change to the PIT is the same as that described in the previous section, while the change to the SUFE is the scenario in which a unform transfer of MXN 400 per month is granted to all workers with an income of up to MXN 4,910 per month, with transfer amounts being progressively reduced above that level and ultimately eliminated for earnings of MXN 7,410 per month or more. As the changes to the PIT and SUFE both incentivize formalization individually, their combined effect is especially large. Under the full reform scenario, the formality rate rises by nearly 12 percentage points. Meanwhile, the positive fiscal impact of the change in the SUFE outweighs the negative impact of the PIT change, resulting in a modest net improvement in the government's budget balance.

Table 7 presents the model's results in terms of employment, average earnings, and the average utility of disposable income. The combination of the PIT exemption for the first two income brackets and the redesign of the SUFE increases the share of formal wage employees from 29.4 to 41.3 percent of total employment. As discussed above, these measures strongly incentivize labor formalization mainly at the expense of own-account workers. They also decrease average net earnings for both formal and informal employment as the most highly skilled own-account and informal wage workers enter informal wage and formal wage occupations, respectively.

Table 7 also shows the average utility of disposable income for workers in both scenarios, monetized in pesos per month. In our model, workers' utility is equivalent to their earnings, given by equations 9, 10, and 11. Therefore, the difference between the average utility of disposable income and net income for both own-account workers and informal wage employees is explained by their valuation of lump sum transfers. For formal employees, the difference

**TABLE 7. Effects of the Combined PIT and SUFE Reforms on Occupational Choice, Net Income, and Average Utility of Disposable Income**

| *Variable* | *Data* | *Baseline model* | *Full reform model* |
|---|---|---|---|
| *Occupation (as a share of employment)* | | | |
| Total informal | 0.658 | 0.658 | 0.539 |
| Own-account | 0.263 | 0.263 | 0.179 |
| Informal wage | 0.395 | 0.395 | 0.360 |
| Formal wage | 0.294 | 0.294 | 0.413 |
| Employers | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | |
| Total wage | 5,668 | 5,720 | 5,545 |
| Formal | 7,447 | 7,469 | 6,700 |
| Informal | 4,344 | 4,419 | 4,223 |
| Own-account | 4,762 | 2,766 | 2,536 |
| Employers | 12,817 | 12,817 | 13,331 |
| *Average utility of disposable income (pesos per month)* | | | |
| Formal wage | ... | 8,441 | 7,556 |
| Informal wage | ... | 5,225 | 5,029 |
| Own-account | ... | 3,572 | 3,342 |
| Employers | ... | 12,817 | 13,331 |

Source: Authors' elaboration.
... Not applicable.

reflects the valuation of their social security benefits plus the fringe benefits conferred by formal employment, and thus the utility and net income of these workers move in the same direction. For entrepreneurs, utility is assumed to be identical to net benefits.

Table 8 shows how the combined changes to the PIT and SUFE affect the fiscal accounts. Under this scenario, PIT revenue increases slightly relative to the scenario in which the PIT is reformed while the SUFE is left unchanged (see table 6). This effect occurs for two reasons. First, because the modified SUFE is less favorable for wage earners with incomes greater than MXN 5,600 per month, the SUFE reform increases the amount of PIT collected from workers with incomes between MXN 5,600 and MXN 7,400 per month. Second, higher formalization expands the PIT tax base. This increase in formalization also raises revenue from SSCs. Overall, the changes implemented under the full reform scenario increase total government revenue by 0.34 percent of GDP relative to the baseline.

Table 8 also shows the effects of the combined PIT and SUFE reforms on public spending. Higher formality rates increase expenditures on contributory social security to 0.71 percent of GDP while boosting extra operating expenses

