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Frederico Alencar (Federal University of Ceara)
Marcus Araripe (Federal University of Ceara)
Marcelo Arbex (University of Windsor)
Marcio V. Correa (Federal University of Ceara)

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Laffer Curves in Brazil: The Tax Evasion Effect

Frederico A. G. Alencar‡ **Marcus A. F. Araripe***

Marcelo Arbex# **Márcio V. Corrêa**†

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Abstract

This paper quantifies the impact of tax evasion on the labor-income Laffer curve in Brazil. We develop a heterogeneous-agent model with incomplete markets, progressive taxation, and imperfect tax enforcement. Beyond the well-known arithmetic and economic effects, the model highlights a novel *evasion effect* – higher statutory rates induce greater concealment of income and reduce effective tax collections. Calibrated to Brazilian data, the model shows that the aggregate Laffer curve peaks at a marginal rate of 25.3%, below the current 27.5%. Tax evasion reduces potential revenue by up to 54% (3.1% of GDP), with losses concentrated among high-income households. A disaggregated analysis further reveals heterogeneous responses across income groups, underscoring distributional and policy implications.

Keywords: Laffer Curve; Tax Evasion; Labor Income Taxation; General Equilibrium.
JEL Classification: E20; E60; D85; H26; I10

*CAEN - Graduate Studies in Economics, Federal University of Ceará, Brazil. Email: marcusafa@hotmail.com. ‡CAEN - Graduate Studies in Economics, Federal University of Ceará, Brazil. E-mail: fredericoalencar91@gmail.com; †CAEN - Graduate Studies in Economics, Federal University of Ceará, Brazil. Email: marciovcorrea@caen.ufc.br; # Department of Economics, University of Windsor, Canada. E-mail: arbex@uwindsor.ca.

1 Introduction

The relationship between taxation and government revenues lies at the heart of public finance. A central framework for understanding this relationship is the Laffer curve, which posits that increases in tax rates generate two opposing forces: an *arithmetic effect*, through which higher rates directly increase revenue, and an *economic effect*, whereby higher rates distort behavior and eventually reduce revenues. The balance of these forces yields an inverted-U shape, where government revenue peaks at some intermediate tax rate (Laffer, 2004). Although extensively studied in advanced economies (e.g., Trabandt and Uhlig, 2011; Holter et al., 2019), relatively little is known about the shape of the Laffer curve in emerging markets (e.g., Alba and McKnight, 2023), where high inequality, weak tax enforcement, and widespread informality create additional channels of fiscal inefficiency. This gap is particularly salient in the case of Brazil, a country with one of the world's most complex tax systems and a persistent struggle with tax evasion.

Brazil's tax system illustrates these challenges clearly. While progressive labor income taxes are administered centrally, their redistributive impact is limited in practice. The effective tax rate rises only moderately with income, and tax compliance is low: in 2019, just 32% of the labor force filed a return, with the majority of lower-income households excluded due to the filing threshold. At the same time, high reliance on indirect consumption taxes creates regressive burdens (Lustig et al., 2014a,b; Higgins and Pereira, 2014). This structure results in both inefficiency and inequity, eroding fiscal capacity and contributing to inequality. Understanding how tax evasion interacts with the Laffer curve is therefore crucial for assessing the revenue potential of Brazil's tax system and for informing fiscal reforms.

A vast body of research has examined the determinants of tax evasion. The foundation of the modern economic analysis of evasion was laid by Allingham and Sandmo (1972a), who modeled taxpayer behavior as a portfolio choice under risk, showing that the amount of income concealed depends on statutory rates, audit probabilities, and penalties. Their framework predicted that evasion would fall as detection risks or fines increased. Yitzhaki (1974) modified this model by assuming that penalties are proportional to the amount of taxes evaded, eliminating the substitution effect and implying that higher tax rates should lead to greater compliance. However, a broad range of empirical studies across different countries - including the U.S., Jamaica, Germany, and Switzerland – have typically found a positive correlation between higher tax rates and greater evasion (Clotfelter, 1983; Slemrod, 1985; Alm et al., 1990; Lang et al., 1997; Pommerehne and Weck-Hannemann, 1996).

Subsequent research has emphasized that the way evasion is embedded in theoretical models has direct implications for tax collection. In static settings, factors such as social norms (Gordon, 1989b), tax prepayment schemes (Yaniv, 1999), and peer effects in reporting behavior (Panadés, 2004) all shape compliance responses to higher statutory rates. Behavioral approaches inspired by prospect theory (Dhami and Al-Nowaihi, 2007) suggest that taxpayers may become risk-seeking at higher rates, thereby raising evasion and lowering effective collections. In dynamic general equilibrium contexts, the relationship becomes richer still: Lin and Yang (2001) and Chen (2003) showed that while higher rates may suppress evasion in static models, they can increase it when households smooth consumption over time. Similarly, Caballé and Panadés (2007) and Lee (2015) demonstrated that whether fines are levied on undeclared income or on unpaid taxes crucially affects revenue outcomes. Together, this literature demonstrates that the link between statutory rates, compliance, and revenues is not mechanical but depends on the precise modeling of evasion incentives.

Our paper builds directly on these insights by explicitly incorporating tax evasion into the analysis of the labor income Laffer curve for Brazil. We construct a heterogeneous-agent model with incomplete markets, borrowing constraints, progressive labor income taxation, and an audit policy conducted by the national tax authority. Households differ in wealth and productivity, choose hours worked, and decide what fraction of labor income taxes to evade, subject to penalties if caught. They also face idiosyncratic shocks and borrowing constraints, while a representative firm rents capital and labor to produce the final good. This framework allows us to quantify not only the arithmetic and economic effects of taxation, but also a third component: the *evasion effect*, whereby higher tax rates induce households to conceal more income, reducing effective collections.

We calibrate our benchmark model to Brazilian data and compare two scenarios: one with tax evasion and one with perfect enforcement. Our results show that the aggregate labor income Laffer curve for Brazil is right-skewed and inverted-U shaped, peaking at a marginal tax rate of 25.3%. Since the current top statutory rate is 27.5%, Brazil is already on the downward-sloping side of the curve. A modest reduction in the tax rate – for example, from 27.5% to 25.3% – would increase government revenues. Importantly, the model estimates the fiscal cost of evasion at up to 54% of potential revenue, or 3.1% of GDP, with most of the tax gap concentrated in the top quartile of the labor income distribution. These findings are consistent with international evidence that wealthier households account for the bulk of evasion (Alstadsaeter et al., 2023).

The model also replicates several key features of the Brazilian economy. Ratios of consumption-to-GDP and investment-to-GDP are closely aligned with data from the Penn World Tables, and the distribution of labor income across deciles is accurately reproduced, albeit with slight over-estimation in middle deciles. Going further, we conduct a disaggregated analysis of the Laffer curve by income deciles, revealing stark heterogeneity. While the first three deciles contribute no revenue due to incomes below the filing threshold, the top decile accounts for more than 65% of total collections, with deciles 8 and 9 contributing 13% and 20.5%, respectively. The peaks of the decile-specific Laffer curves differ, with higher peaks for richer households. Under current rates, only the top three deciles are located on the downward slope of the aggregate curve, meaning further tax increases would reduce their contributions.

Our contribution is threefold. First, we integrate incomplete markets, household heterogeneity, and tax evasion into the construction of the Laffer curve for Brazil, extending previous work on advanced economies (Trabandt and Uhlig, 2011; Holter et al., 2019) and developing countries (Alba and McKnight, 2023). Second, we provide quantitative estimates of the economic cost of labor income tax evasion, linking micro-level compliance behavior to aggregate fiscal capacity. Third, we highlight the distributional implications of taxation and evasion by analyzing Laffer curves across income groups, showing that policy changes have uneven effects across the population. Taken together, these findings underscore the importance of accounting for heterogeneity and evasion when evaluating the revenue potential of fiscal policy.

From a policy perspective, our analysis suggests that Brazil's statutory labor income tax rates are already beyond the revenue-maximizing level, and that improving enforcement – particularly among wealthier households – would be more effective than raising rates further. Moreover, the heterogeneity of responses across income groups points to the need for targeted reforms that enhance compliance while avoiding disproportionate burdens on lower- and middle-income households. By explicitly incorporating the evasion effect into the Laffer curve, this paper provides a framework for understanding how taxation, enforcement, and inequality interact to shape fiscal capacity in Brazil.

