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Low Taxes, Low Productivity? Labor Supply, Informality and The Role of Personal Income Taxes in The MENA Region

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Abstract

This paper investigates the MENA Paradox, where low statutory personal income taxes coexist with low labor productivity and high informality, contradicting standard neoclassical predictions (Prescott, 2004). Extending the standard growth model to include a dual labor market and a comprehensive tax wedge, we argue that heavy reliance on flat-rate Social Security Contributions (SSCs) creates high effective marginal tax rates, driving workers into low-productivity informal employment. Calibrated simulations for Egypt, Morocco, Tunisia, and Jordan reveal that effective tax wedges often exceed 40%, significantly depressing formal labor supply. Counterfactual analysis suggests that rationalizing SSCs could increase aggregate productivity by 5-7% through labor reallocation. Panel regressions using neighboring tax rates as instruments confirm that higher effective tax wedges causally increase informality, and decomposition shows that regressive SSCs are the primary driver. We conclude that the region's "low tax" environment is illusory and that fiscal policy must pivot from labor taxation to broader bases to escape this low-productivity trap.

Keywords: MENA; informality; labor productivity; taxation
JEL Classifications: H21, H24, J46

ملخص

تبحث هذه الورقة في مفارقة منطقة الشرق الأوسط وشمال إفريقيا، حيث يتزامن انخفاض المعدلات القانونية لضريبة الدخل الفردي مع تدني إنتاجية العمل وتفشي القطاع غير الرسمي؛ وهو ما يتعارض مع تنبؤات النظرية الكلاسيكية الجديدة القياسية .(Prescott, 2004) وبإدراج ازدواجية سوق العمل والوتد الضريبي الشامل (Comprehensive Tax Wedge) ضمن نموذج نمو قياسي، نُبيّن أن الاعتماد المكثف على اشتراكات الضمان الاجتماعي ذات السعر الثابت (SSCs) يفرز معدلات ضريبية حدية فعلية مرتفعة، تدفع العمالة نحو وظائف غير رسمية متدنية الإنتاجية. وتكشف عمليات المحاكاة المعايرة لحالات مصر والمغرب وتونس والأردن أن الفجوة الضريبية الفعلية تتجاوز غالبًا 40%، الأمر الذي يحد بشكل ملحوظ من عرض العمل في القطاع الرسمي. كما يُشير التحليل المضاد للواقع (Counterfactual Analysis)إلى أن إعادة هيكلة اشتراكات الضمان الاجتماعي قد ترفع الإنتاجية الكلية بنسبة تتراوح بين 5% و7% عبر إعادة تخصيص الموارد العمالية بكفاءة. وتؤكد تقديرات مسوحات البيانات اللوحية—(Panel Data Regressions) باستخدام معدلات الضرائب في البلدان المجاورة كمتغيرات أداة—(Instrumental Variables) أن اتساع الأوتاد الضريبية الفعلية يقود سببيًا إلى نمو القطاع غير الرسمي، ويُظهر التفكيك التحليلي أن الطبيعة التنازلية لاشتراكات الضمان الاجتماعي تُمثل المحرك الأساسي لهذه الظاهرة. وعليه، نخلص إلى أن وصف المنطقة ببيئة "منخفضة الضرائب" هو محض وهم؛ وأن الإفلات من فخ الإنتاجية المنخفضة يتطلب تحولًا في السياسة المالية من فرض الضرائب على العمل إلى توسيع القواعد الضريبية الأخرى.

1 Introduction

The relationship between tax rates and labor supply has long been a central question in macroeconomics. In his seminal contribution, Prescott (2004) argued that the striking divergence in hours worked between Americans and Europeans since the 1970s could be explained almost entirely by differences in marginal tax rates. His neoclassical growth framework suggests that high labor taxes distort the trade-off between consumption and leisure, reducing the incentive to work in the formal market. Consequently, the policy prescription emanating from this literature is straightforward: reducing marginal tax rates should unleash labor supply, stimulate hours worked, and boost aggregate productivity.

However, when viewed through the lens of the Middle East and North Africa (MENA) region, this theoretical prediction encounters a puzzling contradiction. By standard statutory measures, many MENA economies appear to be low-tax environments. As documented by Mansour and Zolt (2023), revenues from Personal Income Taxes (PIT) in the region often amount to less than 2% of GDP, a figure that pales in comparison to the 10-15% averages observed in OECD economies. If the standard Prescott framework were to hold directly, one would expect such a low tax burden to correlate with high levels of formal labor participation and robust productivity. Yet, the empirical reality is starkly different. Labor productivity in the region remains persistently low, and informal employment rates are among the highest in the world, often exceeding 50% of the workforce (Schneider and Enste, 2000; Elgin, 2020; Elgin et al., 2021). This "MENA Paradox"?where low statutory income taxes coexist with poor labor market outcomes?reveals a critical gap in our understanding of how fiscal systems interact with labor incentives in developing economies.

This paper addresses this paradox by arguing that the standard application of neoclassical labor supply theory to the MENA region is flawed because it ignores two structural realities: the presence of a large informal sector and the composition of the tax wedge. While statutory PIT rates are indeed low, the "effective" tax burden on formal labor is significantly amplified by high mandatory Social Security Contributions (SSCs) and other payroll levies. When these contributions are accounted for, the effective marginal tax rate

on low-to-middle income workers in countries like Egypt, Morocco, and Tunisia often rivals those found in high-tax European welfare states. Furthermore, unlike in advanced economies where the choice is largely between market work and leisure (Rogerson, 2006), workers in the MENA region face a third option: employment in the informal sector. This sector, while untaxed, is characterized by significantly lower capital intensity and productivity (La Porta and Shleifer, 2014).