**TABLE 8. Effects of the Combined PIT and SUFE Reforms on the Fiscal Accounts**

| *Variable* | *Data* | *Baseline model* | *Full reform model* |
|---|---|---|---|
| *Fiscal accounts (% of GDP)* | | | |
| Wage workers | | | |
| (A) Income tax | 3.10 | 3.10 | 2.90 |
| (B) SSC | n.a. | 0.29 | 0.38 |
| Employers | | | |
| (C) Income tax | 3.10 | 3.10 | 2.81 |
| (D) SSC | n.a. | 2.81 | 3.70 |
| Government: Contributory SS | | | |
| (E) SS revenue (B + D) | 3.10 | 3.10 | 4.08 |
| (F) SS expenditures | 0.53 | 0.53 | 0.71 |
| (G) Extra operating expenditures | . . . | . . . | 0.27 |
| (H) Balance (E − F − G) | 2.57 | 2.57 | 3.09 |
| Government: Other | | | |
| (I) Income tax revenues (A + C) | 6.20 | 6.20 | 5.71 |
| (J) Subsidy to formal employment | 0.20 | 0.20 | 0.25 |
| (K) Noncontributory SS | 1.70 | 1.70 | 1.34 |
| (L) Balance (I − J − K) | 4.30 | 4.30 | 4.12 |
| Government: Total | | | |
| (M) Revenue (E + I) | 9.30 | 9.30 | 9.78 |
| (N) Expenditures (F + G + J + K) | 2.43 | 2.43 | 2.57 |
| (O) Budget balance (M − N) | 6.87 | 6.87 | 7.21 |
| *Tax burden (%)* | | | |
| Income tax | | | |
| Wage workers | 50.0 | 50.0 | 50.9 |
| Employers | 50.0 | 50.0 | 49.2 |
| SSC | | | |
| Wage workers | n.a. | 9.4 | 9.3 |
| Employers | n.a. | 90.6 | 90.7 |

Source: Authors' elaboration.
. . . Not applicable.
n.a. Not available.

in health care by 0.27 percent of GDP. However, formalization also decreases spending on noncontributory social security transfers to informal workers, and total government spending increases by just 0.14 percent of GDP. Because the increase in revenues exceeds the increase in expenditures, the budget balance improves relative to the baseline. The combined reforms successfully encourage labor formalization while also strengthening the fiscal accounts, yielding clear benefits in two major economic policy areas while incurring no evident cost.

Finally, table 8 reports how the burden of income taxes and SSCs is distributed between workers and employers. The reform slightly increases the

income tax burden borne by workers from 50.0 to 50.9 percent, but the SSC burden remains broadly unchanged.

## Sensitivity Analysis

The results presented above are based on specific parameter values. However, some values are determined a priori, as no comparable evidence is presented in the literature. To test the robustness of the results, we conduct a sensitivity analysis of the full reform scenario. The analysis shows that the combined PIT and SUFE reforms generate a significant increase in employment formality and a modest improvement in the fiscal accounts under a range of alternative parameter values.

The following parameters are considered for this analysis: the parameter related to the elasticity of substitution between formal and informal wage labor ($\psi$); returns to scale for the production function of the entrepreneur ($\gamma$); the valuation of social security benefits ($\beta_F$) and noncontributory transfers ($\beta_I$); returns to scale for the skill levels of informal wage workers ($\alpha$); and the lower and upper bounds for labor ability ($\underline{e}$ and $\overline{e}$). The first two parameters are directly related to the labor demand of entrepreneurs; the next three are labor supply parameters affecting the occupational choices of workers; and the last two relate to the distribution of labor ability. In each of the following exercises, a single parameter is changed, and the ten parameters under the third group are reestimated to match the moments of table 2. We also present an exercise in which three parameters are simultaneously changed.

For $\psi$, we consider the alternative values of $\psi = 0$ and $\psi = -9$, which imply elasticities of substitution between formal and informal labor of 1 and 0.1, respectively, instead of the elasticity value of 10 used in the baseline scenario. Lower values for $\psi$ reflect a diminished willingness among employers to substitute formal for informal labor, which attenuates the impact of the reforms on formalization. For parameter $\gamma$, alternative values of 0.67 and 0.82 are adopted instead of the original value of 0.76. A lower value for $\gamma$ implies a decrease in the marginal product of labor, which discourages the hiring of wage workers, while a higher value implies the opposite. Decreasing the value of parameter $\beta_F$ from 0.30 to 0.05 means that workers value their social security benefits 83 percent less than in the baseline scenario, while increasing the value of $\beta_F$ from 0.30 to 0.60 means that they value those benefits twice as highly as in the baseline. Raising the value for $\beta_I$ from 0.85 to 1 increases the valuation of lump sum transfers, encouraging informal employment at the

expense of formal employment, whereas reducing the value for $\beta_I$ to 0.35 has the opposite effect. For $\alpha$, we use an alternative value of 0.9, which is slightly above the benchmark value of 0.857. For labor ability, we raise the lower bound of *e* while lowering its upper bound, narrowing the domain of the distribution, which has unpredictable implications for the impact of the reforms on the formalization rate.

Tables 9, 10, and 11 present the results of the sensitivity analysis, as well as the simulation conducted under the baseline scenario. We begin by analyzing changes in a single parameter. For occupational choices, the strong effect on formality reported above is robust to alternative parameter values. Even in the least favorable scenario ($\psi = 0$), the formality rate increases to 37 percent. Changes in average net income relative to the baseline are registered across all occupation types, but these changes are modest. Changes to the fiscal accounts are also relatively small but uniformly positive: in the least favorable scenario, the budget balance rises from 6.87 percent of GDP to 7.05 percent.