The paper is organized as follows. Section 2 presents the heterogeneous-agent model with incomplete markets and imperfect tax enforcement. We describe the households' decision problems, the firm's production technology, and the government's tax and audit policies. Section 3 brings the model to the data in order to quantify the mechanisms outlined above. We first characterize how the *arithmetic, economic, and evasion effects* jointly shape the Brazilian labor-income Laffer curve, and then analyze how these effects vary across the income distribution. Section 4 concludes the paper.

2 The Economy

This section presents a heterogeneous agent model with incomplete markets and imperfect tax enforcement. A continuum of infinitely lived households faces idiosyncratic productivity risk and self-insures using a single risk-free asset subject to a borrowing constraint. Households choose consumption, hours worked, asset holdings, and the fraction of labor income to avoid. A representative firm operates a standard constant-return technology and rents capital and hires labor competitively. The fiscal authority taxes consumption, labor income, and asset returns, but enforces labor-income taxation imperfectly through random audits and fines. Equilibrium features a stationary joint distribution over assets, labor, and productivity, together with prices that clear factor markets and a government budget constraint that internalizes monitoring costs. There is no aggregate uncertainty.

The economy evolves in discrete time. At the beginning of each period t, households carry asset holdings a_t drawn from the endogenous wealth distribution H_t. A productivity shock is then realized at the individual level. Given prices and policy, households choose allocations;

firms optimally demand capital and labor; and the tax authority audits a subset of taxpayers and penalizes evaders. The final consumption good, produced by the representative firm, is the *numéraire* and can be consumed or invested.

2.1 Preferences

Households value consumption (c), dislike labor (l) and incur a disutility cost from engaging in tax evasion (e) (Sandmo, 1981; Gordon, 1989a; Sandmo, 2005; Brizi et al., 2015; Besley et al., 2023). Preferences are given by

$$U = E_t \sum_{t=0}^{\infty} \beta^t \left[\frac{c_t^{1-\gamma}}{1-\gamma} - \chi \frac{l_t^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} - \eta \frac{e_t^{\iota}}{\iota} \right], \tag{1}$$

where $\beta \in (0, 1)$ is the discount factor, γ is the coefficient of relative risk aversion, and ϕ is the Frisch elasticity of labor supply. The parameter $\iota > 0$ controls the curvature of the evasion disutility and thus the sensitivity of optimal evasion to changes in the net benefit of hiding income. A larger ι steepens marginal disutility at higher e_t, dampening evasion when enforcement tightens or when tax rates increase, whereas a smaller ι implies a more elastic evasion response. The positive weights χ and η scale the disutility from work and from evasion, respectively.

The inclusion of tax evasion directly in preferences captures the idea that concealing income is not costless. Beyond the financial risk of audits and penalties, empirical and experimental studies suggest that individuals face psychological, social, and moral costs from dishonest behavior. These can arise from guilt, social stigma, or the internalization of social norms regarding compliance. Moreover, engaging in evasion often involves transaction costs (e.g., concealing records, arranging informal payments) that go beyond the purely pecuniary dimension. By introducing a convex disutility term, we provide a parsimonious way of capturing these non-pecuniary costs within a general equilibrium framework. This modeling choice is consistent with early theoretical work by Sandmo (1981) and Gordon (1989a), as well as more recent contributions that highlight the role of norms and intrinsic motivations in tax compliance (e.g., Brizi et al., 2015; Besley et al., 2023). The parameter η governs the strength of these costs, allowing us to capture heterogeneity in the extent to which households internalize non-pecuniary penalties from tax evasion.

2.2 Tax Code and the Household Budget Constraint

The fiscal authority levies a proportional consumption tax τ_t^c, a tax τ_t^a on asset returns, and a progressive tax on labor income. Households may attempt to evade labor-income taxation by reporting only a fraction $(1 - e_t)$ of true tax liabilities. With probability p, an evader is audited and fined at rate $\mathcal{T} \geq 0$ on the evaded liability.

The period budget constraint is

$$(1+\tau_t^c)c_t + a_{t+1} \;=\; a_t\big[1+(1-\varsigma\tau_t^a)r_t\big] \;+\; \begin{cases} y_t - T(y_t)\,(1+\mathcal{T}\,e_t), & \textit{if audited},\\ y_t - T(y_t)\,(1-e_t), & \textit{otherwise}, \end{cases} \tag{2}$$

where labor income is

$$y_t = \epsilon_t\, w_t\, l_t, \tag{3}$$

with ϵ_t denoting idiosyncratic productivity and w_t the competitive wage. The indicator ς distinguishes asset holders from debtors:

$$\varsigma = \begin{cases} 1, & \text{if } a_t \geq 0,\\ 0, & \text{if } a_t < 0, \end{cases} \tag{4}$$

so that borrowers do not pay taxes on negative asset income.

Labor-income taxation follows the flexible parametric form of Gouveia and Strauss (1994) as employed in Conesa and Krueger (2006):

$$T(y_t) = \delta_0\left[y_t - \left(y_t^{-\delta_1} + \delta_2\right)^{-\frac{1}{\delta_1}}\right], \tag{5}$$

where δ_0 scales overall tax pressure, δ_1 controls progressivity, and δ_2 shifts the effective threshold. As $\delta_1 \to 0$, the schedule converges to a proportional tax $T(y_t) = \delta_0\, y_t$; for $\delta_1 > 0$, average and marginal tax rates rise with income. This functional form matches well the income-tax schedules used in quantitative heterogeneous-agent work while remaining analytically tractable (see, e.g., Kaplan and Violante, 2010; Heathcote et al., 2017; Holter et al., 2019 and Badel et al., 2020).

Households face an exogenous borrowing limit,

$$a_{t+1} \;\geq\; -\Omega, \tag{6}$$

with $\Omega \geq 0$. When $\Omega = 0$, borrowing is ruled out; for $\Omega > 0$, debt is allowed up to the fixed limit. Idiosyncratic productivity follows a log-linear AR(1) process,

$$\log \epsilon_t = (1-\rho)\,\mu \;+\; \rho\,\log \epsilon_{t-1} \;+\; \upsilon_t, \tag{7}$$

where $\upsilon_t \sim \mathcal{N}(\mu_\upsilon, \sigma_\upsilon^2)$. Shocks are *i.i.d.* across households and over time and are realized at the start of the period before choices are made.

2.3 Household Problem

Given prices and policy, a household maximizes utility, equation (1), subject to equations (2) - (7). First-order conditions are standard, except for the terms capturing (i) the progressive labor-income schedule and (ii) the expected net benefit from evasion.

Optimal choice of hours worked must satisfy

$$\chi\, l_t^{\frac{1}{\phi}} = \frac{c_t^{-\gamma}}{1+\tau_t^c}\left[\epsilon_t w_t \;-\; \frac{\partial T(\epsilon_t w_t l_t)}{\partial l_t} \;+\; (1-p-\mathcal{T}p)\, e_t\, \frac{\partial T(\epsilon_t w_t l_t)}{\partial l_t}\right], \tag{8}$$

where a higher marginal tax on labor income reduces hours, while the term multiplied by $(1 - p - \mathcal{T}p)e_t$ captures how expected gains from evasion dampen the effective marginal tax wedge on labor, and

$$\frac{\partial T(\epsilon_t w_t l_t)}{\partial l_t} = \delta_0\, \epsilon_t w_t \left(1 - \frac{(\epsilon_t w_t l_t)^{-1}}{[1+\delta_2(\epsilon_t w_t l_t)^{\delta_1}]^{\frac{1}{\delta_1}+1}}\right).$$

Optimal evasion effort is determined by equating the marginal disutility of evasion with its expected marginal payoff, that is:

$$\eta\, e_t^{\iota-1} = \frac{c_t^{-\gamma}}{1+\tau_t^c}\,(1-p-\mathcal{T}p)\, T(\epsilon_t w_t l_t). \tag{9}$$

Evasion occurs in equilibrium only if the expected net return from hiding income is positive; we therefore restrict attention to environments in which $1-p-\mathcal{T}p > 0$, so that enforcement does not fully eliminate incentives to evade.