Existing literature has largely bifurcated into two streams that rarely intersect. On one hand, macro-labor studies following Prescott (2004) and Ohanian et al. (2008) focus predominantly on advanced economies where informality is negligible. On the other hand, development literature on informality, such as Maloney (2004) and Galiani and Weinschelbaum (2012), often treats taxation as a binary cost of entry rather than a continuous margin affecting labor supply hours. There is a scarcity of structural models that explicitly integrate the intensive margin of labor supply (hours worked) with the extensive margin of sectoral choice (formal vs. informal) within a general equilibrium framework tailored to the specific fiscal architecture of the MENA region.

This research bridges this gap and contributes to the literature in three specific dimensions. First, we extend the theoretical framework of Prescott (2004) to incorporate a dual labor market. By explicitly modeling the informal sector not just as a refuge for the unemployed but as a distinct production technology with lower productivity, we derive a "low-productivity trap." In this equilibrium, high effective tax wedges do not simply increase leisure; they reallocate labor from the high-productivity formal sector to the low-productivity informal sector, thereby depressing aggregate output per worker.

Second, we provide a more accurate measurement of the labor tax wedge in the MENA region. Standard metrics often overlook the distortionary impact of social security systems in developing countries. By combining data on PIT, employee and employer SSCs, and consumption taxes, we calculate "effective marginal tax rates" for a cross-section of MENA countries. Our calculations reveal that despite the "low tax" label, the complete tax wedge often exceeds 40% for the average formal worker. This finding challenges the conventional wisdom that taxation is not a binding constraint on growth in the region.

Third, we offer a structural explanation for the disconnect between low statutory rates and poor outcomes. We demonstrate that the specific design of MENA tax systems?characterized by narrow PIT bases and heavy reliance on flat-rate social contributions?creates a regressive distortion. This structure disproportionately penalizes formalization at the lower end of the income distribution, effectively subsidizing the informal sector. Our results suggest that the "low tax" environment is an illusion created by looking at the wrong metric; the relevant margin for the representative worker is heavily distorted.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature. Section 3 develops the calibrated general equilibrium model incorporating informal sector choices. Section 4 presents the data and calibration strategy. Section 5 presents the quantitative results and empirical analysis. Section 6 discusses policy implications, and Section 7 concludes.

2 Literature Review

This paper is situated at the intersection of three distinct strands of economic research: the macroeconomic analysis of taxes and labor supply, the development economics literature on the structural drivers of informality, and the public finance literature analyzing tax capacity in developing economies. While each strand provides crucial insights, their integration remains limited, particularly within the context of the Middle East and North Africa (MENA).

2.1 Taxation and Labor Supply: The Neoclassical Framework

The starting point for our analysis is the neoclassical growth framework, which emphasizes the role of intratemporal substitution between consumption and leisure. The seminal work of Prescott (2004) established that the aggregate labor supply elasticity is high, arguing that the divergence in hours worked between the United States and Europe since the 1970s is almost entirely attributable to differences in marginal tax rates. In this framework, taxes

on labor income and consumption effectively reduce the real wage, leading households to substitute market work for leisure. Davis and Henrekson (2004) further supported this view, providing evidence from rich-country comparisons that higher tax rates not only reduce market work hours but also alter the industry mix and increase the size of the shadow economy.

However, this "tax-centric" view has not gone unchallenged. Alesina et al. (2005) argue that labor market regulations and the power of unions are more significant determinants of European labor supply than taxes alone. They posit a "social multiplier" effect where union-negotiated work-sharing agreements and mandated vacations coordinate leisure, making non-work time more valuable. Despite this critique, subsequent research by Ohanian et al. (2008) reinforced the importance of taxes using a broader panel of OECD countries, finding that while regulations matter, the tax wedge remains the primary driver of secular trends in hours worked. Rogerson (2006) synthesized these views, demonstrating that structural transformation?specifically the movement of labor into the service sector?is highly sensitive to tax rates, a mechanism highly relevant for developing economies where the service sector is often informal.

The primary limitation of this macro-labor literature is its reliance on a single-sector model. By assuming that agents choose only between market work and leisure, these models obscure the critical choice facing workers in developing economies: the choice between taxed formal work and untaxed informal work.

2.2 The Economics of Informality: Exclusion vs. Exit

The second stream of literature focuses on the nature of the informal sector. Historically, informality was viewed through the lens of dualism, as famously modeled by Harris and Todaro (1970), where the informal sector serves as a holding ground for involuntary unemployment caused by rural-urban migration and rigid formal wages. This "exclusion" view was challenged by De Soto (1989), who argued that informality is a rational response to the prohibitive costs of regulatory compliance. In this view, the informal sector is a reservoir of entrepreneurial energy stifled by a "mercantilist" state.

More recent contributions have nuanced this debate by introducing heterogeneity. Maloney (2004) provides compelling evidence from Latin America that for many micro-entrepreneurs, informality is a voluntary "exit" choice. Workers may prefer self-employment in the informal sector to low-productivity salaried jobs in the formal sector, especially when the benefits of formalization (social security, legal protection) are perceived as low relative to the costs (taxes). Ulyssea (2018) synthesizes these perspectives by modeling both the extensive margin (firm registration) and the intensive margin (hiring informal workers), showing that high entry costs and high payroll taxes can simultaneously depress formal employment and aggregate productivity.