The last column of table 11 shows the results of a simulation in which three parameters are simultaneously changed to make formalization more difficult. The elasticity of substitution between formal and informal wage workers is set to 1 ($\psi = 0$), while $\beta_F$ and $\beta_I$ are set at 0.05 and 1, respectively. Even in this scenario, the formality rate rises by seven percentage points over the baseline, from 29.4 to 36.4 percent, while the fiscal balance remains broadly unchanged.

The sensitivity analysis indicates that the results obtained are robust to a range of alternative parameter values. Even under the least favorable scenario, the combined reforms would have a highly positive impact on formalization while incurring no significant fiscal cost.

## Conclusion

This paper has presented a static general equilibrium model of occupational choice with heterogeneous labor and entrepreneurial skills to evaluate how changes in the labor income tax scheme would affect employment informality and the fiscal accounts. Heterogeneity in labor skills is important because it generates an income distribution and a corresponding income-based tax and subsidy structure, capturing an important characteristic of tax schemes observed in countries around the world. Heterogeneity in entrepreneurial skills is also relevant because it allows larger firms to hire more formal workers than smaller

**TABLE 9. Sensitivity Analysis of the Combined PIT and SUFE Reforms: Labor Demand Parameters**

| Variable | Benchmark model: full reform | Sensitivity analysis | | | |
|---|---|---|---|---|---|
| | | $\psi = 0$ | $\psi = -9$ | $\gamma = 0.67$ | $\gamma = 0.82$ |
| *Occupation (as a share of employment)* | | | | | |
| Total informal | 0.539 | 0.582 | 0.581 | 0.558 | 0.529 |
| Own-account | 0.179 | 0.179 | 0.171 | 0.195 | 0.162 |
| Informal wage | 0.360 | 0.403 | 0.410 | 0.362 | 0.367 |
| Formal wage | 0.413 | 0.370 | 0.371 | 0.394 | 0.423 |
| Employers | 0.048 | 0.048 | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | | | |
| Total wage | 5,545 | 5,539 | 5,521 | 5,579 | 5,509 |
| Formal | 6,700 | 6,742 | 6,748 | 6,707 | 6,702 |
| Informal | 4,223 | 4,433 | 4,411 | 4,351 | 4,136 |
| Own-account | 2,536 | 2,536 | 2,510 | 2,583 | 2,482 |
| Employers | 13,331 | 13,374 | 13,383 | 13,214 | 13,377 |
| *Fiscal accounts (% of GDP)* | | | | | |
| Wage workers | | | | | |
| (A) Income tax | 2.90 | 2.82 | 2.83 | 2.79 | 3.03 |
| (B) SSC | 0.38 | 0.35 | 0.35 | 0.37 | 0.39 |
| Employers | | | | | |
| (C) Income tax | 2.81 | 3.07 | 3.07 | 2.93 | 2.73 |
| (D) SSC | 3.70 | 3.26 | 3.27 | 3.55 | 3.79 |
| Government: Contributory SS | | | | | |
| (E) SS revenue (B + D) | 4.08 | 3.61 | 3.62 | 3.92 | 4.18 |
| (F) SS expenditures | 0.71 | 0.61 | 0.61 | 0.68 | 0.72 |
| (G) Extra operating expenditures | 0.27 | 0.21 | 0.21 | 0.23 | 0.30 |
| (H) Balance (E − F − G) | 3.09 | 2.79 | 2.80 | 3.00 | 3.16 |
| Government: Other | | | | | |
| (I) Income tax revenues (A + C) | 5.71 | 5.89 | 5.89 | 5.72 | 5.76 |
| (J) Subsidy to formal employment | 0.25 | 0.19 | 0.20 | 0.24 | 0.25 |
| (K) Noncontributory SS | 1.34 | 1.44 | 1.44 | 1.40 | 1.31 |
| (L) Balance (I − J − K) | 4.12 | 4.26 | 4.25 | 4.08 | 4.20 |
| Government: Total | | | | | |
| (M) Revenue (E + I) | 9.78 | 9.50 | 9.51 | 9.64 | 9.93 |
| (N) Expenditures (F + G + J + K) | 2.57 | 2.45 | 2.46 | 2.55 | 2.58 |
| (O) Budget balance (M − N) | 7.21 | 7.05 | 7.05 | 7.08 | 7.35 |
| *Tax burden (%)* | | | | | |
| Income tax | | | | | |
| Wage workers | 50.9 | 47.9 | 48.0 | 48.8 | 52.6 |
| Employers | 49.2 | 52.1 | 52.0 | 51.2 | 47.4 |
| SSC | | | | | |
| Wage workers | 9.3 | 9.6 | 9.7 | 9.3 | 9.3 |
| Employers | 90.7 | 90.4 | 90.3 | 90.7 | 90.7 |

Source: Authors' elaboration.