Optimal consumption obeys the Euler equation with a wedge from the consumption tax and, for borrowers, from the asset-income tax exemption:

$$\frac{c_t^{-\gamma}}{1+\tau_t^c} = \beta\, E_t\left[\frac{c_{t+1}^{-\gamma}}{1+\tau_{t+1}^c}\Big(1+(1-\varsigma\tau_{t+1}^a)r_{t+1}\Big)\right] + \Psi_t, \tag{10}$$

where $\Psi_t \geq 0$ is the multiplier on the borrowing constraint, which binds if and only if $\Psi_t > 0$.

Finally, the intertemporal accumulation equation mirrors the budget constraint,

$$a_{t+1} = a_t + (1-\varsigma\tau_t^a)r_t a_t + \epsilon_t w_t l_t - T(\epsilon_t w_t l_t) + (1-p-\mathcal{T}p)e_t\, T(\epsilon_t w_t l_t) - (1+\tau_t^c)c_t, \tag{11}$$

with complementary slackness,

$$\Psi_t\,[a_{t+1}+\Omega] = 0, \qquad \Psi_t \geq 0, \tag{12}$$

and feasibility

$$a_{t+1} \geq -\Omega, \quad c_t > 0, \quad 0 \leq l_t \leq 1, \quad 0 \leq e_t \leq 1. \tag{13}$$

2.4 The Firm

A representative firm produces the final good using capital K_t and effective labor L_t according to a Cobb-Douglas technology,

$$Y_t = K_t^{\alpha} L_t^{1-\alpha}, \qquad \alpha \in (0,1), \tag{14}$$

and takes prices as given. Static profit maximization,

$$\max_{K_t, L_t > 0} \{Y_t - (r_t + \delta)K_t - w_t L_t\},$$

with depreciation rate $\delta \in (0,1)$ yields the familiar factor-price conditions

$$r_t = \alpha \left(\frac{L_t}{K_t}\right)^{1-\alpha} - \delta, \tag{15}$$

$$w_t = (1-\alpha) \left(\frac{K_t}{L_t}\right)^{\alpha}. \tag{16}$$

In equilibrium, L_t is the aggregate of individual effective labor, while K_t equals the aggregate of nonnegative asset positions net of debts, as formalized below.

2.5 Wealth Distribution

Let H_t denote the cross-sectional distribution of assets across households with support $Z = [a_l, a_h] \subset \mathbb{R}^+$. The measurable space $(Z, \mathcal{Z})$ is endowed with probability measure H_t, so for any $V \in \mathcal{Z}$, $H_t(V)$ is the mass of households whose wealth lies in V. Let F_t denote the cross-sectional distribution of idiosyncratic productivity ϵ_t, induced by the stochastic process in equation (7). Together, the distributions H_t and F_t generate a joint distribution $J_t(da, d\epsilon)$ over assets and productivity.

Given household policy functions for consumption, labor supply, evasion, and savings, the evolution of wealth is governed by a transition probability function:

$$P_t(a, \epsilon, V) = \Pr\left[a_{t+1} \in V \;\middle|\; a_t = a,\, \epsilon_t = \epsilon\right], \tag{17}$$

which maps current assets and productivity shocks into next-period asset holdings.[1] Labor supply l_t is not an independent state but is endogenously determined through the household's policy function $l(a, \epsilon)$ and therefore enters the transition function only implicitly.

The law of motion for the wealth distribution is then

$$H_{t+1}(V) = \iint P_t(a, \epsilon, V)\, J_t(da, d\epsilon), \tag{18}$$

[1] Labor supply is an endogenous choice variable and therefore not part of the state vector. In the transition probability $P_t(a, \epsilon, V)$, it is implicitly determined by the household's policy function $l(a, \epsilon)$.

which describes how the cross-sectional distribution of assets evolves as a result of productivity shocks and optimal household decisions. In stationary equilibrium, H_t converges to an invariant distribution consistent with the households' optimal policies and the distribution of productivity.

2.6 Government Budget and Resource Constraint

Let Σ denote the support of the household productivity shock. The fiscal authority finances its consumption ($\mathcal{G}$) and the tax audit policy ($\mathcal{M}$) through taxes on consumption, labor and asset returns.[2]

The government budget constraint is expressed as follows:

$$\iint \left[T(\epsilon_t w_t l_t(a,\epsilon)) - (1-p-\mathcal{T}p)e_t(a,\epsilon)T(\epsilon_t w_t l_t(a,\epsilon)) + \tau_t^c c_t(a,\epsilon)\right] J_t(da,d\epsilon) + \iint_{\mathbb{S}} \tau_t^a r_t a_t J_t(da,d\epsilon) = \mathcal{G}_t + \mathcal{M}_t, \quad (19)$$

where $\mathbb{S} = \Sigma \times [0, a_h]$ represents the mass of non-indebted agents in the economy and $J_t(da, d\epsilon)$ denotes the joint distribution of wealth and household productivity. Let $\mathbb{D}$ represent the subset of households with financial debts in the economy.

The economy's resource constraint is:

$$Y_t = C_t + G_t + K_{t+1} - (1-\delta)K_t, \quad (20)$$

where:

$$K_t + \iint_{\mathbb{D}} a_t J_t(da,d\epsilon) = \iint_{\mathbb{S}} a_t J_t(da,d\epsilon), \quad (21)$$

$$L_t = \iint \epsilon_t l_t(a,\epsilon) J_t(da,d\epsilon), \quad (22)$$

$$C_t = \iint c_t(a,\epsilon) J_t(da,d\epsilon), \quad (23)$$

$$G_t = \mathcal{G}_t + \mathcal{M}_t = \mathcal{G}_t + \mathcal{C}\frac{\iint \mathcal{I}(a,\epsilon) J_t(da,d\epsilon)}{\iint J_t(da,d\epsilon)}, \quad (24)$$

and $\mathcal{I}(a, \epsilon)$ is an indicator function that takes the value 1 if the individual of type (a, ϵ) is monitored by the tax authority and 0 otherwise. The term $\mathcal{C}$ represents the cost of the audit policy borne by the tax authority, with $\mathcal{M} = \mathcal{C}p$.

[2] We assume that the fiscal authority does not issue debt and balances its budget each period. This assumption abstracts from fiscal dynamics and allows us to focus on the interaction between taxation, enforcement, and evasion. While Brazil's government debt is substantial (close to 70 percent of GDP; see Alba and McKnight, 2023, Lozano and Arias, 2021), and prior work (e.g., Fève et al., 2018) shows that debt can influence the shape of Laffer curves, our model deliberately isolates the role of tax enforcement. Extending the framework to include debt is an important direction that we will pursue in future research.

We define the stationary equilibrium for our economy in Appendix A. The steady-state equilibrium is unique, and the economy converges to this equilibrium from any initial condition (Antunes et al., 2008).

2.7 Labor Market Laffer Curve and the Tax Gap

Having established the decentralized steady-state equilibrium of our benchmark economy, we now turn to the construction of the labor-income Laffer curve and the associated tax gap. This section develops the theoretical foundations and interpretation of the Laffer curve in our environment, highlights how tax evasion modifies its shape, and sets the foundation for our quantitative analysis.

The Laffer curve (LC) for labor income relates the revenue from the fiscal authority's labor tax to the level of labor taxation. Formally, in our environment, it is given by

$$\begin{aligned} LC(w,r) &= \iint \left[(1-e(a,\epsilon))\, T(\epsilon w l(a,\epsilon))\right] J(da,d\epsilon) \\ &= \iint (1-e(a,\epsilon))\, \delta_0 \left[(\epsilon w l(a,\epsilon)) - \left((\epsilon w l(a,\epsilon))^{-\delta_1} + \delta_2\right)^{-\frac{1}{\delta_1}}\right] J(da,d\epsilon), \end{aligned} \tag{25}$$

where $J(da, d\epsilon)$ is the invariant joint distribution of wealth and productivity, and $e(a, \epsilon)$ denotes the optimal evasion rate chosen by households. The expression makes clear that aggregate tax revenue is shaped not only by the statutory schedule $T(\cdot)$ but also by endogenous choices of labor supply and evasion.