Crucially for our analysis, La Porta and Shleifer (2014) document a large productivity gap between formal and informal firms. They argue that informal firms are structurally different?smaller, less capital-intensive, and managed by less educated entrepreneurs?and rarely transition to formality. This suggests that tax-induced shifts into informality do not merely represent a change in legal status but a reallocation of labor to lower-productivity technologies, confirming the existence of the "low-productivity trap" modeled in this paper.

2.3 Taxation, Social Protection, and the Informality Wedge

The third relevant stream connects fiscal policy directly to the size of the informal sector. A key theoretical contribution comes from Levy (2008), who analyzes the "truncated welfare state" in Mexico. Levy argues that the combination of contributory social security (paid via payroll taxes) and non-contributory social protection (free health and subsidies for informal workers) creates a "tax on formality and a subsidy on informality." Anton et al. (2013) and Galiani and Weinschelbaum (2012) formalize this insight, showing that when social benefits are unbundled from formal employment, the implicit tax wedge on formal labor rises dramatically, incentivizing low-productivity informal activities.

This mechanism is particularly salient for the MENA region. Gatti et al. (2014) highlight that social protection systems in MENA are often fragmented, with generous but exclusive systems for public sector and formal private workers, and ad-hoc safety nets

for the rest. This creates a dual labor market where the "insider-outsider" dynamic is reinforced by fiscal policy. Furthermore, Besley and Persson (2013) note that developing states often lack the fiscal capacity to enforce broad-based income taxes, leading to a reliance on observable and easy-to-collect taxes like SSCs and consumption taxes. This reliance, as we argue, creates the high effective marginal rates that distort labor allocation.

Finally, Rauch (1991) and Loayza (1996) provide early structural models linking size-dependent enforcement and tax burdens to the "missing middle" in the firm size distribution. Our paper builds on these foundations but specifically calibrates the tax wedge using the distinct PIT and SSC structures of MENA economies, offering a quantitative assessment of how these specific policy instruments drive the region's productivity puzzle.

3 The Theoretical Framework

In this section, we develop a general equilibrium model to analyze the impact of tax systems on labor supply and informality in the MENA region. Our framework builds upon the standard neoclassical growth model used by Prescott (2004) to study cross-country differences in labor supply. However, the standard model assumes a single market sector subject to taxation. To capture the realities of developing economies in the MENA region, we extend this framework in three critical dimensions. First, we explicitly model a dual labor market where households can allocate time between a formal sector and an informal sector. Second, we incorporate a detailed tax structure that accounts for both Personal Income Taxes (PIT) and Social Security Contributions (SSCs), which drives a wedge between gross and net wages in the formal sector. Third, we introduce productivity differentials between the two sectors to reflect the "low-productivity trap" characteristic of informal employment.

3.1 The Economic Environment

Consider an economy populated by a large number of identical, infinitely lived households. Time is discrete and indexed by $t = 0, 1, 2, \ldots$. The representative household values

consumption, c_t, and leisure. Unlike the standard model where non-market time is treated as a single block of leisure, our household distinguishes between true leisure and time spent working in the informal sector only in the budget constraint. In the utility specification, we follow the standard macro practice of defining utility over consumption and total non-working time, implying that formal and informal work are perfect substitutes in terms of disutility.

The household is endowed with total time normalized to 1 per period. This time is allocated between leisure (l_t), formal market work ($h_{f,t}$), and informal market work ($h_{i,t}$):

$$l_t + h_{f,t} + h_{i,t} = 1 \tag{1}$$

The representative household's preferences are given by the standard logarithmic utility function:

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[\ln(c_t) + \alpha \ln(1 - h_{f,t} - h_{i,t})\right] \tag{2}$$

where $0 < \beta < 1$ is the subjective discount factor, and $\alpha > 0$ is the parameter governing the relative preference for leisure.

3.2 Technology

The economy consists of two distinct production sectors: a formal sector and an informal sector.

The Formal Sector The formal sector produces a composite good $Y_{f,t}$ using physical capital (k_t) and formal labor ($h_{f,t}$) via a standard Cobb-Douglas production function:

$$Y_{f,t} = A_{f,t} k_t^{\theta} h_{f,t}^{1-\theta} \tag{3}$$

where $A_{f,t}$ represents Total Factor Productivity (TFP) in the formal sector, and $\theta \in (0, 1)$ is the capital share of income. Firms in the formal sector are perfectly competitive and hire factors of production up to the point where their marginal products equal their factor prices. Crucially, the formal sector is subject to government regulation and taxation.

The Informal Sector The informal sector produces a good $Y_{i,t}$ perfectly substitutable with the formal good. However, informal production operates without recorded capital and relies solely on labor intensity. We model informal production as linear in labor but with a distinct productivity parameter $A_{i,t}$:

$$Y_{i,t} = A_{i,t} h_{i,t} \tag{4}$$

We assume that $A_{i,t} < A_{f,t}(k_t/h_{f,t})^{\theta}$ in equilibrium, reflecting the lower productivity inherent to informal activities that lack access to formal credit markets, legal protections, and economies of scale. Informal output is essentially "hidden" from the tax authorities.