**TABLE 10. Sensitivity Analysis of the Combined PIT and SUFE Reforms: Labor Supply Parameters**

| Variable | Benchmark model: full reform | Sensitivity analysis | | | | |
|---|---|---|---|---|---|---|
| | | $\beta_F = 0.05$ | $\beta_F = 0.60$ | $\beta_I = 0.35$ | $\beta_I = 1$ | $\alpha = 0.9$ |
| *Occupation (as a share of employment)* | | | | | | |
| Total informal | 0.539 | 0.543 | 0.549 | 0.510 | 0.548 | 0.529 |
| Own-account | 0.179 | 0.185 | 0.189 | 0.194 | 0.173 | 0.205 |
| Informal wage | 0.360 | 0.357 | 0.360 | 0.316 | 0.375 | 0.323 |
| Formal wage | 0.413 | 0.409 | 0.403 | 0.442 | 0.404 | 0.423 |
| Employers | 0.048 | 0.048 | 0.048 | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | | | | |
| Total wage | 5,545 | 5,515 | 5,486 | 5,304 | 5,481 | 5,705 |
| Formal | 6,700 | 6,743 | 6,568 | 5,995 | 6,790 | 6,446 |
| Informal | 4,223 | 4,108 | 4,276 | 4,338 | 4,070 | 4,735 |
| Own-account | 2,536 | 2,640 | 2,249 | 1,876 | 2,547 | 2,414 |
| Employers | 13,331 | 13,293 | 13,320 | 13,289 | 13,315 | 13,184 |
| *Fiscal accounts (% of GDP)* | | | | | | |
| Wage workers | | | | | | |
| (A) Income tax | 2.90 | 2.93 | 2.72 | 3.16 | 2.87 | 3.02 |
| (B) SSC | 0.38 | 0.38 | 0.37 | 0.41 | 0.37 | 0.40 |
| Employers | | | | | | |
| (C) Income tax | 2.81 | 2.80 | 2.87 | 2.86 | 2.81 | 2.84 |
| (D) SSC | 3.70 | 3.65 | 3.66 | 4.00 | 3.61 | 3.85 |
| Government: Contributory SS | | | | | | |
| (E) SS revenue (B + D) | 4.08 | 4.02 | 4.03 | 4.42 | 3.99 | 4.25 |
| (F) SS expenditures | 0.71 | 0.70 | 0.71 | 0.77 | 0.69 | 0.74 |
| (G) Extra operating expenditures | 0.27 | 0.27 | 0.24 | 0.33 | 0.26 | 0.29 |
| (H) Balance (E − F − G) | 3.09 | 3.05 | 3.08 | 3.32 | 3.04 | 3.22 |
| Government: Other | | | | | | |
| (I) Income tax revenues (A + C) | 5.71 | 5.72 | 5.59 | 6.01 | 5.68 | 5.86 |
| (J) Subsidy to formal employment | 0.25 | 0.25 | 0.25 | 0.26 | 0.24 | 0.26 |
| (K) Noncontributory SS | 1.34 | 1.35 | 1.37 | 1.27 | 1.36 | 1.33 |
| (L) Balance (I − J − K) | 4.12 | 4.13 | 3.97 | 4.48 | 4.08 | 4.27 |
| Government: Total | | | | | | |
| (M) Revenue (E + I) | 9.78 | 9.74 | 9.61 | 10.43 | 9.67 | 10.11 |
| (N) Expenditures (F + G + J + K) | 2.57 | 2.56 | 2.57 | 2.63 | 2.55 | 2.61 |
| (O) Budget balance (M − N) | 7.21 | 7.18 | 7.05 | 7.80 | 7.11 | 7.50 |
| *Tax burden (%)* | | | | | | |
| Income tax | | | | | | |
| Wage workers | 50.9 | 51.2 | 48.6 | 52.5 | 50.5 | 51.6 |
| Employers | 49.2 | 48.8 | 51.4 | 47.5 | 49.5 | 48.4 |
| SSC | | | | | | |
| Wage workers | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 |
| Employers | 90.7 | 90.7 | 90.7 | 90.7 | 90.7 | 90.7 |

Source: Authors' elaboration.