As emphasized by Laffer (2004), a change in the labor-income tax rate influences tax revenue through two distinct channels. The first is the *arithmetic effect*, which operates mechanically: raising the tax rate increases revenue collected from a given base of taxable labor income. In our model, this corresponds to adjusting the tax-schedule parameters δ_0, δ_1, and δ_2 in equation (25) while holding labor supply and evasion fixed.[3]

The second channel is the *economic effect*, which reflects behavioral responses. Higher labor-income taxation reduces the net return to work, creating a wedge between gross and net wages and thereby distorting households' optimal labor supply decisions. Assuming the substitution effect dominates the income effect, a higher tax rate lowers equilibrium labor supply $l(a, \epsilon)$, thereby shrinking the tax base.[4]

Our framework expands Laffer's analysis by introducing a third channel: the *evasion effect.*

[3] Unlike a flat tax, where the *arithmetic effect* is proportional and straightforward, the parametric schedule employed here generates nonlinear revenue responses because δ_0, δ_1, and δ_2 control both average and marginal rates across the income distribution.

[4] Laffer famously argued that the combination of the arithmetic and economic effects generates an inverted U-shaped relationship between tax rates and revenue: revenue rises with rates on the upward-sloping portion of the curve but eventually declines as the disincentive to work outweighs mechanical gains. In macroeconomics, the distortion created by the tax wedge is widely studied as a source of labor-market inefficiency - see, e.g., Hall (1997), as well as more recent evidence in Dabla-Norris and Lima (2023) and Kaymak et al. (2023).

Because households optimally choose the share of income they hide, higher statutory rates increase the marginal gain from evasion. As shown in the first-order conditions (8) - (10), this incentive raises $e(a, \epsilon)$, directly lowering the effective tax base in equation (25). The *evasion effect* therefore shifts the Laffer curve downward relative to a no-evasion benchmark, reducing revenue for any given statutory schedule.

The presence of these three channels – *arithmetic, economic, and evasion* – implies that the shape of the Laffer curve in our model cannot be understood mechanically. Instead, effective tax revenues reflect the interaction of statutory policy with households' endogenous decisions regarding labor supply and tax compliance. This observation motivates our quantitative exercise. By solving the benchmark economy and comparing it with a counterfactual economy without evasion, we can identify the role played by each channel in shaping the government's collections.

3 Quantitative Analysis

We now bring the model to the data in order to quantify the mechanisms outlined above. The goal of this section is twofold. First, we measure how the *arithmetic, economic, and evasion effects* jointly determine the shape of the labor-income Laffer curve in Brazil. Second, we exploit the heterogeneous-agent structure of the model to assess how these effects vary across the income distribution. By comparing the benchmark economy with a no-evasion counterfactual, we can isolate the quantitative importance of evasion for aggregate tax revenues as well as its distributional consequences.

3.1 Quantitative strategy and Numerical Implementation

To disentangle the contribution of the three effects, we compare the benchmark model with its no-evasion (*NE*) counterpart. Let LC^{NE} denote labor-tax revenue in an economy where evasion is exogenously ruled out:

$$LC^{NE}(w, r) = \iint \delta_0 \left[(\epsilon w l(a, \epsilon)) - \left((\epsilon w l(a, \epsilon))^{-\delta_1} + \delta_2 \right)^{-\frac{1}{\delta_1}} \right] J(da, d\epsilon). \tag{26}$$

The tax gap is defined as the shortfall in revenue due to evasion:

$$TG(w, r) = LC^{NE}(w, r) - LC(w, r). \tag{27}$$

Equation (27) captures, in reduced form, how equilibrium evasion alters government collections. In the extreme, when the labor-income tax rate is zero, revenues are trivially zero. At the other extreme, when the rate approaches 100 percent, households optimally choose not to work, again collapsing revenue to zero. Rolle's Theorem therefore guarantees an interior tax rate that maximizes collections, consistent with the classical Laffer argument (Blinder, 1981).

We calibrate our benchmark model to match key characteristics of the Brazilian economy and then simulate the empirical Laffer curve, equation (25). To examine heterogeneity, we derive labor-income Laffer curves for each decile of the income distribution and compare them to the aggregate curve to determine their relative positions.[5] We also compute the Laffer curve under the assumption that the tax authority can completely eliminate tax evasion. By comparing this counterfactual with the benchmark curve, we calculate the cost of tax evasion for Brazil, defined as the tax gap, equation (27).[6] Finally, this procedure is repeated for each quartile of the labor-income distribution, allowing us to quantify the distributional incidence of evasion.

A distinctive feature of our model is that the relationship between statutory taxation and collections is heterogeneous across the wealth and productivity distribution. Because $J(\cdot)$ embeds cross-sectional variation in assets and productivity, changes in tax rates shift revenue differently for different types of households. This heterogeneity motivates us to compute Laffer curves not only in the aggregate but also by income groups. For each decile D_i of the labor-income distribution, we define

$$LC_{D_i}(w,r) = \iint_{\{\epsilon wl(a,\epsilon)\in D_i\}} (1-e(a,\epsilon))\,\delta_0 \left[(\epsilon wl(a,\epsilon)) - \left((\epsilon wl(a,\epsilon))^{-\delta_1} + \delta_2\right)^{-\frac{1}{\delta_1}}\right] J(da,d\epsilon), \quad (28)$$

for $i = 1, \ldots, 10$. These objects allow us to trace how tax collections vary across the distribution and identify which groups are most responsive to changes in policy.

Similarly, to study the distribution of evasion itself, we compute the tax gap across quartiles of the labor-income distribution, Q_j, as

$$\begin{aligned} TG_{Q_j}(w,r) = & \iint_{\{\epsilon wl(a,\epsilon)\in Q_j\}} \delta_0 \left[(\epsilon wl(a,\epsilon)) - \left((\epsilon wl(a,\epsilon))^{-\delta_1} + \delta_2\right)^{-\frac{1}{\delta_1}}\right] J(da,d\epsilon) \\ & - \iint_{\{\epsilon wl(a,\epsilon)\in Q_j\}} (1-e(a,\epsilon))\,\delta_0 \left[(\epsilon wl(a,\epsilon)) - \left((\epsilon wl(a,\epsilon))^{-\delta_1} + \delta_2\right)^{-\frac{1}{\delta_1}}\right] J(da,d\epsilon), \quad (29) \end{aligned}$$

for $j = 1, \ldots, 4$. This decomposition makes explicit the extent to which evasion varies systematically with income, providing a natural measure of the regressivity or progressivity of tax compliance.

We employ the endogenous grid method (Carroll, 2006; Barillas and Fernández-Villaverde, 2007) to solve the model numerically, both with and without tax evasion. The basic premise of this method is straightforward: starting from an initial guess for the interest rate, we solve the system of nonlinear equations that characterize the household problem (expressions (8) - (13)). The

[5] The concept of relative position refers to the following: according to Laffer, at a given labor-income tax rate, an economy may be at the peak of the curve or on either the upward-sloping or downward-sloping segment of the aggregate Laffer curve. We analyze whether the aggregate Laffer curve and those for labor-income deciles align on the same segment, evaluating whether households across different deciles exhibit similar responses to changes in the tax rate and their corresponding impact on tax collection.

[6] This amount is commonly referred to in the literature as the tax gap. It is calculated as the difference between the taxes owed by agents and the amount of taxes not voluntarily paid (Slemrod, 2007; Alstadsaeter et al., 2019). Since the concepts of tax gap and tax evasion are closely related in our model, we use the terms interchangeably.

optimal values of the control variables are obtained from the Cartesian product of the discretized state variables. At each iteration, the household budget constraint is checked, and in the case of models with evasion, we also verify that the omitted share of labor income lies within the feasible range. The procedure is repeated until a stationary equilibrium is reached.[7]

3.2 Parameterization and Calibration

The model is calibrated to reproduce key empirical features of the Brazilian economy, focusing on 2019 as the benchmark year. We adopt this recent pre-pandemic year because it provides a clean snapshot of Brazil's fiscal structure and macroeconomic aggregates, free from the distortions introduced by COVID-19. While some studies use historical averages over longer periods, our focus is on matching the most recent (steady-state) environment in which fiscal authorities operate. This approach ensures that the simulated Laffer curves speak directly to Brazil's current fiscal capacity. The complete set of calibrated parameters and their targeted moments are summarized in Table I.

The intertemporal discount factor is set to $\beta = 0.967$, which implies a steady-state capital-to-output ratio of $K/Y = 2.43$, consistent with IPEA (*Instituto de Pesquisa Econômica Aplicada*) estimates for Brazil in 2019. Preferences are characterized by relative risk aversion $\gamma = 1.3$ and a Frisch elasticity parameter $\phi = 1.0$, both values consistent with empirical studies on the Brazilian economy (Castro et al., 2011).