3.3 Government and Fiscal Policy

The government finances public consumption G_t and transfers T_t through taxes on formal economic activity. A key innovation of this model relative to Prescott (2004) is the decomposition of the labor tax wedge. We explicitly model:

- A consumption tax rate τ_c.
- A personal income tax rate τ_{pit}.
- Social security contributions τ_{ssc}.

The government budget constraint is balanced in every period:

$$G_t + T_t = \tau_c c_t + (\tau_{pit} + \tau_{ssc}) w_{f,t} h_{f,t} + \tau_k r_t k_t \tag{5}$$

Note that for simplicity in calibration, we treat $w_{f,t}$ as the total labor cost (marginal product of labor). The tax rates τ_{pit} and τ_{ssc} are thus defined as effective shares of this total labor cost collected by the government.

3.4 The Household's Problem

The representative household chooses sequences of consumption $\{c_t\}$, capital accumulation $\{k_{t+1}\}$, formal hours $\{h_{f,t}\}$, and informal hours $\{h_{i,t}\}$ to maximize utility subject to

the budget constraint.

The household's budget constraint is given by:

$$(1+\tau_c)c_t + x_t = (1-\tau_{pit}-\tau_{ssc})w_{f,t}h_{f,t} + w_{i,t}h_{i,t} + (1-\tau_k)r_t k_t + T_t \tag{6}$$

where investment is defined by the law of motion for capital: $x_t = k_{t+1} - (1-\delta)k_t$.

The term $(1-\tau_{pit}-\tau_{ssc})w_{f,t}$ represents the net, take-home wage per hour of formal work. Since $w_{f,t}$ is the marginal product, τ_{ssc} here effectively captures the combined burden of employer and employee contributions that drives a wedge between the firm's cost and the worker's receipt.

3.5 Equilibrium Conditions

The competitive equilibrium is characterized by the first-order conditions (FOCs) of the household and firm maximization problems, along with market clearing conditions.

The firm's profit maximization in the formal sector yields the standard marginal productivity conditions:

$$w_{f,t} = (1-\theta)A_{f,t}k_t^{\theta}h_{f,t}^{-\theta} \tag{7}$$

$$r_t = \theta A_{f,t}k_t^{\theta-1}h_{f,t}^{1-\theta} \tag{8}$$

As stated, $w_{f,t}$ is the total labor cost to the firm.

For the household, the intratemporal optimality conditions describe the labor supply decisions. These conditions are pivotal for understanding the MENA labor market paradox.

Formal Labor Supply Condition The household equates the marginal rate of substitution between leisure and consumption to the effective real after-tax formal wage:

$$\frac{\alpha c_t(1+\tau_c)}{1-h_{f,t}-h_{i,t}} = (1-\tau_{pit}-\tau_{ssc})w_{f,t} \tag{9}$$

Rearranging to isolate the marginal tax wedge, we define the effective marginal tax rate on formal labor, τ, similar to Prescott (2004), but expanded to include social contributions:

$$\tau = \frac{\tau_c + \tau_{pit} + \tau_{ssc}}{1 + \tau_c} \tag{10}$$

This effective rate τ represents the fraction of additional output produced by formal labor that is captured by the government.

Informal Labor Supply Condition Similarly, the condition for informal labor supply is:

$$\frac{\alpha c_t (1 + \tau_c)}{1 - h_{f,t} - h_{i,t}} = w_{i,t} = A_{i,t} \tag{11}$$

Since informal labor is untaxed, the only distortion comes from the consumption tax τ_c.

The Formal-Informal Arbitrage By combining the two labor supply conditions, we derive the arbitrage condition governing the allocation of labor across sectors. In an interior solution where the household works in both sectors:

$$(1 - \tau_{pit} - \tau_{ssc}) w_{f,t} = A_{i,t} \tag{12}$$

Substituting the marginal product of formal labor for $w_{f,t}$:

$$(1 - \tau_{pit} - \tau_{ssc})(1 - \theta) \frac{Y_{f,t}}{h_{f,t}} = A_{i,t} \tag{13}$$

Equation (13) is the core theoretical result explaining the "low productivity" trap. It implies that labor will flow into the formal sector only up to the point where the after-tax marginal product of formal labor equals the low productivity of the informal sector.

If the tax burden ($\tau_{pit} + \tau_{ssc}$) is high, households are incentivized to shift labor hours $h_{i,t}$ into the informal sector, despite its lower inherent productivity $A_{i,t}$. This shift raises the marginal product of labor in the formal sector (by reducing $h_{f,t}$), but lowers aggregate productivity because labor is reallocated from high-productivity capital-intensive technologies to low-productivity labor-intensive activities.

3.6 Aggregation

Aggregate output (GDP) in the model economy is the sum of formal and informal production:

$$Y_{total,t} = Y_{f,t} + Y_{i,t} \tag{14}$$

The resource constraint for the economy is:

$$c_t + x_t + G_t = Y_{f,t} + Y_{i,t} \tag{15}$$

This theoretical structure allows us to quantitatively assess how changes in specific tax instruments?specifically the high SSC rates observed in MENA?distort the allocation of labor $h_{f,t}/h_{i,t}$ and depress aggregate productivity.

4 Data and Calibration

To quantitatively assess the model's predictions and test the hypothesis that tax structures drive informality and low productivity in the MENA region, we employ a combination of calibration and empirical analysis. This section details the data sources, the construction of effective tax rates, and the parameterization of the model for four representative economies: Morocco, Tunisia, Egypt, and Jordan.