**TABLE 11. Sensitivity Analysis of the Combined PIT and SUFE Reforms: Skills Distribution and Multiple Changes**

| Variable | Benchmark model: full reform | Sensitivity analysis | |
|---|---|---|---|
| | | $\underline{e} = 0.3, \overline{e} = 10$ | $\psi = 0, \beta_F = 0.01, \beta_I = 1$ |
| *Occupation (as a share of employment)* | | | |
| Total informal | 0.539 | 0.531 | 0.588 |
| Own-account | 0.179 | 0.182 | 0.171 |
| Informal wage | 0.360 | 0.349 | 0.417 |
| Formal wage | 0.413 | 0.421 | 0.364 |
| Employers | 0.048 | 0.048 | 0.048 |
| *Average net income (pesos per month)* | | | |
| Total wage | 5,545 | 5,537 | 5,454 |
| Formal | 6,700 | 6,560 | 6,948 |
| Informal | 4,223 | 4,301 | 4,151 |
| Own-account | 2,536 | 2,722 | 2,618 |
| Employers | 13,331 | 13,336 | 13,482 |
| *Fiscal accounts (% of GDP)* | | | |
| Wage workers | | | |
| (A) Income tax | 2.90 | 2.76 | 2.74 |
| (B) SSC | 0.38 | 0.38 | 0.34 |
| Employers | | | |
| (C) Income tax | 2.81 | 2.80 | 3.05 |
| (D) SSC | 3.70 | 3.79 | 3.19 |
| Government: Contributory SS | | | |
| (E) SS revenue (B + D) | 4.08 | 4.17 | 3.53 |
| (F) SS expenditures | 0.71 | 0.74 | 0.60 |
| (G) Extra operating expenditures | 0.27 | 0.28 | 0.19 |
| (H) Balance (E − F − G) | 3.09 | 3.15 | 2.74 |
| Government: Other | | | |
| (I) Income tax revenues (A + C) | 5.71 | 5.56 | 5.79 |
| (J) Subsidy to formal employment | 0.25 | 0.27 | 0.20 |
| (K) Noncontributory SS | 1.34 | 1.32 | 1.45 |
| (L) Balance (I − J − K) | 4.12 | 3.97 | 4.15 |
| Government: Total | | | |
| (M) Revenue (E + I) | 9.78 | 9.72 | 9.33 |
| (N) Expenditures (F + G + J + K) | 2.57 | 2.60 | 2.44 |
| (O) Budget balance (M − N) | 7.21 | 7.12 | 6.88 |
| *Tax burden (%)* | | | |
| Income tax | | | |
| Wage workers | 50.9 | 49.6 | 47.4 |
| Employers | 49.2 | 50.4 | 52.6 |
| SSC | | | |
| Wage workers | 9.3 | 9.2 | 9.7 |
| Employers | 90.7 | 90.8 | 90.3 |

Source: Authors' elaboration.

firms, reflecting another important feature of the data. The model has been calibrated for Mexico, which is characterized by a high rate of labor informality. The analysis included various reforms to the current SUFE and PIT schemes, both separately and together, and their estimated impacts on labor formality and the fiscal accounts.

The exercises indicate that minor modifications to the current labor tax and subsidy scheme could have large positive effects on labor formality with no adverse impact on the fiscal balance. Modifying the SUFE schedule while eliminating the PIT liability of the lowest-income formal workers strongly incentivizes formalization, and our simulations suggest that these measures could increase the formality rate by between 7.0 and 11.9 percentage points. Importantly, these changes to tax and subsidy policies would entail no net cost to the government: the fiscal balance would either remain constant or modestly improve. Meanwhile, the distribution of the income tax burden between workers and employers would shift only slightly relative to the baseline scenario.

The simulation exercises presented above underscore how general equilibrium models can yield important insights into prospective changes to income tax and subsidy policies in contexts of high labor informality. For example, in the scenario where the SUFE is eliminated, the government balance does not improve in response to the decrease in subsidy spending, but rather deteriorates because of a sharp increase in informality. Similarly, reducing the PIT liability for low-income workers can improve the fiscal balances by increasing the formality rate, which more than compensates for the loss of direct tax revenue. These counterintuitive results are better understood once the endogenous links between informality and the tax base have been considered.

Despite the important results obtained by the simulations, the model could be developed further to address some of its limitations. For example, because of its static nature, the model is unable to produce a transitional path to a new equilibrium after the introduction of fiscal changes. During the transitional period, such changes may be substantially different from those observed under the new equilibrium. Another extension relates to the inclusion of informal firms that hire wage workers, which could enable the model to explicitly evaluate the effect of changes in the labor income tax scheme on those firms.

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