The weight on leisure is calibrated to $\chi = 56.406$, ensuring that steady-state labor supply corresponds to one-third of available discretionary time (about 16 hours per day, net of sleep and basic personal care).[8] This implies an average of roughly 8 hours of work per day in steady state, consistent with observed hours worked per worker in the data, rather than relying on labor force participation rates that are not explicitly modeled in the framework.

The disutility of evasion parameter is set to $\eta = 0.185$, calibrated so that the model reproduces observed compliance in Brazil. Specifically, this value ensures that *labor-income* tax collections equal 2.64% of GDP, consistent with data from the Brazilian Federal Revenue Service (*Receita Federal do Brasil*).[9] In addition, the calibration aligns the proportion of the population declaring labor income taxes with administrative records. This strategy ties η directly to an observable compliance outcome, ensuring that the effective tax base in the model corresponds to Brazilian data. Its limitation is that it abstracts from informality, implicitly attributing all non-filing behavior to

[7] The numerical implementation presents three main challenges. First, policy functions must converge at each iteration, which we verify by comparing norms across iterations. Second, solving the nonlinear system requires well-chosen initial guesses to accelerate convergence; otherwise, computation becomes significantly slower. Finally, reaching the stationary equilibrium requires balancing the interest rate with the supply and demand for capital in the economy.

[8] According to the American Time Use Survey (ATUS), individuals aged 15 and older spend on average 9.8 hours per day on personal care activities (including sleep, grooming, and meals), leaving approximately 14–16 hours for discretionary activities (Bureau of Labor Statistics, 2024). One-third of this available time corresponds to an 8-hour workday, in line with average hours worked per worker.

[9] This calibration target refers only to direct taxes on labor income. In contrast, Table V reports total *indirect* consumption taxes, which account for a much larger share of GDP (14.21%). Our model abstracts from indirect taxation and focuses on the intensive margin of labor-income evasion.

Table I: Model Parameters - Benchmark Model

Parameters		**Target**	**Source**
	Preferences		
β: Intertemporal Discount	0.967	$K/Y = 2.43$	(1)
Ω: Borrowing Constraint	0.188	$Cred/Y = 27.31\%$	(2)
γ: Risk Aversion	1.300	–	(3)
ϕ: Frisch Elasticity	1.000	–	(3)
χ: Leisure Weight	56.406	$L = 1/3$	(4)
η: Disutility of Evasion	0.185	$IT^l/Y = 2.64\%$	(2)
ι: Elasticity of Evasion	2.000	Fixed	–
	Technology		
α: Capital Share	0.223	$r = 2.12\%$	(2)
δ: Capital Depreciation	0.071	$I/Y = 0.1715$	(5)
	Productivity		
ρ_ϵ: Shock Persistence	0.980	–	(4)
σ_υ^2: Variance of Shocks	0.045	$Gini = 0.544$	(2)
r_ϵ: Scale Factor	3.000	–	(6)
	Tax Policy		
δ_0: Max. Marginal Tax Rate	0.275	–	(2)
δ_1: Progressivity Parameter	0.520	$IT^l/Income = 10.18\%$	(2)
δ_2: Scale Parameter	0.270	$IT^l/Income = 10.18\%$	(2)
τ_t^a: Capital Income Tax Rate	0.093	$IT^a/Y = 0.53\%$	(2)
τ_t^c: Consumption Tax Rate	0.218	–	(7)
$\mathcal{T}$: Tax Penalty	1.500	–	(2)
p: Audit Rate	0.027	–	(2)

Notes: (1) IPEA - Instituto de Pesquisa Econômica Aplicada. (2) RFB/IBGE/BCB - Receita Federal do Brasil, Instituto Brasileiro de Geografia e Estatística, Banco Central do Brasil. (3) Castro et al. (2011). (4) Conesa et al. (2009). (5) Penn World Table (PWT 10.0). (6) Tauchen (1986). (7) Almeida et al. (2017).

individual disutility from evasion.[10]

The elasticity parameter governing the curvature of evasion costs is fixed at $\iota = 2.0$, ensuring convexity of utility in evasion decisions. And, household borrowing is limited by $\Omega = 0.188$, calibrated to match total credit as a share of GDP (27.31%) according to data from the Central Bank of Brazil and IBGE (*Instituto Brasileiro de Geografia e Estatística*).

The capital share of income is set to $\alpha = 0.223$, a value consistent with the average capital income share implied by a steady-state interest rate of $r = 2.12\%$ and data from the Central Bank of Brazil and IBGE. The depreciation rate of capital is calibrated to $\delta = 0.071$, chosen to reproduce

[10] An alternative approach, as in Di Nola et al. (2021), is to explicitly model the informal sector and let the extensive margin of informality govern compliance. Our approach complements this literature by focusing on the intensive margin of evasion, which allows us to quantify its impact on the labor-income Laffer curve.

the investment-to-GDP ratio of $I/Y = 17.15\%$ reported in the Penn World Table. These values jointly ensure that the model's production side aligns with observed macroeconomic ratios for Brazil.

Idiosyncratic labor productivity follows a persistent AR(1) process with persistence $\rho_\epsilon = 0.98$, following the estimates of Conesa et al. (2009). The variance of productivity shocks is set to $\sigma_v^2 = 0.045$, which ensures that the simulated distribution of household income matches Brazil's observed Gini index of 0.544, as reported by Antunes and Cavalcanti (2013). The shock process is discretized using a standard quadrature method with scale factor $r_\epsilon = 3.0$, yielding a grid of productivity states consistent with Brazilian income inequality.[11]

The benchmark labor-income tax schedule is parameterized by $\delta_0 = 0.275$, $\delta_1 = 0.520$, and $\delta_2 = 0.270$, jointly calibrated to ensure that the ratio of individual income tax collections to declared taxable income equals 10.18%, consistent with Brazilian Federal Revenue Service (RFB) data. The capital income tax rate is set to $\tau^a = 9.28\%$, which reproduces capital income tax revenues of 0.53% of GDP (RFB, IBGE). The consumption tax rate is set to $\tau^c = 21.75\%$, equal to the historical average of effective indirect tax rates reported by Almeida et al. (2017).

Regarding enforcement, the penalty on undeclared income is fixed at $T = 1.5$, in line with Brazilian tax law, while the probability of an audit is set to $p = 0.027$, consistent with RFB data indicating that 2.74% of filed tax returns were retained for inspection in 2019. Together, these values discipline the model's fiscal block with institutional details from the Brazilian system. The government expenditure-to-GDP ratio is set at 17.6%, consistent with 2019 data.[12]

Table II reports the key target statistics for the Brazilian economy together with the corresponding outcomes from our calibrated benchmark model in the stationary equilibrium. Overall, the model reproduces the Brazilian economy well across several dimensions. It closely matches the expenditure composition of GDP, with consumption, investment, and government spending ratios all within one percentage point of the data. The model also replicates the observed ratio of consumption taxes to GDP (14.21%), ensuring consistency with indirect taxation in the national accounts. On the household side, the calibration aligns the share of the employed economically active population that files an income tax return (31.2% in the model versus 32.3% in the data) and the share of taxable labor income in GDP (26.1% versus 25.9%). Finally, the benchmark economy reproduces the Brazilian income distribution reasonably well, capturing both the low shares of income in the bottom deciles and the concentration of income in the top decile, albeit with slightly less inequality than observed.

[11] We employ a finite-state Markov-chain approximation that matches the moments of the continuous AR(1) process, ensuring accuracy in the support and transition probabilities. This follows standard practice in heterogeneous agent fiscal models, e.g., Brüggemann (2021), Dyrda and Pedroni (2017) and Guo (2024).

[12] We acknowledge that this is lower than the long-run average of 38.4% reported in Lozano and Arias (2021), reflecting the recent contraction in public spending. Matching this lower value is important for consistency with our benchmark year, though in robustness checks we verify that our main results are preserved when calibrating to higher expenditure ratios.

Table II: Key Statistics: Data and Benchmark Economy.