4.1 Data Sources and Description

Our analysis relies on a compiled dataset. For the structural calibration of the four benchmark countries, we focus on the period **2015-2020**. This timeframe captures recent fiscal reforms while providing sufficient observations prior to the major post-2020 global inflationary shocks. For the panel regression analysis in Section 5, we utilize a broader sample covering **2010-2019**.

The primary data sources include:

1. **Macroeconomic Aggregates:** Data on GDP, household consumption, and gross fixed capital formation are drawn from the World Bank's World Development Indi-

cators (WDI) and national account statistics provided by the IMF's World Economic Outlook (WEO) database.

2. **Labor Market Indicators:** Data on total employment, hours worked, and the size of the informal sector are sourced from the International Labour Organization (ILOSTAT) and national labor force surveys. For informality, we utilize both direct measures (share of employment in the informal sector) and indirect estimates (share of GDP) from the World Bank's informal economy database (Elgin et al., 2021).

3. **Fiscal Data:** Detailed tax revenue data, including Personal Income Tax (PIT) and Social Security Contributions (SSCs), are obtained from the OECD Revenue Statistics for Africa and the IMF Government Finance Statistics (GFS).

Table 1 summarizes the key structural characteristics of the selected countries for the benchmark year 2019.

Table 1: Key Economic and Fiscal Indicators (2019)

Indicator	**Morocco**	**Tunisia**	**Egypt**	**Jordan**
GDP per Capita (PPP, Current Int $)[a]	8,143	10,756	11,763	10,007
Informal Employment (% of Total)[b]	77.3	43.9	63.3	46.0
Statutory Top PIT Rate (%)[c]	38.0	35.0	22.5	30.0
Standard VAT Rate (%)	20.0	19.0	14.0	16.0
Social Security Contribution (Total %)[d]	27.8	25.7	40.0	21.75

Sources:
[a] World Bank WDI (2019).
[b] ILO modeled estimates and World Bank "Informality and Inclusive Growth" report (2023).
[c] PWC Worldwide Tax Summaries; rates correspond to top marginal brackets.
[d] Includes employer and employee contributions. Egypt figure reflects the 1975 Social Insurance Law rates (26%+14%) applicable during the majority of the sample period; the 2019 Law No. 148 was implemented subsequently. Jordan figure reflects SSC statutory rates (14.25%+7.5%).

A critical feature of the data, as shown in Table 1, is the significant divergence between statutory income tax rates and the total tax wedge when SSCs are included. For instance, while Egypt has a relatively moderate top PIT rate of 22.5%, the total social security burden (employer plus employee) under the pre-2020 legal framework reached 40% of the basic wage bill. This creates a substantial wedge between the cost of labor to the firm and the net income received by the worker. Similarly, Morocco and Tunisia exhibit "European-style" tax wedges with high SSCs, which contrast sharply with their lower productivity levels.

4.2 Calibration of Model Parameters

We calibrate the model parameters to match the economic characteristics of our representative MENA economies. The calibration strategy follows the standard real business cycle (RBC) methodology, setting some parameters to standard values in the literature and calibrating others to match specific moments in the data.

Preferences and Technology We set the capital share of income, θ, to 0.35, which is consistent with the standard literature for developing economies (Gollin, 2002). The subjective discount factor, β, is set to 0.96, implying an annual real interest rate of approximately 4%.

The depreciation rate, δ, is set to 0.06. The preference parameter for leisure, α, is country-specific. It is calibrated so that the steady-state formal hours worked in the model, h_f, match the observed average hours worked in the formal sector for each country.

Productivity Differentials The productivity parameter for the formal sector, A_f, is normalized to 1. The crucial parameter is the informal sector productivity, A_i. We calibrate A_i to match the observed **informal employment share** (as reported in Table 1). We verify the calibration by comparing the resulting share of informal output in GDP against estimates from Elgin et al. (2021). This ensures that the model correctly replicates the size of the informal sector relative to the formal sector given the observed tax wedges. Preliminary calibration suggests that A_i ranges between 0.4 and 0.6 across the sample, confirming the "low productivity" hypothesis of the informal sector.

Effective Tax Rates Following the methodology of Prescott (2004), we compute the effective marginal tax rate on labor income, τ. However, we modify the calculation to explicitly account for the heavy reliance on social contributions in the MENA region. The effective tax rate is calculated as:

$$\tau = \frac{\tau_c + \tau_{pit} + \tau_{ssc}}{1 + \tau_c} \tag{16}$$

where τ_c is the consumption tax rate (derived from VAT revenues divided by total consumption), τ_{pit} is the average marginal personal income tax rate, and τ_{ssc} includes both employee and employer contributions expressed as a fraction of total labor cost. By including the full SSC wedge, our calculated τ is significantly higher than measures that only consider PIT, often exceeding 0.45 in the selected countries. For simplicity, we set the effective capital income tax rate $\tau_k = 0$ in the calibration, isolating the distortionary impact of the labor tax wedge.

4.3 Empirical Analysis Strategy

To complement the calibrated model and robustly test the hypothesis that tax structure drives informality, we specify an econometric model to be estimated in Section 5. We employ a panel regression approach using cross-country data for the MENA region.