Variables	Benchmark Model	Brazilian Economy	Source
Consumption / GDP (C/Y)	65.33%	64.99%	(1)
Investment / GDP (I/Y)	17.07%	17.15%	(1)
Government Expenditures / GDP (G/Y)	17.60%	18.35%	(1)
Consumption Tax / GDP (CT/Y)	14.21%	14.25%	(2)
% EEAP that declares tax income	31.22%	32.26%	(3)
Taxable Labor Income / GDP ($Income/Y$)	26.10%	25.90%	(3)
Income Distribution			
Decile 1	0.9%	0.8%	(4)
Decile 2	1.9%	2.1%	(4)
Decile 3	2.5%	3.1%	(4)
Decile 4	3.9%	4.2%	(4)
Decile 5	5.2%	5.4%	(4)
Decile 6	6.1%	6.8%	(4)
Decile 7	9.1%	8.3%	(4)
Decile 8	12.5%	10.9%	(4)
Decile 9	17.4%	15.6%	(4)
Decile 10	40.3%	42.8%	(4)

Sources and Notes: (1) Penn World Table (PWT 10.0). (2) STN - Brazilian Federal Treasury. (3) The percentage of the employed economically active population that declares income tax. RFB and PNAD (National Household Survey) from the IBGE. (4) PNAD (National Household Survey) from the IBGE.

3.3 Laffer Curves in Brazil

Figure 1 presents the aggregate labor income Laffer curve for Brazil. The curve exhibits the standard inverted-U shape: tax revenues rise with higher tax rates until they reach a maximum at a statutory marginal rate of 25.3%. Beyond this point, further increases in tax rates reduce collections, as the disincentive effects outweigh the mechanical gains. Since Brazil's statutory top marginal rate is 27.5%, our results imply that the economy currently operates on the *downward-sloping* portion of the curve. This means that a modest reduction in the top rate would increase total revenues, illustrating the core Laffer curve logic in a Brazilian setting.

To understand what drives this result, we decompose the aggregate curve into three distinct effects: the *arithmetic effect*, the *economic effect*, and the *evasion effect*, shown in Figure 2. The *arithmetic effect* is purely mechanical: raising the statutory tax rate increases revenues collected from a given base of labor income. The *economic effect* captures the response of labor supply: higher taxes reduce the net return to work, and households adjust hours downward, shrinking the tax base. Finally, the *evasion effect* represents households' optimal choice to hide part of their labor income, further eroding collections.

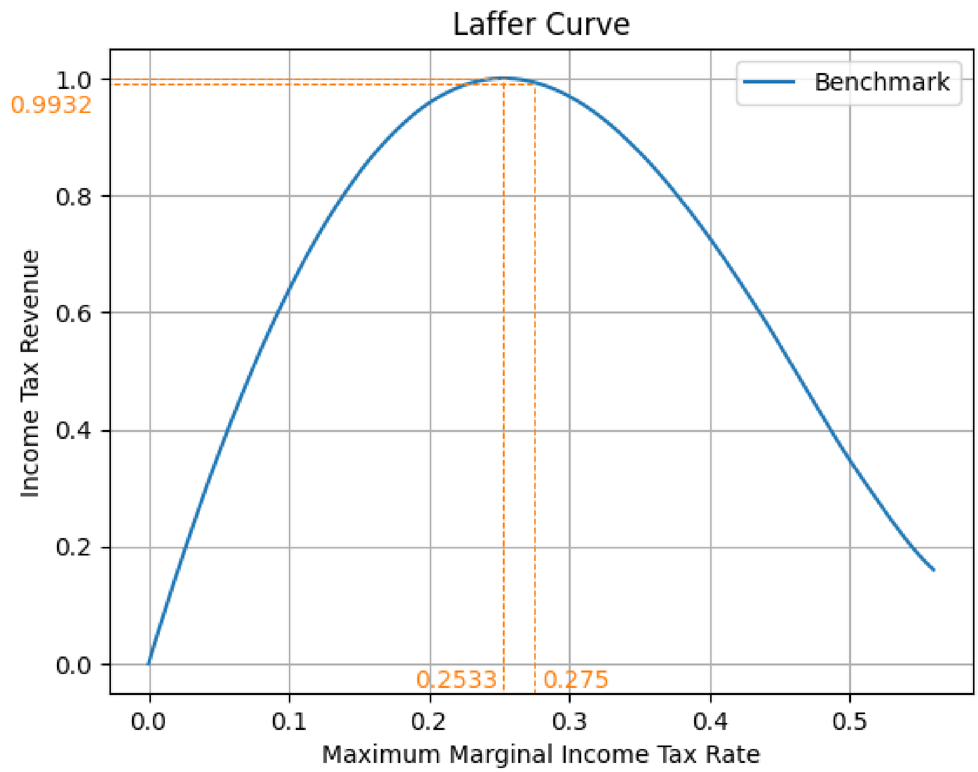

Figure 1: Aggregate labor income Laffer curve for Brazil.

The decomposition reveals that the *arithmetic effect* dominates at low tax rates, ensuring revenue growth along the upward-sloping portion of the curve. However, as the tax rate rises, the *evasion effect* becomes the principal force shaping the decline in collections. Interestingly, the economic effect remains relatively small throughout. This suggests that in Brazil, households respond to higher tax rates primarily on the *evasion margin* rather than through reductions in hours worked. In other words, when confronted with higher statutory rates, individuals choose to under-report income rather than leave the labor market. This "crowding out" of the labor-supply channel by the evasion channel effectively robs the economic effect of quantitative significance. Although the economic margin is central in many macroeconomic Laffer curve studies, our findings indicate that evasion is the crucial behavioral response in this context.

Figure 3 compares the Laffer curves across all income deciles, while Figure 4 zooms in on the top three. The contrast is pronounced. At Brazil's current statutory rate of 27.5%, the richest households are already on the downward-sloping portion of their Laffer curves, while most lower-income groups remain on the upward-sloping side. This asymmetry reveals that Brazil's progressive tax policy affects households differently depending on their position in the income distribution.

The upper deciles – particularly the top 10%, who contribute more than 65% of total labor income tax revenue – largely drive the aggregate outcome. For these groups, both the *economic effect* and the *evasion effect* are stronger: higher incomes imply greater responsiveness of labor supply and stronger incentives, as well as more opportunities, to conceal income. Consequently, their

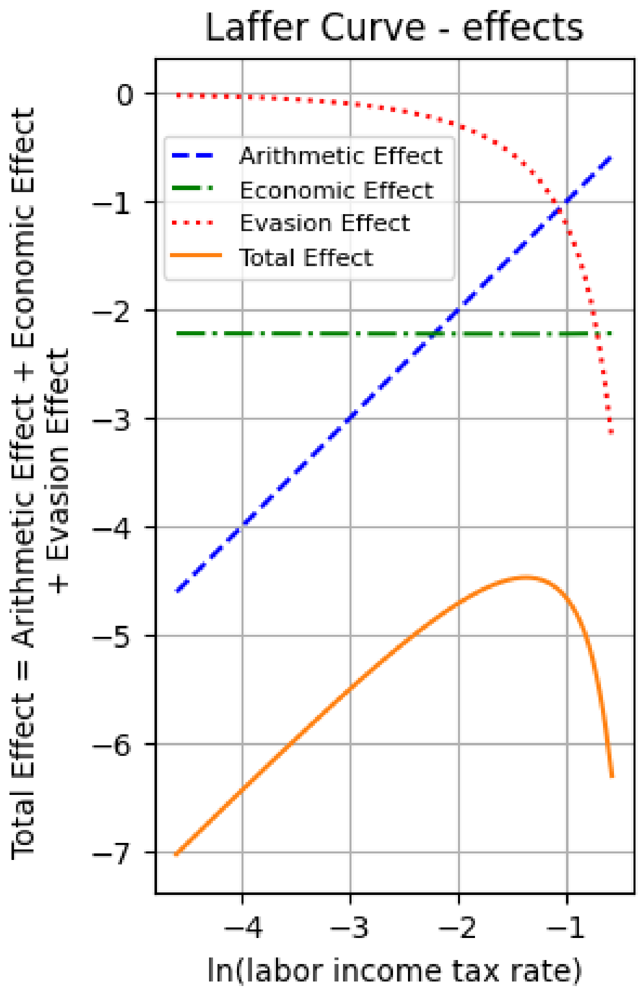

Figure 2: Decomposition of the aggregate Laffer curve.

revenue-maximizing tax rate is substantially lower than that of middle- or lower-income households. Taken together, these results underscore that the aggregate Laffer curve masks important distributional trade-offs. The tax rate that maximizes overall revenue may diverge considerably from the rates that maximize collections within specific income groups, highlighting the importance of accounting for heterogeneity when evaluating fiscal policy. Table III summarizes the revenue-maximizing tax rate (peak tax rate) and corresponding maximum revenue relative to GDP for each decile.

3.4 The Labor Income Tax Gap

We now compare the solutions of our numerical model with and without tax evasion to assess the impact of evasion on total tax collection in Brazil, both in aggregate terms and across subgroups of taxable labor income. Specifically, we simulate expressions (27) and (29) to obtain numerical estimates of the labor-income tax gap.

Estimating tax evasion poses well-known empirical challenges. By definition, individuals who engage in evasion have strong incentives to conceal their behavior to avoid penalties, including

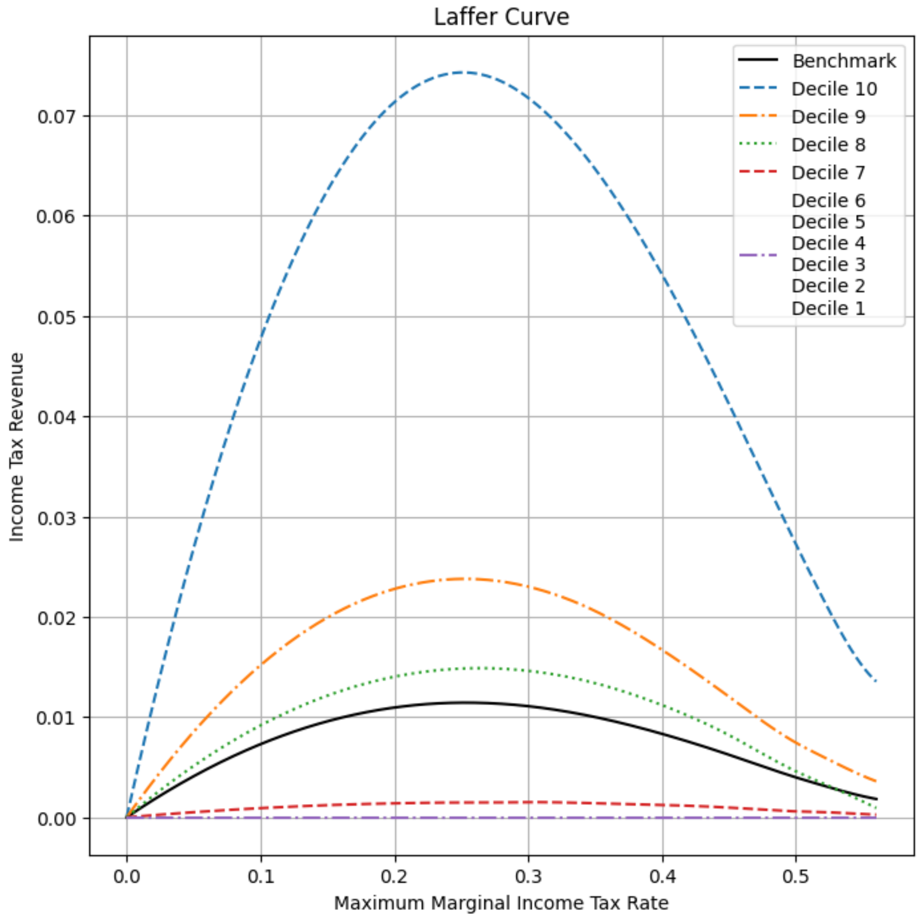

Figure 3: Laffer curves across the labor income distribution.

Table III: Summary of Decile-Specific Laffer Curves

Decile	**Peak Tax Rate %**	**Max Revenue % GDP**
1-6	0.00	0.00
7	30.35	0.03
8	26.39	0.35
9	25.28	0.55
10	25.14	1.73
Aggregate	25.33	2.66

Notes: Revenue-maximizing tax rate and corresponding maximum revenue relative to GDP for each decile.

criminal charges. As a result, available estimates vary widely depending on data, methodology, and the extent to which the informal economy is included in measurement. Our model-based approach circumvents some of these limitations by linking evasion directly to households' optimal decisions, calibrated to match observed compliance behavior in Brazil.

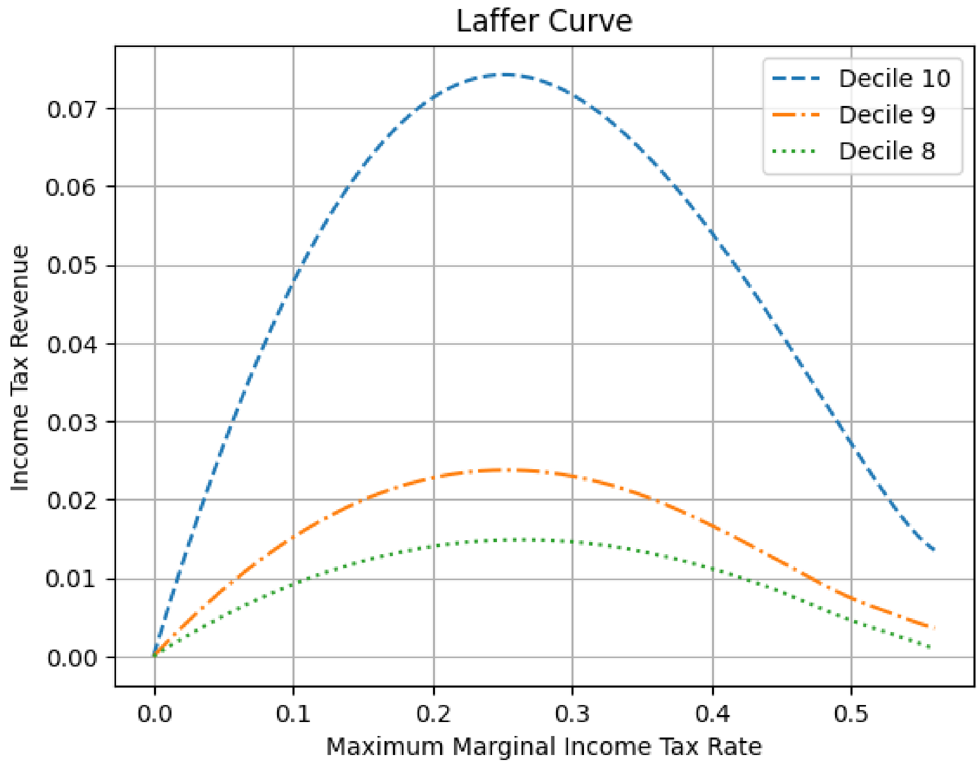

Figure 4: Laffer curves for deciles 8, 9, and 10.

At the aggregate level, the model identifies a substantial tax gap. We estimate that, on average, 54.08% of labor-income taxes owed are not paid, corresponding to 3.11% of Brazilian GDP. This magnitude is consistent with empirical evidence on Brazil's fiscal capacity. For example, Siqueira (2004), building on the Allingham and Sandmo (1972b) framework, estimated labor-income tax evasion using audit data from 1998 and found evasion rates that varied considerably across groups, though their analysis abstracted from informality.[13] Other studies also highlight regional and occupational heterogeneity, with evasion rates ranging from 12.5% to over 33%. More broadly, evidence from Latin America and the Caribbean suggests personal income tax evasion rates between 18.7% and 69.9% (Bárcena et al., 2020), placing Brazil well within the regional range.

Table IV decomposes our results across quartiles of the labor-income distribution. The heterogeneity is striking. For the first two quartiles, the model implies zero evasion of labor-income taxes.[14] For quartiles 3 and 4, however, the evasion rates are 51.74% and 54.26%, respectively.

[13]Accurately estimating tax evasion in Brazil requires accounting for the informal economy. The Brazilian Statistics Institute (IBGE) uses several surveys, including the PNAD, to adjust GDP for informality. In 2019, informal employment was estimated at 41.1% of the labor force. In our model, tax evasion is calibrated using the declared labor-income tax-to-GDP ratio as a target. When GDP includes more informal activity, the observed ratio IT^l/Y falls, which in turn implies higher equilibrium evasion.