The baseline specification is as follows:

$$\text{Informality}_{it} = \beta_0 + \beta_1 \tau_{it}^{eff} + \beta_2 \text{Inst}_{it} + \beta_3 X_{it} + \mu_i + \lambda_t + \epsilon_{it} \tag{17}$$

Where:

- Informality_{it} is the size of the informal sector (measured as a % of GDP to ensure consistency across the broader sample) in country i at time t.
- τ_{it}^{eff} is the computed effective marginal tax rate, which aggregates PIT, SSC, and consumption taxes.
- Inst_{it} captures institutional quality, proxied by the World Bank's Rule of Law or Control of Corruption indices. This controls for the argument that informality is driven by poor enforcement rather than tax rates.
- X_{it} is a vector of control variables including log GDP per capita, education levels, and urbanization rates.
- μ_i represents country-fixed effects to control for time-invariant unobserved heterogeneity.

- λ_t represents time fixed effects to control for common regional shocks.

We hypothesize that $\beta_1 > 0$, indicating that higher effective tax wedges are positively associated with larger informal sectors. Furthermore, we intend to decompose τ_{it}^{eff} into its components (τ_{pit} vs. τ_{ssc}) to test if social security contributions have a distinct and potentially more distortionary impact on labor market formalism than progressive income taxes.

Addressing Endogeneity: Instrumental Variable (IV) Approach A potential concern with the OLS estimation above is reverse causality. High levels of informality might erode the tax base, compelling governments to raise tax rates on the formal sector to maintain revenue, thereby creating a positive bias in β_1. To address this endogeneity, we employ an Instrumental Variable (IV) strategy.

Following the literature on tax competition (e.g., Besley and Persson, 2013), we use the *weighted average effective tax rate of neighboring countries* as an instrument for the domestic tax rate. We define neighbors as countries sharing a land border and use inverse-distance weights. The rationale is twofold. First, tax policy in the MENA region exhibits strong spatial dependence due to regional competition and policy mimicry; a country is likely to adjust its tax rates in response to its neighbors to attract investment or align with regional norms. This ensures the instrument is relevant (correlated with the endogenous regressor). Second, the tax rates of neighboring countries are unlikely to be directly determined by the domestic informality shocks of the country in question, satisfying the exclusion restriction. While regional shocks (e.g., the Arab Spring or oil price fluctuations) could affect both, the inclusion of time fixed effects (λ_t) and the specific country-pair weighting matrix helps mitigate this concern. We expect this IV approach to mitigate the attenuation bias inherent in OLS estimates and provide a causal interpretation of the tax-informality nexus.

5 Quantitative Analysis and Results

In this section, we present the quantitative findings derived from both the structural model and the econometric analysis. The analysis proceeds in three steps. First, we assess the performance of the baseline model in replicating the observed labor market duality in our sample countries. Second, we perform counterfactual simulations to isolate the impact of the tax wedge?specifically the role of social security contributions (SSCs)?on informality and aggregate productivity. Finally, we provide robust empirical evidence through panel regressions that validate the theoretical mechanisms.

5.1 Baseline Model Performance

The first step in our quantitative evaluation is to verify whether the calibrated model can reproduce the key features of the MENA labor markets for the benchmark year 2019. Table 2 compares the model-predicted values for formal hours worked and the size of the informal sector against the actual data.

The model demonstrates a strong fit with the data, particularly in capturing the cross-country variation in informality driven by fiscal structures. For Egypt and Morocco, where the effective tax wedges are highest (exceeding 45% when including employer SSCs), the model accurately predicts a large share of the labor force allocated to the informal sector.

Table 2: Baseline Model Fit vs. Data (2019)

	Informal Emp. Share (%)		**Formal Hours/Week**	
Country	**Data**	**Model**	**Data**	**Model**
Morocco	77.3	75.1	44.0	42.8
Tunisia	43.9	46.2	41.5	40.9
Egypt	63.3	65.8	43.0	44.5
Jordan	46.0	44.1	42.0	43.2

Note: Data sources are as detailed in Table 1. Model results are generated using the calibration described in Section 4.

Specifically, the model predicts an informal employment share of 65.8% for Egypt,

which is remarkably close to the observed 63.3%. This high level of informality is endogenously generated by the model's arbitrage condition (Equation 13). The high statutory SSC rate in Egypt creates a massive wedge between the marginal product of labor in the formal sector and the take-home wage. Households, optimizing their utility, shift labor hours into the informal sector until the untaxed return in the informal sector equals the after-tax formal wage. The slight overprediction in Tunisia (46.2% vs. 43.9%) may reflect the presence of public sector employment guarantees that are not explicitly modeled but which effectively subsidize formal employment.

5.2 The Tax-Informality Link: Counterfactual Simulations

Having established the model's validity, we now use it as a laboratory to test the "Low Taxes, Low Productivity" hypothesis. We conduct a counterfactual experiment: *What would happen to labor allocation and productivity if the effective tax wedge were reduced to OECD levels?*

Specifically, we simulate a reduction in Social Security Contributions (SSCs) by 50%, keeping government revenue neutral through a hypothetical lump-sum tax or a broader base. This experiment is designed to test whether the heavy reliance on SSCs is indeed the binding constraint on formalization.

Table 3 presents the percentage changes in key variables resulting from this policy shock. Sensitivity analysis (available upon request) indicates that these results are robust to variations in the calibrated informal productivity parameter A_i.

Table 3: Counterfactual Simulation: 50% Reduction in SSC Rates

Variable (% Change)	**Morocco**	**Tunisia**	**Egypt**	**Jordan**
Formal Employment (h_f)	+12.4	+8.9	+15.6	+6.2
Informal Employment (h_i)	-8.5	-5.2	-11.3	-4.1
Aggregate Productivity (Y/L)	+5.8	+3.2	+7.1	+2.5
Total Output (Y)	+4.1	+2.8	+5.4	+2.1

The results in Table 3 are striking. In Egypt, a 50% cut in SSC rates leads to a

15.6% increase in formal employment and an 11.3% contraction in the informal sector. The mechanism is straightforward: reducing the wedge increases the after-tax formal wage, making formal work relatively more attractive compared to the informal alternative. Crucially, this reallocation of labor generates a "productivity dividend." Aggregate productivity (Y/L) increases by 7.1% in Egypt and 5.8% in Morocco.

This productivity gain is not driven by technological progress (A_f is constant) but by composition effects. As workers move from the low-productivity informal sector (where $A_i < A_f$) to the capital-intensive formal sector, the economy moves up the value chain. This confirms our central hypothesis: the "low productivity" observed in the region is partly a self-inflicted wound caused by tax structures that penalize the most productive forms of employment. The effect is smaller in Jordan, reflecting its initially lower reliance on SSCs compared to Egypt and Morocco.

5.3 Econometric Evidence

To complement the structural simulations, we estimate the panel regression model specified in Section 4. We use a panel of 12 MENA countries over the period **2010-2019** (yielding 120 observations). The countries included are: Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and UAE. The dependent variable is the size of the informal economy as a percentage of GDP. While informal employment share is the theoretical object of interest, we use the GDP share for the panel regression due to its broader availability and consistency across the 12-country sample over the decade. The key independent variable is the Effective Marginal Tax Rate (τ^{eff}), decomposed into its components.

Table 4 presents the regression results. Column (1) uses the aggregate effective tax rate, while Column (2) decomposes the tax wedge to test if SSCs have a distinct impact. We include country fixed effects (μ_i) to control for time-invariant heterogeneity and time fixed effects (λ_t) to absorb common regional shocks. To address the structural heterogeneity between oil-importing economies and the Gulf Cooperation Council (GCC) states (which rely heavily on expatriate labor and have distinct fiscal structures), we perform

robustness checks excluding GCC countries, finding that the main results hold.

Table 4: Panel Regression Results: Determinants of Informality (Fixed Effects with Time Dummies)

	Dependent Variable: Informal Sector (% GDP)		
Variable	**(1) OLS**	**(2) OLS**	**(3) IV-2SLS**
Effective Tax Rate (τ^{eff})	0.42***		0.55***
	(0.09)		(0.12)
– PIT Rate		0.15*	
		(0.08)	
– SSC Rate		0.58***	
		(0.11)	
Rule of Law Index	-3.25**	-2.90**	-3.45***
	(1.10)	(1.12)	(1.05)
Log GDP per Capita	-4.10***	-4.35***	-3.95***
	(0.95)	(0.92)	(0.98)
Constant	65.4***	62.1***	60.2***
	(8.20)	(7.80)	(8.50)
Observations	120	120	115
R^2 (within)	0.68	0.72	0.65
First-Stage F-Stat	-	-	24.5

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The empirical results robustly support the theoretical predictions. In Column (1), the coefficient on the effective tax rate is positive and highly significant (0.42). Column (2) decomposes the wedge, revealing that the SSC rate (0.58) is **approximately four times** more distortionary than the PIT rate (0.15), confirming the model's mechanism that regressive flat-rate taxes are the primary driver of informality.

Column (3) presents the results of the Instrumental Variable (IV) estimation using the weighted average tax rate of neighboring countries as the instrument. The coefficient on

the effective tax rate increases to 0.55 and remains highly significant. The fact that the IV estimate is larger than the OLS estimate suggests that measurement error or attenuation bias in the OLS regression was dampening the true effect of taxes on informality. It also alleviates concerns that high informality causes high tax rates (reverse causality), reinforcing the causal interpretation that high effective taxes drive workers into the informal sector. The first-stage F-statistic of 24.5 indicates a strong instrument, well above the conventional threshold for weak instruments.

6 Policy Implications

The findings of this study present a stark challenge to the prevailing fiscal wisdom in the MENA region. For decades, the policy narrative has been dominated by the need to "mobilize domestic resources" to close fiscal deficits, often resulting in ad-hoc increases in consumption taxes and social security contributions because they are administratively easier to collect than progressive income taxes. Our results suggest that this strategy has been counterproductive. By focusing on the ease of collection rather than the incentive effects, MENA governments have inadvertently constructed a "tax trap": high effective rates on formal labor drive workers into low-productivity informal employment, shrinking the tax base and necessitating even higher rates on the remaining formal workers to fund social protection. Breaking this cycle requires a fundamental rethinking of the fiscal contract, moving beyond the illusion of low statutory PIT rates to address the reality of high effective tax wedges.

6.1 Rationalizing Social Security Contributions

The most immediate implication of our analysis is the urgent need to rationalize Social Security Contributions (SSCs). Our empirical results show that SSCs are the most distortionary component of the tax wedge, with a negative impact on formalization four times larger than that of personal income taxes. The current model, which relies on high flat-rate payroll taxes (often exceeding 25-30% of the wage bill) to fund social insurance,

acts as a heavy tax on formal job creation, particularly for low-skilled workers whose productivity may barely exceed the minimum wage.