[14]This outcome reflects the fact that households in the bottom half of the distribution fall below the statutory filing threshold of R$ 28,559.70 in 2019. By law, they are not required to pay income taxes, which implies no tax gap in our framework.

Despite similar evasion rates, the absolute contribution to the tax gap differs enormously: the third quartile accounts for only 6.76% of the total, while the top quartile accounts for 93.24%. This reflects both the higher taxable income of the top quartile and the stronger incentives and opportunities for concealment at higher income levels.

Taken together, these results reinforce two key points. First, the tax gap in Brazil is quantitatively large, amounting to more than three percent of GDP in lost revenues. Second, it is highly skewed toward the top of the distribution, where both the bulk of taxable income resides and where evasion incentives are strongest. These findings echo the broader literature emphasizing the central role of wealthy households in shaping compliance outcomes and suggest that policies aimed at reducing evasion among high-income earners could have disproportionately large effects on revenue mobilization (e.g., Alstadsaeter et al., 2023).

Table IV: Tax Evasion by Income Quartile

Quartile	**Tax Evasion Rate (%)**	**Contribution to Total Gap (%)**
1	0.00	0.00
2	0.00	0.00
3	51.74	6.76
4	54.26	93.24
Aggregate	54.08	100.00

Notes: The table reports evasion rates and contributions to the aggregate tax gap across quartiles of the labor-income distribution. 1 (lowest), 4 (highest); Values are derived from the benchmark model calibrated to Brazil in 2019.

We further examine the robustness of these findings in Section 3.5, where we conduct a sensitivity analysis of the tax gap to changes in audit probabilities and penalty parameters.

3.5 Sensitivity Analysis

We now assess the sensitivity of our benchmark results to alternative parameter values for enforcement and behavioral elasticities. This exercise is intended to verify that the main findings regarding the tax gap are not an artifact of specific calibration choices. We focus on the probability of audit and the penalty parameter. Table V reports the impact of varying the probability of monitoring (p) and the punishment parameter ($\mathcal{T}$) by $\pm 20\%$ relative to the benchmark values ($p = 2.74\%$, $\mathcal{T} = 1.5$). As expected, higher monitoring intensity or harsher penalties reduce tax evasion, while weaker enforcement raises it.

The quantitative effects, however, are asymmetric across enforcement margins. A 20% increase in the audit probability reduces aggregate evasion by 1.28%, compared to 0.76% when the penalty is raised by the same proportion. Conversely, a 20% reduction in the audit probability raises evasion by 1.26%, whereas a comparable reduction in the penalty increases evasion by only 0.78%.

These results suggest that, in the Brazilian context, changes in monitoring are more effective at curbing evasion than adjustments in the statutory penalty rate. Heterogeneity across the income distribution is also informative. Quartile 3 (middle-income households) is more responsive to changes in both p and $\mathcal{T}$ than quartile 4 (top-income households). This reflects the fact that wealthier households already have strong incentives to conceal income, so marginal changes in enforcement parameters have proportionally smaller effects on their evasion behavior.

Table V: Tax Evasion Distribution under Alternative Audit Probabilities and Penalties

Scenario	**Quartile 3 Evasion (%)**	**Quartile 4 Evasion (%)**
Benchmark: $p = 2.74\%$, $\mathcal{T} = 1.5$	51.74	54.26
+20% audit prob. ($p = 3.29\%$)	51.03	53.57
−20% audit prob. ($p = 2.19\%$)	52.42	54.95
+20% penalty ($\mathcal{T} = 1.8$)	51.31	53.85
−20% penalty ($\mathcal{T} = 1.2$)	52.15	54.68

Notes: Entries show evasion rates for quartiles 3 and 4 under alternative enforcement parameters, with aggregate tax gap reported in the bottom rows. Aggregate tax gap (benchmark): 54.08%. Aggregate tax gap (range): [53.39, 54.76]%.

Finally, we verify that our results are not sensitive to small variations in the calibrated elasticity of evasion, ι. Recalibrating the model with values close to the benchmark ($\iota = 2.0$), namely $\iota = 1.9$ and $\iota = 2.1$, leaves the main aggregates and distributional outcomes virtually unchanged. This robustness check confirms that our findings are not driven by the specific choice of ι. Detailed results are provided in Appendix B.

4 Conclusion

This paper has examined the role of tax evasion in shaping the empirical Laffer curve for Brazil. By embedding endogenous compliance decisions into a heterogeneous-agent model with incomplete markets, progressive taxation, and imperfect enforcement, we have shown that the labor-income Laffer curve is right-skewed, peaking at a marginal rate of 25.3% – below the current statutory rate of 27.5%. The results highlight the importance of a novel *evasion effect*, which reduces effective revenues when higher statutory rates induce greater concealment of income. Quantitatively, tax evasion lowers potential revenues by as much as 54% (3.1% of GDP), with losses concentrated among wealthier households. The model also replicates key macroeconomic aggregates and matches the distribution of labor income across deciles, allowing us to disaggregate the Laffer curve by income groups and reveal substantial heterogeneity in tax responsiveness.

These findings carry important policy implications. They suggest that increasing statutory labor-income tax rates in Brazil would be counterproductive, while more effective enforcement

–particularly targeted at high-income households – could expand fiscal space without exacerbating inequality. Moreover, the heterogeneity across income groups underscores that tax reforms must consider distributional consequences alongside aggregate revenue effects. For future research, extending the framework to incorporate firm-level evasion, payroll taxation, or sectoral informality would provide further insights into the interaction between enforcement and labor markets. More broadly, linking this analysis to models of fiscal capacity and public spending could help assess how improving compliance not only increases revenue but also strengthens the redistributive and developmental role of taxation in emerging economies.

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Laffer Curves in Brazil: The Tax Evasion Effect

Appendix

A The Stationary Equilibrium

Given an exogenous borrowing limit Ω, a stationary competitive equilibrium is a collection of: (i) A set of government policy instruments $(T, \tau^a, \tau^c, \mathcal{T}, \mathcal{G}, \mathcal{M})$; (ii) A price system (w, r) for wages and interest rates; (iii) Household allocations (c, a, l, e) that solve the household problem for every (a, ϵ); and (iv) A joint distribution $J(a, \epsilon)$ over assets and productivity shocks, with marginals $H(a)$ and $F(\epsilon)$ such that:

- Households and firms satisfy their optimality conditions [eqs. (8) - (13) and (15) - (16)];
- The distribution $J(a, \epsilon)$ is stationary, consistent with household policies and the stochastic process for productivity;
- The government budget constraint and the resource constraint [eqs. (20) and (21)] hold;
- Factor markets clear, with aggregate labor and capital consistent with firms' demand functions;
- Aggregate consumption and government spending correspond to household and fiscal choices [eqs. (24) and (25)].

The steady-state equilibrium is unique, and the economy converges to this equilibrium from any initial condition (Antunes et al. (2008)).

B Sensitivity - Elasticity of Evasion

As noted in the calibration section, the benchmark value of the elasticity of evasion, $\iota = 2.0$, was chosen to ensure convexity of the utility function in the evasion margin. Since no empirical benchmark exists for this parameter, we test the robustness of our findings by recalibrating the model with $\iota = 1.9$ and $\iota = 2.1$. All other parameters are adjusted so that the recalibrated economies continue to match the Brazilian targets reported in Table I.

Table B.6 shows that the predictions of the recalibrated models are virtually identical to those of the benchmark. Key aggregates—including the capital-output ratio, government expenditures, and the tax gap—remain unchanged, as does the income distribution across deciles. These results confirm that the quantitative implications of the model are not sensitive to small variations in ι.

Table B.6: Sensitivity of Results to the Elasticity of Evasion, ι

Variable	$\iota = 2.1$	$\iota = 2.0$ (benchmark)	$\iota = 1.9$
C/Y	65.34%	65.33%	65.33%
I/Y	17.06%	17.07%	17.07%
G/Y	17.60%	17.60%	17.60%
CT/Y	14.21%	14.21%	14.21%
Share declaring income tax	31.22%	31.22%	31.24%
Tax gap	54.08%	54.08%	54.08%
Decile 1	0.9%	0.9%	0.9%
Decile 5	5.2%	5.2%	5.2%
Decile 10	40.3%	40.3%	40.3%

Notes: Selected aggregates and income distribution shares under alternative calibrations of the elasticity of evasion ι. All recalibrated models preserve the Brazilian targets reported in Table I.