Policymakers should consider a "fiscal devaluation" strategy. This involves shifting the financing of social protection away from labor taxes towards less distortionary revenue sources, such as Value Added Tax (VAT) or property taxes. By reducing the employer portion of SSCs and replacing the lost revenue with a slight increase in VAT, governments can reduce the cost of formal labor without compromising fiscal sustainability. This policy would directly reduce the $A_{i,t} < (1 - \tau)w_{f,t}$ gap identified in our model, making formal employment more attractive. Furthermore, introducing a progressive SSC schedule?where contributions are lower for low-wage earners?would directly target the margin where informality is most prevalent, encouraging the formalization of entry-level jobs.

6.2 Broadening the Tax Base to Relieve Labor

The "low tax" paradox in MENA is essentially a problem of a narrow base. Because capital gains, property wealth, and professional income often escape the tax net, the burden of financing the state falls disproportionately on formal wage labor. This inequity not only fuels informality but also limits the state's capacity to lower rates.

To create the fiscal space necessary to lower SSCs and labor taxes, MENA governments must broaden the Personal Income Tax (PIT) base. This entails eliminating the widespread exemptions for agricultural income, real estate speculation, and certain dividends that currently benefit high-income earners. Bringing these non-labor income streams into the tax net would allow for a revenue-neutral reduction in the tax rates applied to labor income. Moreover, strengthening the enforcement of taxes on liberal professions (doctors, lawyers, engineers), who often operate in a "semi-formal" capacity, is crucial. Digitalization of tax administration and the integration of databanks between tax authorities and banks can significantly reduce evasion in these high-income sectors, allowing for a more equitable distribution of the tax burden that supports, rather than penalizes, productive labor.

6.3 Graduated Formalization Incentives

Our model highlights the binary nature of the formal/informal choice in the current system: firms are either fully formal (facing the full brunt of taxes and regulations) or fully informal (facing none). This "cliff edge" discourages small, growing firms from crossing the threshold into formality. To bridge this gap, policy should embrace "graduated formalization."

This approach involves creating a simplified tax regime for small and micro-enterprises (SMEs) that replaces the complex array of PIT, SSCs, and VAT with a single, low-rate turnover tax (a "monotax"). Countries like Brazil and Uruguay have successfully implemented such systems (e.g., the *Simples Nacional*), resulting in significant increases in formalization. For the MENA region, a monotax that bundles social security coverage with a simplified tax payment would lower the administrative and financial barrier to entry. Crucially, this regime must be designed as a bridge, not a permanent shelter; as firms grow and their productivity increases, they should be gradually graduated into the standard tax system to avoid creating a "poverty trap" where firms artificially stunt their growth to remain in the preferential regime.

6.4 Delinking Social Protection from Employment Status

Finally, the deep structural link between formal employment and social protection is a primary driver of the region's labor market segmentation. In the current contributory system, a worker must hold a formal job to access health insurance and pension rights. This excludes the vast majority of the workforce who toil in the informal sector and creates a strong disincentive for firms to hire formally.

A transformative policy direction would be to move towards universal, non-contributory social protection floors financed from general taxation. By delinking basic health and old-age security from the employment contract, governments can achieve two goals simultaneously: extending social safety nets to the most vulnerable informal workers and removing the "tax wedge" component of social security from the cost of labor. While a fully universal system may be fiscally challenging in the short term, a gradual transition?starting

with universal health coverage financed by VAT and progressively reducing the contributory component of pensions?would significantly reduce the distortionary impact of labor taxes on employment decisions.

7 Conclusion

This paper began with a puzzle: why does the Prescott (2004) framework, which successfully explains labor supply differences between the US and Europe based on tax rates, seemingly fail in the MENA region? Standard metrics suggest that MENA countries are "low tax" economies, yet they exhibit the low labor participation and productivity typically associated with high-tax environments.

Our analysis resolves this paradox by extending the standard neoclassical model to incorporate the defining feature of developing economies: the informal sector. We demonstrate that when the analysis accounts for the full tax wedge?including the often-overlooked but burdensome Social Security Contributions (SSCs)?and the option to work in the informal economy, the behavior of MENA workers is entirely consistent with rational economic theory. They are not "culturally" predisposed to low productivity; rather, they are responding to a tax system that imposes effective marginal rates exceeding 40% on formal work, incentivizing a massive reallocation of labor into low-productivity informal activities.

The quantitative results are sobering. Our simulations suggest that this tax-induced distortion reduces aggregate productivity by approximately 6-7% in countries like Egypt and Morocco. The econometric evidence reinforces this, showing that regressive SSCs are the primary driver of informality, with a causal impact confirmed by instrumental variable analysis. The "low tax" environment is an illusion; for the representative formal worker, the state is as demanding as a European welfare state, but without the commensurate public services.

The implications for the region are critical. As MENA economies face a demographic "youth bulge" and the need to diversify away from oil, the current fiscal model is a binding constraint on growth. Continuing to rely on high labor taxes to fund exclusionary social

protection systems will only deepen the dualism of labor markets, trap millions in low-quality jobs, and stifle the productivity growth necessary for prosperity. The path forward lies in a bold fiscal reconfiguration: shifting the tax burden from labor to consumption and wealth, integrating the informal sector through graduated incentives, and building social protection floors that support workers regardless of where they work. Only by dismantling the "low productivity trap" can the region realize its full economic potential.

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